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Arizona State University

2001–2002 Graduate Catalog

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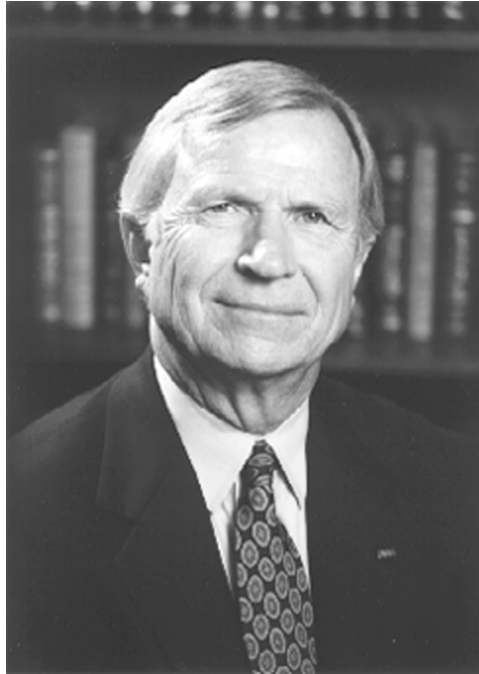
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President Lattie F. Coor

Tim Trumble photo

Dear ASU Students and Prospective Students:

I am pleased to welcome you to Arizona State University, a Research Extensive university in one of the nation's fastest-growing metropolitan areas.

I am proud of the fact that ASU continues to advance rapidly as a major national research university. This accomplishment is reflected by the talented and diverse students and faculty we have attracted, our ability to deliver quality education, achievements in research and creative activities, and the richness in our cultural diversity. We are committed to excellence in research, teaching, and professional and community service, which are all essential components of a great and engaging university.

Arizona State University is noted for its outstanding resources and environment and for faculty characterized by their creative and scholarly distinction and innovation. As well, we seek ways to create educational partnerships with the community to enrich its intellectual life and enhance the professional tenor of our programs.

We will continue to strive for excellence and to encourage creative individuals to be curious and to think critically and boldly. It is an honor to invite you to be a part of the vigorous academic community at ASU.

Sincerely,

A handwritten signature in black ink, appearing to read "Lattie F. Coor". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Lattie F. Coor
President



Bianca L. Bernstein

Tim Trumble photo

I extend a warm welcome to new and continuing graduate students at Arizona State University. Our advanced programs are a source of pride for our students, alumni, and faculty. We offer 48 doctoral and 91 master's degree programs, supported by 1,600 faculty members whose innovative teaching and groundbreaking research are recognized nationally and internationally.

A leading center for research and technological development, ASU partners with the private sector to advance the economic competitiveness and quality of life in Arizona. Benefiting from the rich resources and intellectual capital existing in the Phoenix metropolitan area, ASU is a key contributor in developing the industries and services of the New Economy. As one of the major metropolitan research universities in America, we take pride in our success in matching university talents and expertise with the vision of community leaders to shape the future.

Our faculty are at the forefront of reforming doctoral education. ASU is one of 12 institutions in the U.S. participating in the Woodrow Wilson National Fellowship Foundation's Responsive Ph.D. program to improve doctoral education in the arts and sciences. We emphasize professional development through our Preparing Future Faculty program, one of the first in the nation, and our Preparing Future Professionals program for students headed toward nonacademic careers. A prominent feature of graduate education at ASU is the wide range of opportunities for students and faculty to work together on interdisciplinary, collaborative research projects.

We are proud of our commitment to graduate education: to prepare our students to become scholars and professional leaders in a new century marked by constant change, rapid technological advances, and rich traditions. Our partnership with ASU students provides a nurturing environment to enhance their intellectual and personal growth. Please call on us if we may be of assistance.

I wish you every success in the pursuit of your goals at Arizona State University.

Cordially,

Bianca L. Bernstein
Dean of the Graduate College

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Course Prefix Index

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ACC	Accountancy	106	COE	College of Education.....	188
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AFH	African American Studies Humanities ¹		CPP	College of Public Programs	303
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AFS	African American Studies Social Science ¹		CRJ	Criminal Justice ²	
AGB	Agribusiness	109	CSE	Computer Science and Engineering.....	160
AIS	American Indian Studies ¹		CSH	Chicana and Chicano Studies Humanities ¹	
AJS	Administration of Justice ²		CSS	Chicana and Chicano Studies Social Science ¹	
AMS	American Studies ²		DAH	Dance History	177
AMT	Aeronautical Management Technology	325	DAN	Dance	177
ANP	Environmental Analysis and Programming	121	DCI	Curriculum and Instruction	171
APA	Asian Pacific American Studies ¹		DSC	Design	181
APH	Architectural Philosophy and History	121	ECD	Early Childhood Education.....	171
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ARB	Arabic ¹		ECN	Economics.....	185
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ASM	Anthropology.....	114	EET	Electronics Engineering Technology	328
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AVC	Architectural Communication ¹		EPD	Environmental Design and Planning.....	209
BCH	Biochemistry.....	147	EPE	Exercise Science/Physical Education	217
BIO	Biology	134	ERS	Environmental Resources	213
BIS	Bachelor of Interdisciplinary Studies ¹		ETC	Engineering Technology Core ¹	
BLE	Bilingual Education	170	ETH	Ethnic Studies ²	
BME	Bioengineering.....	131	ETM	Environmental Technology Management	331
BUE	Business Education.....	171	EXW	Exercise and Wellness.....	215
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CCS	Chicana and Chicano Studies ¹		FIN	Finance.....	138
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CHM	Chemistry.....	148	GIT	Graphic Information Technology.....	332
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CIS	Computer Information Systems.....	106	GLG	Geological Sciences	227
CLS	Clinical Laboratory Sciences/Medical Technology ¹				

¹ See the *General Catalog*.

² See the *ASU West Catalog*.

GPH	Physical Geography	224	MTE	Mathematics Education	263
GRA	Graphic Design	181	MUE	Music Education	275
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GRN	Gerontology	229	NOR	Norwegian ¹	
HCR	Health Care Related ¹		NTR	Nutrition	283
HEB	Hebrew ¹		NUR	Nursing	280
HED	Higher and Postsecondary Education	232	OPM	Operations Management	140
HEE	Home Economics Education ¹		PAF	Public Affairs	299
HES	Health Science ¹		PGS	Psychology	297
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HRM	Human Resources Management ²		PHY	Physics	289
HSA	Health Services Administration	231	PLA	Landscape Architecture	211
HST	History	235	PLB	Plant Biology	291
HUD	Housing and Urban Development ¹		POL	Politics ²	
HUM	Humanities	239	POR	Portuguese ¹	
IAP	Interdisciplinary Arts and Performance ²		POS	Political Science	295
IAS	Integrative Studies ²		PSY	Psychology	297
IBS	International Business Studies ¹		PUB	Scholarly Publishing	306
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INT	Interior Design	182	REL	Religious Studies	305
IPO	International Programs Overseas	50	ROM	Romanian ¹	
ISM	Information Systems Management ²		RUS	Russian	250
ITA	Italian ¹		SBS	Social and Behavioral Sciences ²	
ITM	Industrial Technology Management	332	SCA	Scandinavian ¹	
JAC	Joint Admission Continuous Enrollment ¹		SCM	Supply Chain Management	142
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JRN	Journalism	256	SEM	Science and Engineering of Materials	308
JUS	Justice Studies	244	SET	Security Engineering Technology	336
KOR	Korean ¹		SHS	Speech and Hearing Science	157
LAT	Latin ¹		SOC	Sociology	316
LAW	Law	252	SPA	Spanish	251
LES	Legal and Ethical Studies	142	SPE	Special Education	318
LIA	Liberal Arts and Sciences ¹		SPF	Social and Philosophical Foundations	309
LIN	Linguistics	206	STE	Society, Values, and Technology ¹	
LIS	Library Science	173	STP	Statistics and Probability	263
LSC	Life Sciences ²		SWE	Swedish ¹	
MAE	Mechanical and Aerospace Engineering	265	SWG	Social Work	314
MAT	Mathematics	260	SWU	Social Work ¹	
MBB	Molecular Biosciences/Biotechnology	136	TCM	Telecommunication	257
MCB	Molecular and Cellular Biology	270	THA	Thai ¹	
MCE	Multicultural Education ¹		THE	Theatre	338
MCO	Mass Communication	256	THP	Theatre Performance and Production	339
MET	Manufacturing Engineering Technology	335	TRC	Transportation Systems Certificate	342
MGT	Management	139	TWC	Multimedia Writing and Technical Communication ¹	
MHL	Music History/Literature	274	UET	Microelectronics Engineering Technology	329
MIC	Microbiology	269	UNI	Academic Success at the University ¹	
MIS	Military Science ¹		VTN	Vietnamese ¹	
MKT	Marketing	141	WAC	Writing Across the Curriculum ¹	
MSE	Materials Science and Engineering	145	WSH	Women's Studies Humanities ¹	
MTC	Music Theory and Composition	275	WST	Women's Studies ¹	

¹ See the *General Catalog*.

² See the *ASU West Catalog*.

ASU Graduate Degrees

Graduate degrees, majors, and concentrations offered by ASU Main, ASU East, and ASU West and through ASU Extended Campus are shown in the “ASU Graduate Degrees” table below, organized by the name of the major. The table points to the primary page where more information can be found. The table includes only officially approved concentrations; other informal areas of study may be available.

ASU offers these graduate degrees, abbreviated in the table below and elsewhere in the catalog:

Master of Accountancy and Information Systems (M.A.I.S.)
 Master of Architecture (M.Arch.)
 Master of Arts (M.A.)
 Master of Business Administration (M.B.A.)
 Master of Computer Science (M.C.S.)
 Master of Counseling (M.C.)
 Master of Education (M.Ed.)
 Master of Engineering (M.E.)
 Master of Environmental Planning (M.E.P.)

Master of Fine Arts (M.F.A.)
 Master of Health Services Administration (M.H.S.A.)
 Master of Mass Communication (M.M.C.)
 Master of Music (M.M.)
 Master of Natural Science (M.N.S.)
 Master of Physical Education (M.P.E.)
 Master of Public Administration (M.P.A.)
 Master of Public Health (M.P.H.)
 Master of Science (M.S.)
 Master of Science in Design (M.S.D.)
 Master of Science in Engineering (M.S.E.)
 Master of Science in Technology (M.S.Tech.)
 Master of Social Work (M.S.W.)
 Master of Taxation (M.Tax.)
 Master of Teaching English as a Second Language (M.TESL)
 Doctor of Education (Ed.D.)
 Doctor of Musical Arts (D.M.A.)
 Doctor of Philosophy (Ph.D.)
 Juris Doctor (J.D.)

ASU Graduate Degrees

Major	Degree	Concentration	Campus	Page
Accountancy and Information Systems	M.A.I.S.	—	Main	105
Aerospace Engineering	M.S., M.S.E., Ph.D.	—	Main	107
Agribusiness	M.S.	Agribusiness management and marketing, food quality assurance	East	108
Anthropology	M.A.	Archaeology, bioarchaeology, linguistics, medical anthropology, museum studies, physical anthropology, social-cultural anthropology	Main	111
	Ph.D.	Archaeology, physical anthropology, social-cultural anthropology	Main	112
Architecture	M.Arch.	—	Main	115
Art	M.A.	Art education, art history	Main	123
	M.F.A.	Ceramics, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, sculpture, wood	Main	123
Asian Languages and Civilizations—Chinese/Japanese	M.A.	—	Main	247
Bioengineering	M.S., Ph.D.	—	Main	130
Biology ¹	M.S., Ph.D.	Ecology	Main	132
Building Design	M.S.	Design knowledge and computing, energy performance and climate-responsive architecture, facilities development and management	Main	118

¹ This major has formalized concentration(s); other areas of study are available.

² Applications are not being accepted at this time.

³ This collaborative program is offered by the three state universities.

⁴ This major is jointly offered with the University of Arizona.

⁵ Students apply to this degree program through the College of Law, not the Graduate College.

ASU Graduate Degrees (continued)

Major	Degree	Concentration	Campus	Page
Business Administration	M.B.A.	—	Main	137
			West	435
	Ph.D.	Accountancy, computer information systems, finance, health services research, ² management, marketing, supply chain management	Extended	446
			Main	137
Chemical Engineering	M.S., M.S.E., Ph.D.	—	Main	143
Chemistry	M.S., Ph.D.	Analytical chemistry, biochemistry, geochemistry, inorganic chemistry, organic chemistry, physical chemistry, solid-state chemistry	Main	147
Civil Engineering	M.S., M.S.E., Ph.D.	—	Main	149
Communication	M.A.	—	Main	152
	Ph.D.	Communicative development, intercultural communication, organizational communication	Main	155
Communication Disorders	M.S.	—	Main	157
Communication Studies	M.A.	—	West	435
Composition	M.M.	—	Main	272
Computer Science	M.C.S., M.S., Ph.D.	—	Main	159
Construction	M.S.	Construction science, facilities, management	Main	163
Counseling	M.C.	—	Main	164
Counseling Psychology	Ph.D.	—	Main	166
Counselor Education	M.Ed.	—	Main	167
Creative Writing	M.F.A.	—	Main	167
Criminal Justice	M.A.	—	West	435
Curriculum and Instruction	M.A.	Bilingual education, communication arts, early childhood education, elementary education, English as a second language, Indian education, mathematics education, reading education, science education, secondary education, social studies education	Main	169
	M.Ed.	Bilingual education, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, professional studies, science education, secondary education, social studies education	Main	169
		Secondary education	Extended	447
	Ed.D.	Bilingual education, communication arts, curriculum studies, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, science education, secondary education, social studies education	Main	170

¹ This major has formalized concentration(s); other areas of study are available.

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ASU Graduate Degrees (continued)

Major	Degree	Concentration	Campus	Page
Curriculum and Instruction (continued)	Ph.D.	Art education, curriculum studies, early childhood education, educational media and computers, ² elementary education, English education, exercise and wellness education, language and literacy, mathematics education, music education, physical education, science education, special education	Main	175
Dance	M.F.A.	—	Main	177
Design	M.S.D.	Graphic design, industrial design, interior design	Main	178
Economics	M.S., Ph.D.	—	Main	184
Educational Administration and Supervision	M.Ed.	—	Main	189
	Ed.D.	—	West	435
	Ed.D.	—	Main Extended	189 447
Educational Leadership and Policy Studies	Ph.D.	—	Main	190
Educational Psychology	M.A., M.Ed.	—	Main	191
	Ph.D.	Learning; lifespan developmental psychology; measurement, statistics, and methodological studies; school psychology		
Educational Technology	M.Ed.	—	Main	194
	Ph.D.	—	Main	
Electrical Engineering	M.S., Ph.D.	—	Main	195
	M.S.E.	—	Main	195
			Extended	447
Elementary Education	M.Ed.	Bilingual education, educational technology, ESL education, reading	West	435
Engineering ³	M.E.	—	Main	200
			Extended	447
Engineering Science	M.S., M.S.E., Ph.D.	—	Main	201
English	M.A.	Comparative literature, English linguistics, literature and language, rhetoric and composition	Main	202
	Ph.D.	Literature, rhetoric/composition and linguistics	Main	203
Environmental Design and Planning	Ph.D.	Design; history, theory, and criticism; planning	Main	207
Environmental Planning	M.E.P.	Landscape ecological planning, urban and regional development, urban design	Main	209
Environmental Resources	M.S.	GIS/remote sensing, natural resource management, range ecology	East	212
Exercise and Wellness	M.S.	—	East	214
Exercise Science	Ph.D.	Biomechanics, motor behavior/sport psychology, physiology of exercise	Main	216
Exercise Science/Physical Education	M.S.	—	Main	217
Family and Human Development	M.S.	Family studies	Main	219
Family Science ¹	Ph.D.	Marriage and family therapy	Main	221

¹ This major has formalized concentration(s); other areas of study are available.

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⁵ Students apply to this degree program through the College of Law, not the Graduate College.

ASU Graduate Degrees (continued)

Major	Degree	Concentration	Campus	Page
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Geography	M.A., Ph.D.	—	Main	222
Geological Sciences	M.S., Ph.D.	—	Main	225
German	M.A.	Comparative literature, language and culture, literature	Main	228
Health Services Administration	M.H.S.A.	—	Main	230
Higher and Postsecondary Education	M.Ed., Ed.D.	Higher education	Main	232
History	M.A.	Asian history, British history, European history, Latin American history, public history, U.S. history, U.S. Western history	Main	233
	Ph.D.	Asian history, British history, European history, Latin American history, U.S. history	Main	234
History and Theory of Art ⁴	Ph.D.	—	Main	238
Humanities	M.A.	—	Main	239
Industrial Engineering	M.S., M.S.E., Ph.D.	—	Main	240
Information Management	M.S.	—	Main	182
Interdisciplinary Studies	M.A.	—	West	435
Justice Studies	M.S.	—	Main	243
	Ph.D.	Criminal and juvenile justice; dispute resolution; law, justice, and minority populations; law, policy, and evaluation; women, law, and justice	Main	245
Law ⁵	J.D.	—	Main	77
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Materials Engineering	M.S., M.S.E.	—	Main	201 259
Materials Science	M.S.	—	Main	201
Mathematics	M.A., Ph.D.	—	Main	259
Mechanical Engineering	M.S., M.S.E., Ph.D.	—	Main	264
Microbiology	M.S., Ph.D.	—	Main	268
Molecular and Cellular Biology	M.S., Ph.D.	—	Main	270
Music	M.A.	Ethnomusicology, music history and literature, music theory	Main	272
	D.M.A.	Choral conducting, music composition, music education, solo performance (instrumental, keyboard, piano pedagogy, voice)	Main	273
Music Education	M.M.	Choral music, general music, instrumental music, jazz studies	Main	272
Natural Science	M.N.S.	Biology, chemistry, geological sciences, mathematics, microbiology, physics, plant biology	Main	278
Nursing	M.S.	Adult health nursing, community health nursing, community mental health/psychiatric nursing, family health nursing, nursing administration, parent-child nursing, women's health	Main	279

¹ This major has formalized concentration(s); other areas of study are available.

² Applications are not being accepted at this time.

³ This collaborative program is offered by the three state universities.

⁴ This major is jointly offered with the University of Arizona.

⁵ Students apply to this degree program through the College of Law, not the Graduate College.

ASU Graduate Degrees (continued)

Major	Degree	Concentration	Campus	Page
Nutrition	M.S.	—	East	282
Performance	M.M.	Music theatre/opera musical direction, music theatre/ opera performance, performance pedagogy, piano accompanying, solo performance (instrumental, keyboard, voice)	Main	272
Philosophy	M.A., Ph.D.	—	Main	284
Physical Education	M.P.E.	—	Main	217
Physics	M.S., Ph.D.	—	Main	287
Plant Biology ¹	M.S., Ph.D.	Ecology, photosynthesis	Main	291
Political Science	M.A., Ph.D.	American politics, comparative politics, international relations, political theory	Main	293
Psychology	Ph.D.	Behavioral neuroscience, clinical psychology, cognitive/behavioral systems, developmental psychology, environmental psychology, quantitative research methods, social psychology	Main	296
Public Administration	M.P.A.	Public information management, public management, public policy analysis and evaluation, urban manage- ment and planning	Main Extended	298 448
	Ph.D.	—	Main	301
Public Health ³	M.P.H.	Community health practice, health administration and policy	Main	302
Recreation	M.S.	—	Main	303
Religious Studies	M.A.	—	Main	304
Science and Engineering of Materials	Ph.D.	High-resolution nanostructure analysis, solid-state device materials design	Main	307
Secondary Education	M.Ed.	Educational technology	West	435
Social and Philosophical Foundations of Education	M.A.	—	Main	309
Social Work	M.S.W.	Advanced direct practice; planning, administration, and community practice	Main	310
	—	—	West	435
	Ph.D.	—	Main	312
Sociology	M.A., Ph.D.	—	Main	316
Spanish	M.A.	Comparative literature, language and culture, linguistics, literature	Main	317
	Ph.D.	Cultural studies, literature		
Special Education	M.A., M.Ed.	—	Main	317
		Gifted mildly disabled, multicultural exceptional, severely multiply disabled	Main	317
		Infants and young children	West	317
Speech and Hearing Science	Ph.D.	Developmental neurolinguistic disorders, neuroauditory processes, neurogerontologic communication disorders	Main	319
Statistics	M.S.	—	Main	321
Taxation	M.Tax.	—	Main	322

¹ This major has formalized concentration(s); other areas of study are available.

² Applications are not being accepted at this time.

³ This collaborative program is offered by the three state universities.

⁴ This major is jointly offered with the University of Arizona.

⁵ Students apply to this degree program through the College of Law, not the Graduate College.

ASU Graduate Degrees (continued)

Major	Degree	Concentration	Campus	Page
Teaching English as a Second Language	M.TESL	—	Main	322
Technology	M.S.Tech.	Aeronautical engineering technology, aviation human factors, aviation management technology, computer systems engineering technology, electronic systems engineering technology, environmental technology management, fire service administration, global technology and development, information technology, instrumentation and measurement technology, management of technology, manufacturing engineering technology, mechanical engineering technology, microelectronics engineering technology, security engineering technology	East	323
Theatre	M.A.	—	Main	336
	M.F.A.	Performance, scenography, theatre for youth	Main	337
	Ph.D.	Theatre for youth	Main	338

- ¹ This major has formalized concentration(s); other areas of study are available.
- ² Applications are not being accepted at this time.
- ³ This collaborative program is offered by the three state universities.
- ⁴ This major is jointly offered with the University of Arizona.
- ⁵ Students apply to this degree program through the College of Law, not the Graduate College.



Arizona's climate enables students to gather together outdoors for group study.

Ken Sweat photo

Concurrent and Dual Degrees

Concurrent or Dual Degrees	Administered By	Campus	Page(s)
Juris Doctor/Master of Health Services Administration	College of Law/School of Health Administration and Policy	Main	77, 230
Juris Doctor/Master of Science in Economics*	College of Law/Department of Economics	Main	77, 184
Juris Doctor/Doctor of Philosophy in Justice Studies	College of Law/Committee on Law and Social Sciences	Main	77, 247
Master of Business Administration/Juris Doctor	College of Business/College of Law	Main	62, 77
Master of Business Administration/Master of Accountancy and Information Systems	College of Business	Main	62, 105
Master of Business Administration/Master of Architecture	College of Business/School of Architecture	Main	62, 118
Master of Business Administration/Master of Health Services Administration	College of Business	Main	62, 230
Master of Business Administration/Master of Science in Information Management	College of Business	Main	62, 182
Master of Business Administration/Master of International Management	College of Business/American Graduate School of International Management (Thunderbird); ESAN, Lima, Peru; Groupe Ecole Supérieure de Commerce, Toulouse, France; ITESM-CEM, Mexico City, Mexico; and Universidad Carlos III de Madrid, Madrid, Spain	Main	62
Master of Business Administration/Master of Science (Economics)	College of Business	Main	62, 184
Master of Business Administration/Master of Taxation	College of Business	Main	62, 322
Master of Science in Engineering (Industrial Engineering)/Master of International Management of Technology	Department of Industrial and Management Systems Engineering/American Graduate School of International Management (Thunderbird)	Main	240
Master of Science in Justice Studies/Master of Arts in Anthropology	School of Justice Studies/Department of Anthropology	Main	244
Master of Science in Nursing/Master of Health Services Administration	College of Nursing/School of Health Administration and Policy	Main	279

* Applications for this program are not being accepted at this time.

ASU Certificates

Students may pursue some certificate programs along with a major and other certificate programs independently. Graduate certificates and postbaccalaureate certificates are available to students who already hold a bachelor's degree. Graduate certificates constitute graduate work; postbaccalaureate certificates are distinct from graduate certificates

and are an extension of the undergraduate curriculum. See the "ASU Graduate Certificates" and "ASU Postbaccalaureate Certificates" tables below for certificates offered by ASU Main, ASU East, and ASU West and through ASU Extended Campus. For information on undergraduate certificates, see the *General Catalog*.

ASU Graduate Certificates

Certificate	Administered By	Campus	Page
Geographic Information Science, Interdisciplinary Certificate in	Graduate College	Main	222
Gerontology Certificate	Graduate College	Main Extended	228 448
Indian Law Certificate	College of Law	Main	78
Medieval Studies Certificate	Arizona Center for Medieval and Renaissance Studies (ACMRS)	Main	268
Museum Studies Certificate	Department of Anthropology	Main	112
Nonprofit Leadership and Management Certificate	College of Public Programs	Main	278
Post-Bachelor's Artist Diploma	School of Music	Main	271
Post-Master's Nurse Practitioner Certificate	College of Nursing	Main	279
Renaissance Studies Certificate	ACMRS	Main	268
Scholarly Publishing Certificate	Department of History	Main	306
Statistics, Certificate in	Committee on Statistics and the Graduate College	Main	320
Translation Certificate	Department of Languages and Literatures	Main	247
Transportation Systems Certificate	Committee on Transportation Systems and the Graduate College	Main	342

ASU Postbaccalaureate Certificates

Certificate	Administered By	Campus	Page
Accountancy, Postbaccalaureate Certificate in	School of Management	West	434
Communication and Human Relations, Postbaccalaureate Certificate in	College of Human Services	West	434
Gerontology Certificate	College of Human Services	West	434
Multimedia Writing and Technical Communication, Postbaccalaureate Certificate in	East College	East	65
Professional Accountancy, Postbaccalaureate Certificate in	School of Management	West	434

Graduate College Calendar

April 2001

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

May 2001

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

June 2001

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

July 2001

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

August 2001

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

2001

Check the 2001 *Summer Sessions Bulletin* for details and to confirm these dates.

Mon., Feb. 5–
Wed., May 30

Registration and drop/add for first five-week session and eight-week session

Mon., Feb. 5–
Tues., July 3

Registration and drop/add for second five-week session

Tues., Apr. 24

Final tuition payment deadline for all summer sessions (For students who register on or after the deadline, fees are due daily)

Mon., May 28

Memorial Day Holiday

Tues., May 29

Instruction begins for first five-week session and eight-week session

Tues., June 5

Unrestricted course and complete withdrawal deadline for first five-week session

Tues., June 5

Unrestricted course and complete withdrawal deadline for eight-week session

Fri., June 15

Restricted course withdrawal deadline for first five-week session and eight-week session

Fri., June 22

Restricted complete withdrawal deadline for first five-week session

Fri., June 29

First five-week session ends

Mon., July 2

Instruction begins for second five-week session

Wed., July 4

Classes are excused for Independence Day

Fri., July 6

August graduation filing deadline (must be met to have name appear in commencement program)

Mon., July 9

Unrestricted course and complete withdrawal deadline for second five-week session

Fri., July 13

Restricted complete withdrawal deadline for eight-week session

Fri., July 13

Deadline to submit thesis or dissertation for format review to Graduate College and schedule defense

Fri., July 20

Eight-week session ends

Fri., July 20

Restricted course withdrawal deadline for second five-week session

Fri., July 27

Restricted complete withdrawal deadline for second five-week session

Fri., July 27

Last day to hold oral examination in defense of a thesis or dissertation

Wed., July 31

Last day to obtain signature of the Graduate College dean for thesis or dissertation approval and to submit to ASU Bookstore for binding by 3 P.M.

Fri., Aug. 3

Second five-week session ends

Fri., Aug. 3

Commencement

2001

Fall Semester

Check the fall 2001 *Schedule of Classes* for details and to confirm these dates.

Thurs., Mar. 29–

Preregistration

Fri., Apr. 6

Mon., Apr. 23–

Drop/add

Sun., Aug. 26

August 2001

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

September 2001

S	M	T	W	T	F	S
						1
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9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

October 2001

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November 2001

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

December 2001

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

January 2002

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Wed., Apr. 25–
Sun., Aug. 26
Tues., July 31

Wed., Aug. 1
Mon., Aug. 13–
Tues., Aug. 14

Mon., Aug. 13–
Sat., Aug. 18

Tues., Aug. 14–
Wed., Aug. 15

Wed., Aug. 15
Thurs., Aug. 16
Thurs., Aug. 16

Mon., Aug. 20

Mon., Sept. 3

Fri., Sept. 14

Mon., Oct. 1

Tues., Oct. 2

Mon., Oct. 15–
Fri., Oct. 19

Fri., Oct. 19

Fri., Oct. 26

Mon., Nov. 12

Wed., Nov. 21

Thurs., Nov. 22–
Fri., Nov. 23

Wed., Nov. 28

Tues., Dec. 4

Wed., Dec. 5

Fri., Dec. 7

Thurs., Dec. 6–
Sat., Dec. 8;
Mon., Dec. 10–
Wed., Dec. 12

Tues., Dec. 11

Thurs., Dec. 13

Fri., Dec. 14

Sat., Dec. 15

Thurs., Dec. 27

Registration

Final tuition payment deadline for fall 2001
(For students who register on or after the deadline,
fees are due daily)

Early Teaching Assistant Orientation (8 A.M.–5 P.M.)

New Teaching Assistant Orientation and activities (8 A.M.–12 P.M.)

International Student Orientation and activities

Welcoming orientation for all new graduate students, Memorial
Union, Arizona Room (7–9 P.M. Tuesday, 10 A.M.–noon
Wednesday)

Residence halls open

New Faculty and Academic Professional Orientation and Reception

Workshops for new graduate students, Memorial Union, Arizona
Room (8 A.M.–5 P.M.)

Instruction begins

Classes are excused for Labor Day

Unrestricted withdrawal deadline

Winter session (College of Extended Education [CEE]) registration
begins

Thesis/Dissertation Workshop, Memorial Union,
Ventana Room (3–5 P.M.)

Semester midpoint

December graduation filing deadline (must be met to have name
appear in commencement program)

Restricted course withdrawal deadline

Classes are excused for Veterans Day

Last day to submit materials for thesis or dissertation format review
and oral defense

Classes are excused for Thanksgiving recess

Restricted complete withdrawal deadline

Instruction ends

Reading day

Last day to hold oral examination in defense of a thesis or
dissertation

Final examinations

Last day to obtain signature of the Graduate College dean for thesis
or dissertation approval and to submit to ASU Bookstore for
binding by 3 P.M.

Commencement (4 P.M.)

Some residence halls close for semester break

Midyear recess begins

Winter session (CEE) instruction begins

January 2002

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

February 2002

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

March 2002

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

April 2002

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May 2002

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

June 2002

S	M	T	W	T	F	S
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9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

2002

Check the spring 2002 *Schedule of Classes* for details and to confirm these dates.

Mon., Oct. 29– Preregistration
Tues., Nov. 6, 2001

Mon., Nov. 19, 2001– Drop/add
Fri., Jan. 18, 2002

Wed., Nov. 21, 2001– Registration
Fri., Jan. 18, 2002

Tues., Dec. 18, 2001 Final tuition payment deadline for spring 2002
(For students who register on or after the deadline,
fees are due daily)

Tues., Jan. 1, 2002 Winter session classes are excused for New Year's Day

Mon., Jan. 7 New Teaching Assistant Orientation

Mon., Jan. 7– International Student Orientation and activities
Sat., Jan. 12

Tues., Jan. 8 New Graduate Student Orientation begins

Wed., Jan. 9 Residence halls open

Fri., Jan. 11 Winter session (CEE) instruction ends

Mon., Jan. 14 Instruction begins

Mon., Jan. 21 Classes are excused for Martin Luther King Jr. Day

Fri., Feb. 8 Unrestricted withdrawal deadline

Tues., Feb. 12 Thesis/Dissertation Workshop, Memorial Union,
Ventana Room (3–5 P.M.)

Sun., Mar. 10– Classes are excused for spring recess; semester midpoint
Sun., Mar. 17

Fri., Mar. 22 May graduation filing deadline (must be met to have name appear in
commencement program)

Fri., Mar. 29 Restricted course withdrawal deadline

Fri., Apr. 19 Last day to submit materials for thesis and dissertation format
review and oral defense

Thurs., Apr. 25 Restricted complete withdrawal deadline

Tues., Apr. 30 Instruction ends

Wed., May 1 Reading day

Thurs., May 2– Final examinations
Sat., May 4;

Mon., May 6–
Wed., May 8

Fri., May 3

Last day to hold oral examination in defense of a thesis or
dissertation

Tues., May 7 Last day to obtain signature of the Graduate College dean for thesis
and dissertation approval

Tues., May 9 Last day to submit to ASU Bookstore binding for thesis and
dissertation (due by 3 P.M.)

Thurs., May 9 Commencement

Fri., May 10 Residence halls close

2002**Summer Sessions**

Check the 2002 *Summer Sessions Bulletin* for details and to confirm these dates.

Mon., Feb. 4– Registration and drop/add for first five-week session
Wed., May 29 and eight-week session

April 2002

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May 2002

S	M	T	W	T	F	S
		1	2	3	4	
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

June 2002

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

July 2002

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

August 2002

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Mon., Feb. 4–
Tues., July 2
Tues., Apr. 30

Mon., May 27
Tues., May 28
Tues., June 4

Fri., June 14

Fri., June 21

Fri., June 28

Mon., July 1

Thurs., July 4

Fri., July 5

Mon., July 8

Fri., July 12

Fri., July 12

Fri., July 19

Fri., July 19

Fri., July 26

Fri., July 26

Tues., July 30

Tues., July 30

Fri., Aug. 2

Fri., Aug. 2

Registration and drop/add for second five-week session

Final tuition payment deadline for all summer sessions
(For students who register on or after the deadline,
fees are due daily)

Memorial Day Holiday

Instruction begins for first five-week session and eight-week session

Unrestricted course and complete withdrawal deadline for first five-week session and eight-week session

Restricted course withdrawal deadline for first five-week session and eight-week session

Restricted complete withdrawal deadline for first five-week session

First five-week session ends

Instruction begins for second five-week session

Classes are excused for Independence Day

August graduation filing deadline (must be met to have name appear in commencement program)

Unrestricted course and complete withdrawal deadline for second five-week session

Restricted complete withdrawal deadline for eight-week session

Last day to submit materials for thesis and dissertation format review and oral defense

Eight-week session ends

Restricted course withdrawal deadline for second five-week session

Restricted complete withdrawal deadline for second five-week session

Last day to hold oral examination in defense of a thesis or dissertation

Last day to obtain signature of the Graduate College dean for thesis and dissertation approval

Last day to obtain submit to ASU Bookstore binding for thesis and dissertation (due by 3 P.M.)

Second five-week session ends

Commencement

Frequently Asked Questions

Admission Information? Requests for applications should be directed to Graduate Admissions at 480/965-6113 or gradadmiss@asu.edu. For more information, visit www.asu.edu/graduate/admission on the Web.

Advising? The Graduate College Advising Office is open to prospective and admitted graduate students. For an appointment, call 480/965-3521 or stop by Wilson Hall, center lobby. Students admitted to degree programs should first seek advising within their programs.

Application Fee Waiver? ASU cannot waive, defer, or refund the fee. A decision cannot be made on your application until the \$45 application processing fee is paid.

Campus Map? See the "ASU Main Map," inside back cover; "ASU East Map," page 426; "ASU West Map," page 436; "ASU Downtown Center Map," page 451; and "ASU Vicinity Map," page 453. The Graduate College (Wilson Hall, center lobby) also distributes maps of the campus and parking facilities. Maps are also available at the ASU Bookstore, 480/965-3191.

Catalog? Once admitted, you receive a free copy. This copy is mailed to you if your address is in the United States, or you may present your letter of admission at the Graduate College to receive your free copy. Catalogs are also available in the ASU Bookstore, 480/965-3191, for a fee of \$4.

Corresponding with ASU? Address letters to: Department or Office Name, Arizona State University, Tempe, AZ 85287. For information regarding the progress of your file during the admission process, access the Graduate College Web site at www.asu.edu/graduate and click on Studies at ASU for department e-mail addresses and Web site links, or send inquiries to Graduate Admissions, and the staff will forward it to the proper office.

Degree Programs and Departments? For specific information about faculty, programs, application requirements, and deadlines, contact the academic unit directly, by mail or by phone. Unsure? Contact the Graduate College Advising Office, 480/965-3521.

Employment on Campus? The Student Employment Office, 480/965-5186, maintains and posts up-to-date employment information for jobs on campus.

Financial Assistance? Loans? Assistantships? Scholarships?

First. Your best source of information is the academic unit to which you are applying; its director of graduate study can provide information, guidance, and application forms for scholarships, assistantships, and fellowships specific to that program. Most units set early deadlines and require special forms or procedures.

Second. Information about loans, scholarships, grants, work-study, and employment opportunities is available through the Graduate College Student Financial Assistance Office, Wilson Hall, 480/965-3521. For more information, access www.asu.edu/graduate/financial.html on the Web, or send e-mail to gradaid@asu.edu.

Third. At a college or public library, ask a reference librarian for publications to help you find scholarships and fellowships.

Fourth. If you now attend school, ask your advisor for guidance in finding information on financial assistance in your discipline.

Financial Guarantee? International applicants must provide explicit verification from their banks that funds equal to the amount specified on the Financial Guarantee Form are available to them. (A general assurance of good credit is not accepted.) For more information, access www.asu.edu/graduate/admission on the Web.

Housing?

On Campus. Cholla Apartments house graduate students and should be specifically requested for campus housing on applications instead of other facilities; contact Residential Life, 480/965-3515 or reslife@asu.edu. University housing is available for married students or families only at ASU East campus. For more information, access www.asu.edu/reslife on the Web.

Off Campus. Information is available from the ASASU Tenants/Commuter Students Association, 480/965-6246. Tempe, Mesa, Scottsdale, and Phoenix newspapers advertise many rentals.

I-20/IAP-66 Forms? ASU issues visa forms permitting attendance at ASU only. ASU issues the I-20 or IAP-66 only after receiving an acceptable Financial Guarantee Form and admitting the student to a graduate degree program.

Immunization? Students born after December 31, 1956, must receive a measles immunization or offer proof of measles immunity. Direct questions to Student Health Center, 480/965-3346. For more information, access www.asu.edu/health on the Web.

International Student Association? Call the International Student Office, 480/965-7451, after arriving on campus. For more information access www.asu.edu/vpsa/studentlife/iso on the Web.

Internet Information? ASU Web: www.asu.edu; ASU Graduate College: www.asu.edu/graduate.

Letters of Recommendation? Send these letters to the director of graduate study in the academic unit to which you are applying.

Phone Numbers? Call the campus operator Monday through Friday, 8 A.M. to 5 P.M., at 480/965-9011. Unsure about who to call? Contact a Graduate College advisor, 480/965-3521.

Registration? Contact the Office of the Registrar, 480/965-3171, or the academic unit to which you are applying.

Release of Information to Friends? By law, staff members can give personal information only to the applicant. If you want us to release information to another person, you must authorize us to do so. Send a letter to Graduate Admissions naming the person who may represent you. Sign the letter with your name as it appears on your application form.

Research and Support Facilities? The academic unit to which you are applying is your best source of information about library resources, computing facilities, and research laboratories in your field. Contact the program's director of graduate study.

Teacher Certification? Students who select nondegree and degree graduate programs at ASU are eligible for Arizo-

na teacher's certification. Contact the Office of Student Affairs, College of Education at 480/965-5555.

TOEFL Scores? ASU accepts score reports from *only* the Educational Testing Service, Princeton, New Jersey, or from a sponsor organization such as LASPAU or the Institute of International Education.

Transcripts? For a full description of the ASU policy on transcripts, see "Transcripts," page 41.



A view from inside the Memorial Union

Tim Trumble photo

General Information

MISSION

Arizona State University has emerged as a leading national and international research and teaching institution with a primary focus on Maricopa County, Arizona's dominant population center. This rapidly growing, multicampus public research university offers programs from the baccalaureate through the doctorate for approximately 49,700 full-time and part-time students through ASU Main in Tempe; ASU West in northwest Phoenix; a major educational center in downtown Phoenix; ASU East, located at the Williams Campus (formerly Williams Air Force Base) in southeast Mesa; and other instructional, research, and public service sites throughout Maricopa County. ASU is a modern university that applies its research capabilities to the rapidly evolving needs of Maricopa County and the state.

Arizona State University's goal is to become a world-class university in a multicampus setting, one of the very best public universities in the nation. Its mission is to provide outstanding programs in instruction, research, and creative activity, to promote and support economic development, and to provide service appropriate for the nation, the state of Arizona, and the state's major metropolitan area. To fulfill its mission, ASU places special emphasis on the core disciplines and offers a full range of degree programs—baccalaureate through doctorate. To become competitive with the very best public universities, ASU recognizes that it must offer quality programs at all degree levels in a broad range of fundamental fields of inquiry. ASU will continue to dedicate itself to superior instruction; to excellent student performance; to original research, creative endeavor, and scholarly achievement; and to outstanding public service and economic development activities. As a result of this dedication, ASU was awarded the prestigious Research I (now referred to as Research Extensive) university status in 1994, recognizing ASU as a premier research institution.

ORGANIZATION

Arizona State University is part of a university system governed by the Arizona Board of Regents, a body with perpetual succession under the constitution and laws of Arizona. The board consists of eight citizens appointed by the governor of the state for terms of eight years, and two students with the elected governor and state superintendent of public instruction as members *ex officio*.

The regents select and appoint the president of the university, who is the liaison between the Arizona Board of Regents and the institution. The president is aided in the administrative work of the institution by the provosts, vice presidents, deans, directors, department chairs, faculty, and other officers. Refer to "Administrative Personnel," page 416.

The academic units develop and implement the teaching, research, and service programs of the university, aided by the university libraries, museums, and other services.

The faculty and students of the university play an important role in educational policy, with an Academic Senate, joint university committees and boards, and the Associated Students serving the needs of a large institution.

ACADEMIC ACCREDITATION AND AFFILIATION

See "Accreditation and Affiliation," page 454.

EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION

It is the policy of ASU to provide equal opportunity through affirmative action in employment and educational programs and activities. Discrimination is prohibited on the basis of race, color, religion, national origin, citizenship, sex, sexual orientation, age, disability, special disabled veteran, other eligible veteran, or Vietnam-era veteran status. Equal employment opportunity includes but is not limited to recruitment, hiring, promotion, termination, compensation, benefits, transfers, university-sponsored training, education, tuition assistance, and social and recreational programs.

ASU is committed to taking affirmative action in increasing opportunities at all levels of employment and to increasing participation in programs and activities by all faculty, staff, and students. Affirmative action is directed toward minority persons, women, special disabled veterans, other eligible veterans, Vietnam-era veterans, and persons with disabilities.

University Policy Prohibiting Discriminatory Harassment

Harassment Prohibited. Subject to the limiting provisions of "Freedom of Speech and Academic Freedom" specified below, it is a violation of university policy for any university employee or student to subject any person to harassment on university property or at a university-sponsored activity.

Harassment Defined. Actions constitute harassment if (1) they substantially interfere with another's educational or employment opportunities, peaceful enjoyment of residence, physical security, and (2) they are taken with a general intent to engage in the actions and with the knowledge that the actions are likely to substantially interfere with a protected interest identified above. Such intent and knowledge may be inferred from all the circumstances.

Freedom of Speech and Academic Freedom. Neither this nor any other university policy is violated by actions that amount to expression protected by the state or federal constitutions or by related principles of academic freedom. This limitation is further described in the ASU First Amendment Guidelines, the current version of which supplements this policy and is available in the Office of the General Counsel.

Relationship to the Work of the Campus Environment Team. If harassment is discriminatory, it falls within the education, monitoring, reporting, and referral functions of the Campus Environment Team. Harassment is discriminatory if taken with the purpose or effect of differentiating on the basis of another person's race, sex, color, national origin, religion, age, sexual orientation, disability, or Vietnam-era veteran status.

INTERGROUP RELATIONS CENTER

The only center of its kind on a college campus, the Intergroup Relations Center (IRC) works with students, staff, and faculty to promote positive intergroup relations, to prepare students for living in a diverse democracy, to create greater understanding between the different groups that exist at ASU, and to provide faculty, staff, and students opportunities to explore the rich diversity that is part of the ASU campus community. Through structured interaction programs, including intergroup dialogues, story circles, retreats, and institutes and via educational and training workshops, the center promotes diversity as one of the university's greatest assets. The educational work of the center encompasses gender, race/ethnicity, sexual orientation, age, disability status, nationality, adult reentry, and other salient social identities found at ASU.

Some of the programs and initiatives offered by the center include Voices of Discovery, a six-week student intergroup dialogue program that brings together small groups of African Americans and white/EuroAmericans, males and females, American Indians and white/EuroAmericans, Latinos and white/EuroAmericans, gays, lesbians, bisexuals, heterosexuals, and other groups to interact with and learn about each other. Leadership 2000, an annual four-day, off-campus retreat brings together 80 students from many different backgrounds to explore their own and others' diversity. Allies in Action, a diverse group of students sponsored by the IRC, works together to improve intergroup relations on the campus. Intergroup Relations Theatre and Music programs use the arts to interactively involve, entertain, and educate participants about issues of diversity. The center also offers programs for faculty and staff addressing issues of diversity in the workplace and the classroom and custom-designed programs, consultation, and intergroup conflict mediation services for a wide range of campus offices, academic departments, and student groups.

For more information, visit the center in SSV 278, call 480/965-1574, or access the IRC Web site at www.asu.edu/provost/intergroup.

HISTORY OF ARIZONA STATE UNIVERSITY

On February 26, 1885, House Bill 164, "An Act to Establish a Normal School in the Territory of Arizona," was introduced in the 13th Legislative Assembly of Arizona Territory by John Samuel Armstrong. The bill, strongly supported by Charles Trumbull Hayden of Tempe, passed the House on March 6 and the Council on March 11 and was signed by Governor F.A. Tritle on March 12, 1885, thereby founding the institution known today as Arizona State University. Under the supervision of Principal Hiram Bradford Farmer, instruction was instituted on February 8, 1886, when 33 students met in a single room on land donated by George and Martha Wilson of Tempe.

The institution began with the broad obligation to provide "instruction of persons...in the art of teaching and in all the various branches that pertain to good common school education; also, to give instruction in the mechanical arts and in husbandry and agricultural chemistry, the fundamental law of the United States, and in what regards the rights and duties of citizens."

With the growth of the state, especially the surrounding Phoenix metropolitan area, the school has carried forward

this charter, accompanied by successive changes in scope, name, and governance.

The Early Years. For the first 14 years, the school was governed by six principals. At the turn of the century and with another new name, Normal School of Arizona, President Arthur John Matthews brought a 30-year tenure of progress to the school.

He assisted in changing the school to an all-college student status; the Normal School had enlisted high school students who had no other secondary educational facilities in Arizona. He embarked on a building schedule that included the state's first dormitories. Of the 18 buildings constructed while Matthews was president, six are still in use. His legacy of an "evergreen campus," with the import of many shrubs and trees and the planting of Palm Walk, continues to this day: the main campus is a nationally recognized arboretum.

Matthews also saw to it that the Normal School was accredited outside the state. His service on national education organization boards was conducive to this recognition. The school remained a teacher's college in fact and theory during Matthews' tenure, although the struggle to attain status as a university was ongoing.

An extraordinary event occurred March 20, 1911, when former President Theodore Roosevelt visited the Tempe school and spoke from the steps of Old Main. He had dedicated the Roosevelt Dam the day before and was impressed with Arizona. He noted that construction of the dam would benefit central Arizona's growth and that of the Normal School. It would be another year before the territory became a state.

During the Great Depression, Ralph W. Swetman was hired as president for a three-year term. This was a time of uncertainty for educational institutions. Although enrollment increased due to the depression, many faculty were terminated and faculty salaries were cut. The North Central Association became the accrediting agency for Arizona State Teachers College.

The Gammage Years. In 1933, Grady Gammage, then president of Arizona State Teachers College at Flagstaff, became president of Arizona State Teachers College at Tempe, a tenure that would last for nearly 28 years.

The Graduate Division was created in 1937, and the first master's program was established the same year.

On March 8, 1945, the three state institutions of higher learning came under the authority of one Arizona Board of Regents, which oversees ASU today.

The phenomenal growth of the college began after the end of World War II. Dr. Gammage had foreseen that the G.I. Bill of Rights would flood campuses everywhere with returning veterans. Many of the veterans who had received military training in Arizona had fallen in love with the state and vowed to return after the war. The numbers within one year were staggering: in the fall semester of 1945, 553 students were enrolled; over the weekend semester break in January 1946, enrollment increased 110 percent to 1,163 students. Successive semesters saw continuing increased enrollment.

Like his predecessor, Dr. Gammage oversaw the construction of a number of buildings. His greatest dream, that of a great auditorium, came to fruition after his death. He laid the groundwork for it with Frank Lloyd Wright, who

designed what is now the university's hallmark building, Grady Gammage Memorial Auditorium, built in 1964.

Years of Growth and Stature. During the 1960s, with the presidency of Dr. G. Homer Durham, Arizona State University began its academic rise with the establishment of several new colleges (the College of Fine Arts, the College of Law, the College of Nursing, and the School of Social Work) and the reorganization of what became the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences. Perhaps most important, the university gained the authority to award the Doctor of Philosophy and other doctoral degrees.

The next three presidents—Harry K. Newburn, 1969–71, John W. Schwada, 1971–81, and J. Russell Nelson, 1981–89—and Interim President Richard Peck, 1989, led the university to increased academic stature, expansion of the campuses, and rising enrollment.

On January 1, 1990, Dr. Lattie F. Coor, a native Arizonan, became 15th in the institution's succession of principals and presidents. He has highlighted undergraduate education, research, cultural diversity, and economic development as the "four pillars" of the university's agenda. He has taken steps in these areas by further defining the role of ASU West and by initiating the establishment of ASU East.

In 1996, "The University for the Next Century" initiative, involving campus and community members, developed a set of general goals to guide the university at the turn of the millennium. By making selective investments in people, programs, and new practices, ASU will be a prototype of the major metropolitan research university of the future.

In 1997, President Coor publicly launched the ASU Campaign for Leadership, a \$400 million fund-raising campaign designed to transform ASU into *the* model metropolitan research university for the 21st century. Funds raised through the campaign, which continues through 2001, are targeted to the areas that will most significantly impact the future of ASU: Great Teachers, Great Students, and Great Communities. Among the campaign's achievements thus far are the naming and endowing of the Barrett Honors College, the Herberger College of Fine Arts, and the Morrison School of Agribusiness and Resource Management at ASU East; the creation of many new endowed faculty positions and hundreds of new scholarships and fellowships; and the enhancement of programs and facilities across the university.

As of fall 2000, ASU was the fourth largest university in the nation with approximately 50,000 students.

Research Extensive Status. ASU was named a Research I (now referred to as Research Extensive) university by the Carnegie Foundation for the Advancement of Teaching in early 1994. Nationally, 88 universities have been granted this status, indicating successful garnering of support for research projects and educating future scientists.

Athletics

The original nickname for the Normal School of Arizona athletic teams was the Owls. Athletics other than Sunday hikes and lawn tennis were not part of the early curriculum.

During President Matthews' tenure, some team competition began. The Tempe Bulldogs saw some interesting and rough competition with the University of Arizona Wildcats. In the 1940s, the college's teams became the Sun Devils.

In 1979, the university joined the Pacific-10 Conference. In 1987, ASU became the first Arizona football team to play in the Rose Bowl, defeating the University of Michigan Wolverines 22–15. ASU made its second appearance in 1997 against Ohio State.

In 2000, ASU finished 11th nationally in the Sears Directors' Cup, which recognizes the top athletic programs in the country. Six teams finished in the top 20 nationally with three teams posting top 10 finishes. Men's swimming and diving finished 10th, women's tennis finished in a tie for fifth, while men's indoor track and field also finished 10th.

Graduate College

Graduate education at ASU began with the creation of the Graduate Division in 1937 and the establishment of the first master's program the same year. For the first 20 years, graduate education focused exclusively on professional programs in education. During the 1950s as the campus grew and broadened its mission, a number of new degree programs appeared, significantly enhancing the role of graduate studies on the campus. By the early 1960s, graduate programs were established in many disciplines; humanities, social science, and science fields were well represented, as were professional programs in business, engineering, fine arts, and public administration. With this expansion of the mission of the campus came new facilities and the development of a wider range of research interests and activities.

Major changes in the nature and role of graduate education came in the early 1960s when the first Ph.D. programs were established in chemistry, education, engineering, English, physics, and psychology. The research focus of campus programs grew at a rapid pace. Master's programs matured as doctoral programs were added. From the late 1960s to the present, campus facilities for instruction, research, and advanced study significantly expanded to support university programs with the construction of new laboratories, classroom structures, and two large libraries—including a new main library and a separate science and engineering library.

UNIVERSITY CAMPUSES AND SITES

ASU Main. ASU Main is located near the heart of metropolitan Phoenix in the city of Tempe (population 163,626). Nearby are the municipalities that make up the fast-growing Valley of the Sun: Chandler, Gilbert, Glendale, Mesa, Scottsdale, and other communities.

ASU Main comprises more than 700 acres and offers outstanding physical facilities to support the university's educational programs.

The campus is characterized by broad pedestrian malls laid out in an easy-to-follow grid plan, spacious lawns, and subtropical landscaping. ASU Main offers more than 80 programs leading to bachelor's degrees and more than 140 programs leading to graduate degrees.

ASU East. ASU East opened at the Williams Campus in the fall of 1996 and now serves approximately 2,000 students. ASU East offers many of the features of a small residential college in a rural area while providing access to the resources of a major research university and the amenities of a large metropolitan area.

The campus offers excellent educational facilities and residential opportunities, which include a choice of traditional residence halls or two- to five-bedroom homes. A

shuttle service provides transportation between ASU East and ASU Main. The 600-acre ASU East campus is easily accessible via major interstate routes.

For more information, see “ASU East,” page 424.

ASU West. ASU West is a growing anchor campus of Arizona State University that offers primarily upper-division undergraduate and graduate degree programs, plus certificates, in diverse professional fields. Starting in fall 2001, the campus admits freshmen for the first time since its founding in 1984.

As a commuter campus, ASU West offers an array of innovative student services to help working families achieve their educational goals: A child development center, academic advising, and writing support services are just a few examples.

At ASU West, students enjoy a friendly, small-campus atmosphere while benefiting from the resources of a major research university.

The campus is located in northwest Phoenix between 43rd and 51st Avenues on West Thunderbird Road. The core campus was completed in 1991 and features a variety of state-of-the-art classroom and student service buildings, including Fletcher Library, the Sands Classroom Building, the Computer Laboratory/Classroom Building, Kiva Lecture Hall, the University Center Building, and the Faculty/Administration Building.

For more information, see “ASU West,” page 433. For complete information and course listings, see the *ASU West Catalog*.

ASU Extended Campus. The ASU Extended Campus (www.asu.edu/xed) goes beyond the boundaries of the university’s three physical campuses to provide access to quality academic credit and degree programs for working adults through flexible schedules; a vast network of off-campus sites; classes scheduled days, evenings, and weekends; and innovative delivery technologies, including television, the Internet, and independent learning. The ASU Extended Campus offers programs in partnership with the campuses and colleges of ASU, including a variety of professional continuing education programs. The ASU Downtown Center is the anchor location of the ASU Extended Campus. Lifelong learning opportunities are offered to students of all ages throughout Maricopa County and Arizona through the ASU Extended Campus.

ASU Downtown Center. Located in downtown Phoenix, 502 E. Monroe, the ASU Downtown Center offers a variety of daytime and evening courses of interest to employees in private businesses and government agencies and to individuals seeking personal growth and enrichment. These courses are scheduled at a variety of convenient times and offered through various modes of delivery. Professional continuing education, certificate programs, and lecture series are also available. Access to ASU library information and resources, ASU computing resources, and the Internet is available through the center’s computer lab.

ASU Research Park. The mission of the ASU Research Park (researchpark.asu.edu) is to enhance Arizona’s high-value research-based economic development and to build the university’s capacity to educate and advance knowledge. To this end, the Research Park serves to attract new corporate and regional headquarters and research and develop-

ment firms to Arizona—headquarters and firms that broaden the base for potential research, interact with graduate students, consult with university faculty, cosponsor seminars on research topics, and provide employment opportunities for ASU graduates.

The Research Park has numerous major tenants, including ASM Lithography, Avnet CMG, Bright Horizons Family Solutions, Cytec Fiberite, Iridium, Lakeside Technology Center, Motorola Flat Panel Display, Motorola University, National Association for Purchasing Management, PKS Information Services, Transamerica Research Center, VLSI Technology, and Walgreens Healthcare Plus. A 50,000-square-foot multitenant building has been developed by Transamerica Corporation, and the Lakeside Technology Center, a 44,000-square-foot multitenant building, has been developed by the park itself.

Camp Tontozona. Located in the famed Mogollon Rim country near Kohl’s Ranch, northeast of Payson, this continuing education facility serves the needs of academic departments conducting teaching and research in mountain terrain. The camp is also available to faculty, staff, graduate students, and alumni for family use. For more information, call 480/965-6851.

Deer Valley Rock Art Center. Deer Valley Rock Art Center, located two miles west of the Black Canyon Freeway on Deer Valley Road, is operated by the ASU Department of Anthropology in consultation with the Hopi, Yavapai, and Gila River Indian tribes. It includes more than 1,500 petroglyphs that cover the eastern slope of Hedgpeth Hills. For more information, call 623/582-8007.

The Arboretum. The Arboretum at Arizona State University is the entire 722-acre main campus. The Arboretum is home to a flourishing oasis of plants from around the world. This virtual outdoor classroom includes more than 300 species of trees and other woody ornamental and herbaceous plants from diverse geographic regions as well as the Sonoran Desert. The Arboretum contains one of the best collections of palms and conifers in the desert Southwest and a growing collection of native Southwestern plants. The Arboretum’s date palm collection has received international recognition by the American Association of Botanical Gardens and Arboreta North American Plant Collection Consortium.

The Arboretum’s collection began with Arthur J. Matthews. By the time Matthews’ 30-year presidency was finished, nearly 1,500 trees of 57 species and more than 5,700 feet of hedges were planted. One of his most enduring landscape projects was the planting of Mexican Fan Palms along Palm Walk in 1916, which extends from University Drive south to the Student Recreation Complex. Today the Arboretum has expanded its collection to include nearly 4,000 trees of 164 species/varieties.

The Arboretum is open to the public free of charge 365 days a year from dawn to dusk. Walking tours of the various collections and points of interest are designated by signage denoting those areas. Many of the plants in the collection throughout campus are marked with identification plaques.

UNIVERSITY LIBRARIES AND COLLECTIONS

The collections of the university’s libraries comprise more than 3 million volumes, approximately 7 million

microform units, and more than 33,000 periodical and serial subscriptions. Computer access to commercially and locally produced databases and the ability to borrow research materials from other libraries enhance local resources. ASU is a member of the Association of Research Libraries and the Center for Research Libraries.

For telephone numbers, see the "ASU Main Directory," page 343. For more information, access the Web site at www.asu.edu/lib.

Charles Trumbull Hayden Library. The Charles Trumbull Hayden Library, designed by Weaver and Drover in 1966, houses the largest multidisciplinary collection at ASU. In addition to the open stack areas, separate collections and service areas include Access for Disability Accommodations; Circulation; Current Periodicals and Microforms; Government Documents Services; Interlibrary Loan and Document Delivery Services; Library Instruction, Systems, and Technology (L.I.S.T.); Reference; Reserve; Special Collections; and Archives and Manuscripts, which includes the Arizona Collection, the Chicano Research Collection, the Benedict Visual Literacy Collection, and the Labriola National American Indian Data Center. Archives and Manuscripts holds the papers of several major Arizona political figures, including Senator Carl Hayden, with historic materials about Arizona, Chicano, and Indian affairs.

The Special Collections department includes the Child Drama Collection, and collections of materials by and about William S. Burroughs, the Press of Thomas Bird Mosher, and the Patten Herbal Collection. For more information, access the Web site at www.asu.edu/lib/hayden.

Architecture and Environmental Design Library. A branch of the University Libraries, located in the College of Architecture and Environmental Design/North building, contains collections pertinent to areas of study within the college, the Materials Resource Center, and the Architectural Drawings Collection. For more information, access the Web site at www.asu.edu/caed/AEDlibrary.

Arizona Historical Foundation. Under a cooperative agreement with ASU, the Arizona Historical Foundation houses a library of several thousand volumes, manuscript collections, maps, and photographs, and a large collection of audiovisual materials. Housed in the Charles Trumbull Hayden Library, the collection's focus is on the history of Arizona and the Southwest. For more information, access the Web site at www.users.qwest.net/~azhistoricalfdn.

Fletcher Library. Located at the ASU West campus, Fletcher Library utilizes a range of electronic systems, from compact discs to telecommunications networks, to provide access to resources and delivery of materials. Its holdings include more than 315,000 volumes, 5,000 serial subscriptions, and 1.4 million microforms selected to complement ASU West course offerings.

Law Library. The John J. Ross–William C. Blakley Law Library is located on McAllister Avenue. See "Organization," page 77, for more information.

Music Library. A large collection of music scores, recordings, books, music reference materials, and listening facilities for individuals and groups is located on the third floor of the Music Building, West Wing. For more information, access the Web site at www.asu.edu/lib/music.

Daniel E. Noble Science and Engineering Library. The Daniel E. Noble Science and Engineering Library houses books, journals, and microforms in the sciences, engineering, and nursing; the Map Collection; and the U.S. Patent and Trademark Depository. For more information, access the Web site at www.asu.edu/lib/noble.

University Archives. The University Archives collection is available for use at the Luhrs Reading Room in Hayden Library. The collection (1885–present) comprises university theses and dissertations; administrative records of the university; historical photographs and personal papers of faculty, staff, and alumni; and student, faculty, and official university publications. The historic University Archives Building on Tyler Mall is the home of the 1907 Gallery, which hosts exhibits of historical photographs from the collections of the Department of Archives and Manuscripts. For more information, access the Web site at www.asu.edu/lib/archives/archives.htm.

Video Resources. Located in ECA 100, Video Resources supports a variety of educational media services, including reserve videotapes of all ASU courses broadcast on cable television and ITFS, video viewing/study carrels, and a studio facility for students and faculty. In addition, Video Resources houses thousands of video titles in the ASU Media circulating collection that may be checked out for three days. Special Collections include the WorldFest Video Archive, Horizon, C-SPAN Booknotes, and C-SPAN I and II. Patrons with a current university ID may check out any available videotape for three days. Interlibrary loans and video booking may be scheduled by calling 480/965-7564. For more information, call 480/965-5046, or access the Web site at www.asu.edu/lib/video.

PERFORMING AND FINE ARTS FACILITIES

ASU Art Museum. The ASU Art Museum serves students and scholars within and beyond the university and as a cultural resource for the Phoenix Metropolitan area. Additionally, the museum serves a public beyond the immediate area through traveling exhibitions and publications that not only document the exhibitions but also offer critical insight into the museum's areas of concentration.

Exhibitions, education programs, and publications are interdisciplinary and educational and are designed to engage viewers with art that is relevant to their lives. New technologies in the content of art and in the approaches to reaching new audiences are eagerly and openly adopted.

Collections and exhibitions focus on contemporary art, particularly new media and new methods of presentation; art by Latin American artists; art from the Southwest; prints, both historic and contemporary; and crafts, emphasizing American ceramics. The museum was founded by a gift of historic American paintings, which are on continuous display, including works by Gilbert Stuart, Albert Pinkham Ryder, Winslow Homer, Georgia O'Keeffe, and Romare Bearden. The contemporary art holdings include works by Nam June Paik, Lorna Simpson, Vernon Fisher, Sue Coe, and Enrique Chagoya. Exhibitions and collections are housed in galleries and study rooms in two facilities: the international award-winning Nelson Fine Arts Center and Matthews Center in the middle of campus.

Educational programs include artist residencies and dialogs with classes, a student docent program, internships and

research assistanceships, lectures and symposia, in-gallery materials, special curricula-based school programs, and school and public tours. For information on upcoming exhibitions and programs, call 480/965-2787.

ASU Downtown Center Gallery and the Galleria. The Gallery, located on the first floor of the ASU Downtown Center, is a partnership with the Joint Urban Design Program from the College of Architecture and Environmental Design. The Gallery features special rotating exhibits, including architectural models, computer imaging projects, and other unique exhibits accessible for public view. For information on upcoming exhibitions and programs, call 480/965-3046.

The Galleria, located on the second floor of the ASU Downtown Center, features work by ASU faculty, staff, students, and local artists. The Galleria is a member of Artlink First Friday's and the Phoenix Art Detour. Open Monday through Saturday, from 8 A.M. to 5 P.M., the Galleria features new and different works each month. For information on current or upcoming exhibitions, call 480/965-3046.

Computing Commons Gallery. One of the few exhibit spaces of its kind, the Computing Commons Gallery features five to six changing exhibits per year: technology-generated art, multimedia installations, and history of technology. For a current gallery schedule, access the Web site at www.asu.edu/it/spotlight.

Dance Multimedia Learning Center. The Department of Dance Multimedia Learning Center is a facility designed to promote and encourage the use of media and computer technology in dance education and performance at ASU.

Dance Studio Theatre. The Dance Studio Theatre is a 300-seat performance space that is the mainstage performance site for the 12 formal and informal concerts produced annually by the Department of Dance. The theatre is one of the only dance spaces in the country that is designed with interactive and telematic capabilities. The facility uses video-based motion sensing and enables dancers to interact with sound, lighting, images, and video in performance. High-speed Internet connectivity enables this space to connect with other telematic spaces for dual, multisite, and Web performances.

Drama City. Housed in a 50-year-old former church, Drama City is the primary performance venue for the Institute for Studies in the Arts. The space is a black box, 60 by 30 feet with fixed lighting positions and flexible control stations. The area can seat up to 100 and is equipped for performance or installation pieces. The facility also houses a wide range of technology for performance and presentation including video projection, automated luminaires, and a unique computerized control system for integrated media usage.

Gallery of Design. Housed in the College of Architecture and Environmental Design, the Gallery of Design features traveling exhibitions on design and urban issues.

Paul V. Galvin Playhouse. Built to stage the largest productions of the ASU Theatre, the Paul V. Galvin Playhouse is a 496-seat proscenium-stage theatre set at the east end of the Nelson Fine Arts Center. The Department of Theatre's annual season of 12 to 15 plays also includes productions in

the Lyceum and Prism theatres and the Nelson Fine Arts Center Studios.

Grady Gammage Memorial Auditorium. A versatile center for the performing arts designed by Frank Lloyd Wright and named for the late ASU President Grady Gammage, Grady Gammage Memorial Auditorium seats 3,000 and has won wide acclaim for its design and acoustics. In addition to the great hall and related facilities—including the Aeolian-Skinner organ contributed by Hugh W. and Barbara V. Long—the building contains classrooms and workshops for the Herberger College of Fine Arts.

The Intelligent Stage. The Intelligent Stage is a production and performance facility designed to explore the possibilities of interactive stage performance. The facility includes a sprung floor; 30 dimmers and a four channel sound system; a composer workstation; workstations for designing interactive MIDI performances; and a movement sensing, image-processing workstation. All are networked together for multemachine performance and production. Resident artists and technologists provide design and logistical support for projects in the facility.

Katzin Concert Hall. Located in the new music building expansion, the Katzin Concert Hall seats 350 people. Primarily used for solo and chamber music recitals, the hall houses a nine-foot Hamburg concert Steinway piano. The acoustics are enhanced by the maple-paneled stage and the multifaceted walls and ceiling.

Louise Lincoln Kerr Cultural Center. Located in Scottsdale, the Louise Lincoln Kerr Cultural Center offers cultural events, especially in the performing arts, to the community.

Lyceum Theatre. A small but technically sophisticated 164-seat proscenium theatre, the Lyceum Theatre is a venue for faculty productions and a laboratory for the work of student playwrights, directors, and actors.

Music Theatre. As part of the music complex, the Music Theatre, modeled after the Wagnerian Theatre in Bayreuth, Germany, rises five stories and seats an audience of 500. This theatre is the home of many operatic and musical productions.

J. Russell and Bonita Nelson Fine Arts Center. Designed by Albuquerque architect Antoine Predock, the J. Russell and Bonita Nelson Fine Arts Center is a spectacular, 119,000-square-foot, village-like aggregate of buildings that includes five galleries of the ASU Art Museum, the Paul V. Galvin Playhouse, the University Dance Laboratory, seven specialized theatre and dance studios, a video studio, and a variety of scenic outdoor features, including courtyards, fountains, pools, and a 50-by-100-foot projection wall designed for outdoor video.

Northlight Gallery. The Northlight Gallery is dedicated to museum-quality exhibitions of historical and contemporary photography. Located in Matthews Hall, it is open during the academic year.

Organ Hall. Located in the new music building expansion, the Organ Hall houses the Fritts Organ. This tracker-action pipe organ is designed to capture the qualities of baroque European organs. The hall is designed to complement the

organ with a barrel-vaulted ceiling and wooden benches to seat 175 persons.

Prism Theatre. The Prism Theatre is an alternative black box space devoted to multiethnic, experimental works and student productions.

Recital Hall. Located on the fifth floor of the Music Building, the Recital Hall is an intimate 125-seat facility that opens onto a rooftop courtyard.

Sundome Center for the Performing Arts. As America's largest single-level theatre, the Sundome Center for the Performing Arts in Sun City West has 7,169 seats. The theatre is equipped with sophisticated, state-of-the-art lighting systems, and a single-span roof affords each seat a clear view. As one of Arizona's premier entertainment venues, the Sundome provides an array of top entertainment from Las Vegas-style concerts to classical ballets to celebrity lectures.

Television Station KAET. KAET, Channel 8, is the university's PBS station. Studios of the award-winning station are located in the Stauffer Communication Arts Building. To operate 24 hours a day, KAET employs more than 50 ASU students and interns. To learn more about KAET-TV, access its Web site at www.kaet.asu.edu, or call 480/965-3506.

University Dance Laboratory. A flexible performance space within the Nelson Fine Arts Center, the University Dance Laboratory is designed specifically for experimental dance productions. Along with the Dance Studio Theatre in the Physical Education Building East, the University Dance Laboratory is used by the Department of Dance for experimental performances.

Harry Wood Gallery. Housed in the Art Building (ART 120), the Harry Wood Gallery provides temporary exhibitions of the visual arts during the academic year.

COMPUTING FACILITIES AND SERVICES

Computers are fundamental tools for learning, instruction, and research in every college and department at ASU. The Information Technology (IT) department provides a variety of computing equipment and services available for use by students, faculty, and staff. IT also provides programming, statistical, graphics, and other applications for desktop computers and mainframe computing systems. University-wide electronic mail and the library's online catalog are accessible through a high-speed campus network and from off campus via the Internet.

A wide range of information on campus activities and related topics is available online at the ASU Web site www.asu.edu. This site contains a wide variety of information from various colleges, departments, and organizations, including approved courses, the *Schedule of Classes*, the *General Catalog*, the *Graduate Catalog*, a telephone and electronic mail directory, the athletic calendar of events, application forms, and financial aid information.

IT provides several service centers, described below, for the ASU academic community.

Computing Commons. The Computing Commons building (CPCOM) provides a "technology hub" that draws together students, faculty, and staff from all disciplines on campus in an environment conducive to maximum creative interaction. The building and its facilities have drawn

national recognition and acclaim as a model for the support of instruction and research in a technology-based environment. The Computing Commons houses a 225-workstation computing site, nine electronic classrooms, a Research Support Lab, the Customer Assistance Center, a computer store, and a technology-based gallery (see "Computing Commons Gallery," page 29).

Computing Sites. In addition to the Computing Commons Atrium, there are three additional computing sites located on the ASU Main campus, available for ASU faculty, staff, and students. Site configurations and hours of operation vary; current information is available on the Web at www.asu.edu/computingsites.

ASU Downtown Center Computer Lab. The ASU Downtown Center offers an alternative to the computer labs at ASU Main. This facility features four Pentium II-400 Mhz and 16 Pentium-200 Mhz computers—all loaded with Microsoft Office 2000, Internet Explorer, Netscape, and other software. A high-speed laser printer and a color flat-bed scanner are available, and faculty may use the ceiling-mounted computer projection system. The ASU Downtown Center is located in downtown Phoenix. It is a unique educational, applied-research, and community-service facility designed to address the multifaceted urban opportunities of the central Phoenix community. For more information, call 480/965-3046, or access the Web site at www.asu.edu/xed/dtccplab.

Computer Accounts. Computer Accounts, located in CPCOM 105, assists customers with account access issues (including lost passwords), disk space quotas, accounts for non-ASURITE services (including mainframe computer access), and other account-related services. Most computing services are accessible through the standard ASURITE UserID and password, available from self-subscription workstations located in a variety of on-campus locations or online (accessible from ASU addresses only) at www.asu.edu/jukebox/webpages/selfsub.html. More information about Computer Accounts is available on the Web at www.asu.edu/computeraccounts.

Customer Assistance Center. The Customer Assistance Center, located in CPCOM 202, offers a library of reference manuals, computing periodicals, and other information concerning computing systems and software. Self-paced training is available for various software applications running under the Windows, Macintosh, or Unix operating systems. The center also distributes communication, virus protection, and other site-licensed software as well as site-specific documentation in a "print-on-demand" format. Print on demand is also available on the Web at cgi.asu.edu/it/fyi/cgi/document.cgi?page=quicklook. More information about the center is available from the Web site at www.asu.edu/cacenter.

Help Desk/Consulting. The IT Help Desk provides ASU students, faculty, and staff with centralized systems information and first-level assistance in resolving computing problems. Services are available by telephone at 480/965-6500, on the Web at www.asu.edu/helpdesk, and in person at the Customer Assistance Center, CPCOM 202. The IT Help Desk assists with data recovery and repair; AFS file space and permissions for Web sites; communica-

tion, e-mail, and virus protection software; and computing and equipment problem referral.

Instruction Support (IS). Instruction Support serves as a development center for the use of technology in the design and delivery of instruction. Staffed with students, faculty, and researchers skilled in the areas of system design, graphics, interactive software, networked delivery, and digital video, the innovation-driven group pushes the development of instruction to the limits of available technology. From this perspective, IT/IS fosters technological innovation by serving as a research and development unit, a production group, and a training facility.

IT/IS collaborates with faculty in the coordination of cross-disciplinary research and production projects relating to the integration of technology with education. Through partnerships with faculty and groups outside ASU, grant-writing teams are able to leverage support not otherwise available to a single academic unit or faculty member. Central to effective support services is the establishment of a partnership among the various support units within the university. IT/IS coordinates the efforts of these groups—which include the College of Extended Education, University Libraries, Disability Resources for Students, and the Office of Research and Creative Activities—to provide faculty with a wide array of instruction support services.

IT/IS offers consultation sessions tailored toward enhancing the instructional use of technology by the university teaching community. Sessions range from an introduction to technology in education through advanced and customized approaches for instructors in specific programs.

More information about IT/IS is available from the Web site at is.asu.edu.

Instruction Support (IS) Lab. The IS Lab provides an environment in which faculty may seek and receive one-on-one, guided, or independent support for course development and delivery. Expert staff work closely with faculty to refine and develop their skills and confidence in the design and delivery of instruction through a variety of technology-supported means, both synchronous and asynchronous. Located in CPCOM 213, the IS Lab provides faculty, university professionals, and graduate students with a unique opportunity to integrate technology with instruction. The IS Lab sponsors workshops and demonstrations and serves as a dynamic clearinghouse of information and referrals for effective integration of technology with education.

Research Support (RS). Research Support provides processing and operations assistance to faculty, staff, and student researchers engaged in scientific and creative endeavors. Processing support involves consulting in the use of software tools and program coding directly related to projects or specific research; operations activities support the overall workflow in university computing facilities and include consulting for computation, statistics, visualization, and GIS platforms in conjunction with software package installation and use; media conversion; and product evaluation.

A variety of computation facilities are provided in support of research and creative endeavors within the ASU community, ranging from individual workstations to SMP/MPP servers and mainframes. Extended computer capabilities

are available through access to national computing centers. More information is available at www.asu.edu/it/fyi/research on the Web.

Research Support (RS) Lab. The RS Lab is located in CPCOM 235 and provides Geographic Information Systems (GIS) Services and Visualization Services. GIS services staff members provide researchers with hardware, software, and data to facilitate the creation of geographic information systems for spatial analysis, query, and display. Research is supported from various disciplines and provides additional resources to students enrolled in classes for GIS instruction, serving as a focal point for GIS users to meet and share information and technical expertise.

Visualization Services offers faculty, staff, and graduate students the hardware and application software resources and services for the high-level graphics and visualization used in research. Researchers receive assistance ranging from interactive viewing of scientific data to visualization in the liberal and the performing arts and other endeavors.

ALUMNI ASSOCIATION

Founded in 1894, the Alumni Association is a volunteer organization committed to serve and unite alumni for the purpose of advancing the interests of ASU and its alumni. The association provides a variety of services for ASU alumni as well as a series of events scheduled around the country.

With more than 230,000 alumni living in the United States and throughout the world, the association plays an important role as the university's primary support organization. Comprising more than 50 groups, the campus, college, club, and chapter organizations (4Cs) of the association provide opportunities for all alumni to stay involved with the part of ASU that interests them most.

Members of the ASU Alumni Association Board of Directors are elected each spring. See "Institutional Advancement," page 421. For more information about the association or its board of directors, call 1-800-ALUMNUS or 480/965-ALUM.

PROGRAM ASSESSMENT AND THE OFFICE OF UNIVERSITY EVALUATION

The Office of University Evaluation is a research and service facility that focuses on assessing and improving the effectiveness of the university's academic and support programs. The office conducts, coordinates, and manages research designed to measure the degree to which courses, curricula, and academic programs impart knowledge and skills to students as well as the quality of support provided to students. The results of these studies, or assessments, are used to enhance both the support provided to students and the intellectual integrity of an ASU education.

In order for the university to assess and improve its programs, periodic measurement of student experiences, perceptions, and intellectual growth must be obtained. When asked by the university, students are expected to participate in one or more evaluative procedures, such as the ASU Report Card. These evaluative procedures are designed to assess the efficacy of the total university experience, including teaching and learning and support programs and are not used in individual grading. The information obtained is one

of the means used to improve the quality of the educational experience for this and future generations of ASU students.

For more information, call the office at 480/965-9291, or contact them via e-mail at oue@asu.edu. The Office of University Evaluation's Web site is www.asu.edu/oue.

RESEARCH CENTERS, INSTITUTES, AND LABORATORIES

These units serve the university's mission in research. They are overseen by eight of the colleges, the vice provost for Research, and the ASU East provost.

Center for Research on Education in Science, Mathematics, Engineering, and Technology. The Center for Research on Education in Science, Mathematics, Engineering, and Technology (CRESMET), an alliance of the ASU Colleges of Education, Engineering and Applied Sciences, and Liberal Arts and Sciences, was initiated in 1999, growing out of what was previously the Center for Innovation in Engineering Education. The mission of the center is to bring together individuals, programs, and organizations interested in improving K–20 science, mathematics, engineering, and technology education to research, develop, and assess educational theories, curricula, courses, and administrative policies that impact science, mathematics, engineering, and technology education. The center also encourages and supports wide-scale sharing and implementation of effective approaches to producing a more scientifically and technologically literate populace and more capable science, mathematics, engineering, and technology majors.

Research. CRESMET pursues research and development that demonstrates coherent, consistent, and conceptually powerful mathematics, science, engineering, and technology education from kindergarten through college (K–20).

Partnering. CRESMET supports collaborations across the traditional boundaries of university, community, business, and local education agencies.

Sharing. CRESMET establishes communication avenues for intellectual and material products proven effective in supporting powerful learning in science, mathematics, engineering, and technology fields.

For more information, visit CRESMET in ECG 303, call 480/965-5350, or access the CRESMET Web site at www.eas.asu.edu/~cresmet.

College of Architecture and Environmental Design

Herberger Center for Design Excellence. The Herberger Center for Design Excellence is the research, outreach, and publication arm of the College of Architecture and Environmental Design. The center facilitates and promotes research, scholarship, and creative activity among the faculty and students of the college in the fields of architecture, interior design, industrial design, graphic design, landscape architecture and urban design, and environmental planning.

In keeping with its outreach mission, the Herberger Center also publishes reports, newsletters, and books that help to inform debate on key design and planning issues in the desert southwest. The center works closely with the faculty to publish books, working papers, and conference proceedings that promote scholarship in the planning and design disciplines.

The Joint Urban Design Program (JUDP), based in downtown Phoenix, is the center's outreach arm. It facilitates

interaction among college faculty, students, and the broader community, and offers design as a way to further dialogue and to address urban issues. The JUDP conducts intensive workshops, (community-based charrettes) that help neighborhoods, groups, and other city stakeholders focus on concerns and strategies to respond to critical needs. Student groups and faculty work with the JUDP to identify real world problems that they address in studio projects. For more information, call 480/727-5146, or access the JUDP Web site at www.asu.edu/caed.

College of Business

Arizona Real Estate Center. The Arizona Real Estate Center (AREC), established in 1980, serves a multifunction research and educational role to foster better understanding of the real estate sector of the Arizona economy. Housing, commercial real estate, and construction activity data for Arizona and Maricopa County are collected by the center and are utilized for a variety of ongoing projects, including the calculation of affordability indexes and the computation of housing appreciation figures for the metropolitan Phoenix area. The center's annual outlook series provides a public forum for prominent members of the real estate industry to present their perceptions of market conditions.

For more information, call 480/965-5440, access the AREC Web site at www.cob.asu.edu/seid/arec, or write

ARIZONA REAL ESTATE CENTER
PO BOX 874011
TEMPE AZ 85287-4011

Bank One Economic Outlook Center. The Bank One Economic Outlook Center (EOC), established in 1985, specializes in economic forecasts of Arizona and the Western states. The center publishes the *Bank One Arizona Blue Chip Economic Forecast* (monthly), *Greater Phoenix Blue Chip Economic Forecast* (quarterly), *Western Blue Chip Economic Forecast* (10 issues per year), and *Blue Chip Job Growth Update* (monthly), an update of current job growth in the United States. The center also publishes *Mexico Consensus Economic Forecast* (quarterly), a forecast and historical data on the Mexican economy.

For more information, call 480/965-5543, access the EOC Web site at www.cob.asu.edu/seid/eoc, or write

BANK ONE ECONOMIC OUTLOOK CENTER
PO BOX 874011
TEMPE AZ 85287-4011

Center for the Advancement of Small Business. The Center for the Advancement of Small Business (CASB) is the 21st-century leader in business education, practice, and research that provides high-quality, relevant programs, and information services focused on small business since 1994. The center enables students and existing small and medium-size businesses to participate, contribute, and compete in the global economy.

The center provides students from all disciplines with programs and resources that prepare them for positions of leadership in small and medium-size businesses, and aids small and medium-size businesses in the continuous improvement of their human resources and business practices. CASB also engages in applied research on entrepreneurship and the emerging changes and trends in small business.

For more information, visit CASB in BAC 111, call 480/965-3962, or access the CASB Web site at www.cob.asu.edu/seid/casb.

Center for Advanced Purchasing Studies. The Center for Advanced Purchasing Studies (CAPS) was established in November 1986 by a national affiliation agreement between the ASU College of Business and the National Association of Purchasing Management. It is the first and only program of its kind in the nation and is located in the Arizona State University Research Park, about eight miles south of the main ASU campus. CAPS conducts in-depth research into the problems facing the purchasing profession today and, through its studies, seeks to improve purchasing effectiveness and efficiency and the overall state of purchasing readiness.

For more information, call 480/752-2277, or write

CENTER FOR ADVANCED PURCHASING
STUDIES
ASU RESEARCH PARK
2055 E CENTENNIAL CIRCLE
PO BOX 22160
TEMPE AZ 85285-2160

Center for Business Research. The Center for Business Research (CBR) has been a consistent source of information on the Arizona and metropolitan Phoenix economies since 1951. Both the business community and the public have had access to the economic indicators produced by the ongoing projects of the center, including quarterly net migration estimates for Arizona and Maricopa County. CBR also conducts projects under the sponsorship of private and public agencies. Recent examples include the economic impact of Super Bowl XXX, a study of seasonal migration to Arizona, and an analysis of the state's hospital industry. A monthly publication of the center, *AZB/Arizona Business*, plays a major role in disseminating to the public the economic information compiled by the research centers of the Seidman Institute. The staff within the center is available to respond to inquiries and to provide available data.

For more information, call 480/965-3961, access the CBR Web site at www.cob.asu.edu/seid/cbr, or write

CENTER FOR BUSINESS RESEARCH
PO BOX 874011
TEMPE AZ 85287-4011

Center for Services Marketing and Management. The Center for Services Marketing and Management (SMM Center) is a leading university-based hub devoted to the study of services marketing and management since 1985. The SMM Center addresses how any company can improve internal service processes and use service and customer satisfaction as a competitive advantage. The center encourages firms to share the best ideas and practices for adaptation across industries. Though grounded in marketing, the center's work is cross-functional, integrating concepts and techniques from marketing, operations, human resources, and management.

The center's areas of expertise include customer retention and loyalty; service quality; service delivery; professional services such as healthcare, accounting, and consulting; customer satisfaction; services strategy; service culture; and service recovery. A leader in the business and academic

communities, the SMM Center's work advances the knowledge base in the field and provides applicable frameworks, concepts, and tools.

The center offers its partner firms topflight executive education in services through the annual "Activating Your Firm's Service Culture" symposium, the annual "Services Marketing and Management" institute program, and the annual "Information Technology Services Marketing" course and provides customized executive education programs and research projects tailored to and conducted for charter member firms.

The center also actively supports the College of Business M.B.A. program that offers a certification in Services Marketing and Management. The services track infuses strong company-based experience and encourages summer internships.

For more information, visit the SMM center in BAC 440, or call 480/965-6201.

Center for the Study of Finance. The Center for the Study of Finance, established in 1986, serves the national financial, policy-making, and academic communities through research, publications, conferences, and educational programs. The focus of such activities is on the changing nature of the domestic and international financial system with such specific areas as the interaction between financial markets, deposit insurance reform, the deregulation of financial institutions, the financing of mergers and acquisitions, and the effect of government policy on financial markets receiving recent attention.

For more information, call 480/965-5362, or write

CENTER FOR THE STUDY OF FINANCE
PO BOX 874011
TEMPE AZ 85287-4011

L. William Seidman Research Institute. The mission of the L. William Seidman Research Institute is to encourage and support applied business research by serving as a public access point to the College of Business. Specific goals include transferring new knowledge to the public; supporting faculty and student research; encouraging the development of educational programs grounded in business research; and conducting high-quality, applied business research.

The institute encourages research activity by providing research support services to the faculty, staff, and students of the college. These services include facilitating grant preparation and assistance in grant administration. The institute's research centers act as the focal point for involving faculty and students in applied research on important issues identified by the business community.

The institute also serves an important role in the broader educational mission of the College of Business by disseminating the findings of research conducted by the faculty, students, and research center staff, as well as the results of business research from other sources around the world. This is accomplished through a variety of mechanisms: newsletters and research reports; seminars and conferences; internet Web pages; media interviews and press releases; and by responding to inquiries from businesses, public officials, and the community. For more information, call 480/965-5362, access the institute's Web site at www.cob.asu.edu/seid, or write

L. WILLIAM SEIDMAN RESEARCH INSTITUTE
PO BOX 874011
TEMPE AZ 85287-4011

Manufacturing Institute. See “Manufacturing Institute,” on this page under “College of Engineering and Applied Science,” for information about this joint venture of the College of Business and the College of Engineering and Applied Sciences.

College of Education

Center for Bilingual Education and Research. The Center for Bilingual Education and Research (CBER) was created in 1980 to conduct policy-relevant research in bilingualism, bilingual education, and language policy in education. The center’s scope of work is driven by a need to merge several related topics into a single articulated conversation: English/Spanish biliteracy, promoting the role of public education to strengthen communities, and enabling binational collaboration among educators on both sides of the U.S.-Mexico border. The long-term vision is to help develop a new pedagogy tailored to the needs of the bicultural region the center serves. The integration of these themes shapes the scope of work for CBER in these areas:

1. Within the broad scope of educational policy research, CBER focuses on scholarly inquiry that contributes to informed and enlightened discourse on language policy for schools and society, especially on the harmonious coexistence of English, the national language, and Spanish, the second most used language in our society.
2. Life in the American Southwest is bicultural and increasingly binational. In this Pan-American context, bilingualism will gain in importance. Equally important will be the collective ability of residents on both sides of the border to work harmoniously in pursuit of a common destiny that will be ever more intertwined. Schools must help children and youth develop skills and predispositions to face this challenge.
3. Mexico and the United States are becoming more interdependent. In this context, Mexican educators should have opportunities to contribute to improving education for Mexican immigrant children in U.S. schools. To enable this, schools must create pilot projects and an infrastructure for collaboration among institutions and individuals on both sides of the U.S.-Mexico border.

For more information, visit CBER in ED 440, call 480/965-7134, or access the CBER Web site at www.asu.edu/educ/cber.

Center for Indian Education. The Center for Indian Education is an interdisciplinary research and service center established in 1959. It promotes studies in American Indian policy and administration that contribute to scholarship and effective practices in education, professional training, and tribal capacity building. It is structured to foster relations between the university and sovereign tribes and to provide training and technical assistance for community programs. The center publishes the *Journal of American Indian Education* and sponsors workshops and colloquia that bring together scholars and tribal community leaders.

The center provides leadership through a group of American Indian faculty and is organized on the basis of scholarly expertise of the faculty. In addition to College of Education faculty, responsibilities are shared by faculty from the School of Social Work, the School of Justice Studies, the College of Liberal Arts and Sciences, and the College of Law. Areas currently studied include administrative leadership, policy analysis, bilingual education, health and welfare policy, justice studies, and program development in professional studies.

For more information, visit the center in ED 402, call 480/965-6292, or access the center’s Web site at www.asu.edu/educ/cie.

CRESMET. See “Center for Research on Education in Science, Mathematics, Engineering, and Technology,” page 32, for information about this joint venture of the Colleges of Education, Engineering and Applied Sciences, and Liberal Arts and Sciences.

College of Engineering and Applied Sciences

Center for Low-Power Electronics. The Center for Low-Power Electronics (CLPE) is a collaborative effort of the University of Arizona and ASU to address fundamental, industry-relevant research problems in the design of ultra-low power microelectronic systems. The CLPE is formed under the State/Industry/University Cooperative Research initiative of the National Science Foundation (NSF). The NSF and the State of Arizona recognize that Arizona has the key ingredients to become a leader in this technology. It has the world’s leading companies involved in the manufacture of portable computing and communication systems. The technical areas of focus of the Center for Low-Power Electronics include

1. basic materials, alternative materials, and their fabrication;
2. device design optimization;
3. design of digital, analog, and hybrid low-power circuits; and
4. power-based physical design for single- and multi-chip VLSI systems.

For more information, visit the center in ENGR 115, or call 480/965-8654.

Center for Solid-State Electronics Research. The Center for Solid-State Electronics Research (CSSER) focuses on research in the areas of epitaxial semiconductor crystal growth, device characterization and modeling, defect behavior in semiconductors material characterization, environmentally benign and other novel processing, fine line lithography, surface analysis, and transport. Major programs address semiconductor device modeling, transport theory, optoelectronics, ferroelectrics, semiconductor processing, microwave devices, and ultra-submicron and nano-structured devices. New thrust areas include molecular electronics and MEMS.

For more information, visit CSSER in ENGR 115, call 480/965-3708, or access the CSSER Web site at ceaspub.eas.asu.edu/csser.

Manufacturing Institute. The Manufacturing Institute is a joint venture of the College of Business and the College of Engineering and Applied Sciences, established to enhance

manufacturing research and industrial collaboration at the interface between the two colleges. The mission of the institute involves integrating aspects of manufacturing in the business and engineering areas, and helping to fulfill the university's goal of becoming one of the leading educational and research institutions in manufacturing enterprise and manufacturing process technology issues. Research thrust areas include virtual manufacturing, enterprise systems, knowledge management, and software in the system solution.

For more information, visit the institute in GWC 402, or call 480/965-3709.

Center for System Science and Engineering Research.

The Center for System Science and Engineering Research (SSERC) has established four focus areas: nonlinear dynamical systems, control theory and its applications, mathematical neuroscience, and scientific computing and interdisciplinary systems engineering. The center is jointly sponsored by the College of Engineering and Applied Sciences and the College of Liberal Arts and Sciences. Its main goals are the creation and enhancement of interdisciplinary and cooperative research, graduate education, and public service programs in the areas of systems science, applied mathematics, and computation.

For more information, visit the SSERC in GWC 606, call 480/965-8382, or access the SSERC Web site at www.eas.asu.edu/~sserc.

CRESMET. See "Center for Research on Education in Science, Mathematics, Engineering, and Technology," page 32, for information about this joint venture of the Colleges of Education, Engineering and Applied Sciences, and Liberal Arts and Sciences.

Telecommunications Research Center. Telecommunications play a vital role in home, commercial, entertainment, educational, scientific, and military systems. The Telecommunications Research Center focuses its interests and activities in research and educational programs. The approach is to conduct basic and applied research, develop technologies, and provide education programs in all major areas of telecommunications, from signal generation to reception. The targeted areas of excellence are antennas, propagation, and scattering; microwave circuits, devices, and measurements; optical communications; signal processing; broadband switching; and wireless communication systems. Ultramodern laboratories and computational facilities are associated with the center.

For more information, visit the center in GWC 411, call 480/965-5311, or access the center's Web site at trc.eas.asu.edu.

College of Law

Center for the Study of Law, Science, and Technology.

Located in the College of Law, the Center for the Study of Law, Science, and Technology conducts research, edits *Jurimetrics: The Journal of Law, Science and Technology* in cooperation with the American Bar Association Section on Science and Technology, and sponsors seminars, workshops, and conferences. Through these activities, the center seeks to contribute to the formulation and improvement of law and public policy affecting science and technology and to the wise application of science and technology in the

legal system. Current areas of research include communications and telecommunications law, computer-related law, forensic science and statistics, legal issues and biotechnology, law and medicine, and law and social science.

For more information, visit the center in LAW 201, or call 480/965-2124.

College of Liberal Arts and Sciences

Arizona Center for Medieval and Renaissance Studies

(ACMRS). The Arizona Center is a research unit serving affiliate scholars from ASU, Northern Arizona University, and the University of Arizona. It represents a variety of disciplines, including history, literature, philosophy, religion, language, music, art, and science. ACMRS enriches academic offerings in medieval and renaissance studies by sponsoring one or two visiting professors each year. Graduate research assistantships are also available through the center.

Significant opportunities for the study of the Middle Ages and the Renaissance exist at ASU. Hayden Library has an extensive microfilm collection and many rare books in medieval and renaissance studies. ACMRS also sponsors a lecture series each semester covering a variety of topics.

Other programs include an annual conference, a public symposium, a summer study abroad program at the University of Cambridge (United Kingdom), and student exchange programs with the University of Copenhagen (Denmark) and the University of Kalmar (Sweden).

Since 1996, ACMRS has published *Medieval and Renaissance Texts and Studies (MRTS)*, a major series of editions, translations, and reference works. In collaboration with the University of Massachusetts at Dartmouth and the Medieval and Renaissance Committee of the University of Michigan, ACMRS sponsors and coedits *Mediterranean Studies*, an annual interdisciplinary journal publishing articles on all aspects of the Mediterranean region. ACMRS also sponsors a book series titled *Arizona Studies in the Middle Ages and the Renaissance*, published by Brepols (Belgium).

ACMRS also partners with the Renaissance Society of America and the University of Toronto in *Iter*, a massive, retrospective, online medieval and renaissance bibliography covering all languages and disciplines, and is the official site of the Medieval Academy of America's online data project offering information on medieval centers, programs, committees, and regional associations in North America.

For more information, visit ACMRS in SS 224, call 480/965-5900, or access the ACMRS Web site at www.asu.edu/clas/acmrs.

Cancer Research Institute. Significant advances in the treatment of human cancer and other serious medical problems depend upon scientists well trained in organic chemistry, biochemistry, and biology. The Cancer Research Institute provides graduate students with the specialized training necessary for research in the discovery and development of effective anticancer drugs. Among various activities, laboratory personnel are pursuing a unique program concerned with isolation, structural identification, and synthesis of naturally occurring anticancer agents from marine animals, plants, and marine microorganisms.

For more information, visit the institute in CRI 209, or call 480/965-3351.

Center for Asian Studies. Through its East Asian and Southeast Asian studies programs, the Center for Asian Studies serves as research coordinator for Asian studies' faculty and graduate students in a variety of disciplines. The center sponsors colloquia and research conferences. It also publishes two scholarly *Monograph Series* and a newsletter on Southeast Asian studies, *Suvannabhumi*, which have an international readership. Graduate students may apply for research assistantships in the center and its program.

The center works with the office of International Programs to administer student exchange programs with a number of universities in Asia. The center also sponsors a graduate student colloquium and film series on Asian topics. A reading room is located in the center office suite offering a variety of Asian and English language publications and newspapers from and about Asia.

For more information, visit the center in WHALL 105, or call 480/965-7184.

Center for Meteorite Studies. The nation's largest university collection of extraterrestrial materials is available for research in the Center for Meteorite Studies. Teaching and research on meteorites, meteorite craters, and related areas of space and planetary science are accomplished through the regular academic units in cooperation with the center.

For more information, visit the center in PS C151, or call 480/965-6511.

Center for Solid-State Science. The Center for Solid-State Science is a research unit within the College of Liberal Arts and Sciences.

The membership comprises faculty and academic professional researchers and research support personnel, most of whom hold simultaneous appointments in affiliated academic units. The Center for Solid-State Science is the ASU focal point for interdisciplinary research on the properties and structures of condensed phases of matter at the interfaces between solid-state chemistry and physics, earth and planetary science, and materials science and engineering. It also supports interdisciplinary approaches to science and engineering educational outreach activities.

The center provides an administrative home for large, multidisciplinary, block-funded research projects. These include the NSF-supported Materials Research Science and Engineering Center (MRSEC) and the Interactive Nano-Visualization for Science and Engineering Education (IN-VSEE) project. To support these activities, members of the center operate modern and sophisticated research facilities and organize regular research colloquia and symposia.

Principal topical areas of research in the center include studies of structure and reactivity of surfaces and interfaces, electronic materials, advanced ceramics and glasses, synthesis of new materials, high-pressure research, development of techniques in high-resolution electron microscopy and micro-structural and chemical analysis, development of visualization techniques at different scales of magnification for science education and community outreach.

The research facilities of the center include the Center for High-Resolution Electron Microscopy (CHREM) and the Goldwater Materials Science Laboratories (GMSL).

CHREM. The center operates several ultra high-resolution and ultra high-vacuum electron microscopes and supports microscopy methods, and instrumentation development, including holography, position- and time-resolved nano-

spectroscopy and energy-filtered imaging and diffraction. The center provides high-resolution capability for a large external group from other universities and industry.

GMSL. These facilities include

1. the Materials Facility (MF), which provides a wide range of synthesis and processing capabilities for preparation of specimen materials. MF also provides thermal analysis for study of solid-state reactions and Auger and X-ray photoelectron spectroscopy for analysis of surface compositions and electronic structure of surfaces;
2. the Materials Science Electron Microscopy Laboratory (MSEML), which provides state-of-the-art electron microscopes for analysis of microstructures, including imaging and diffraction, and high spatial resolution chemical analysis using energy dispersive X-ray and electron energy loss micro-spectroscopy;
3. the Ion Beam Analysis of Materials (IBeAM) facility, which provides compositional and structural determination of the surface and near-surface regions (0–2mm) of solids by ion beam analysis where elemental composition and depth distribution information are needed. Channeling experiments are used to determine crystal perfection and site occupancy;
4. the Secondary Ion Mass Spectrometry (SIMS) laboratory, which provides depth profile and point composition analysis with very high chemical sensitivity, on the order of one part per billion, including isotopic analysis for many materials. SIMS is also used as a chemical microscope, to image elemental distributions on specimen surfaces;
5. the Scanning Probe Microscopy Laboratory (SPM), which provides facilities for nanoscale viewing of solid surfaces using scanning tunneling microscopy (STM), atomic force microscopy (AFM), and related techniques. The SPM laboratory serves as a focus for undergraduate research training programs and educational and outreach activities;
6. the Facility for High-Pressure Research, which provides facilities for synthesis of new materials and for geochemistry/geophysics studies at up to 25 Gpa (250,000 atmospheres) and temperatures greater than 2000° C. These facilities are complemented by diamond anvil cells capable of in situ studies at up to one million atmospheres. This laboratory provides a focus for core research projects within the MRSEC;
7. the Goldwater Materials Visualization Facility (GMVF), which consists of a battery of linked workstations for remote operation of instruments and data collection, capture of images in real time, and advanced computing and simulation of materials. The GMVF is used in research and in undergraduate and graduate education, as well as in educational and community outreach; and
8. other specialized laboratories under development, which include high-resolution X-ray diffraction for thin film characterization, optical spectroscopy, and nuclear magnetic resonance spectroscopy for solid-state studies and research on materials under extreme conditions.

These facilities provide the primary teaching and research resources used by students in the Science and Engineering of Materials interdisciplinary Ph.D. program and the undergraduate option for Materials Synthesis and Processing. They are also used extensively by students in disciplinary programs from affiliated departments.

For more information, visit the center in PS A213, or call 480/965-4544.

Center for the Study of Early Events in Photosynthesis.

The ASU Center for the Study of Early Events in Photosynthesis was established in 1988 as part of a joint grant program of the Department of Energy, the National Science Foundation, and the Department of Agriculture. In 1990, it was designated a Regents Center of the University. Since September of 1995, it has been funded by the Office of the Vice Provost for Research and the College of Liberal Arts and Sciences. The center consists of about 90 students, post-doctoral associates, and research scientists led by 15 faculty members in the Department of Chemistry and Biochemistry and the Department of Plant Biology. These research groups share a common goal: understanding the process of photosynthesis, which is responsible for producing all of our food and filling the vast majority of our energy and fiber needs. The impetus for development of the center was the premise that photosynthesis is a complex problem that will only yield to an investigation using a wide variety of approaches and techniques. Thus, the center serves as an infrastructure supporting individual ASU scientists and fostering multidisciplinary cooperative research projects.



At the Challenger Science Camp, Ph.D. student Tinna Traustadottir (left) monitors Erin Burgess (right) as she rides an exercise bike in an experiment that tests exercise while breathing air polluted by carbon monoxide.

Tim Trumble photo

The ultimate objective of the research is the elucidation of the basic principles governing the biochemical and biophysical processes of photosynthetic energy storage. This goal is being realized via investigation of the early events of photosynthesis, including: light absorption and excitation transfer in photosynthetic antennas; the mechanism of primary photochemistry in plant and bacterial systems; secondary electron transfer processes; structure and assembly of photosynthetic antennas, reaction centers, and electron transfer proteins; pigment-protein interactions; artificial and biomimetic photosynthetic solar energy conversion systems; and mechanisms of biological electron transfer reactions.

The center is equipped with state-of-the-art instrumentation which allows students to do frontier research in a broad range of disciplines. Equipment includes a variety of pulsed lasers for measurements with time resolution ranging from sub-picoseconds to seconds, a 500 MHz NMR instrument; an EPR spectrometer, a protein X-ray facility, spectrophotometers, fluorometers; a protein sequencer, and an amino acid analyzer.

The center sponsors a weekly Photosynthesis Seminar Series and brings in visiting scientists from around the world to carry out collaborative research. Undergraduate, graduate, and postdoctoral training programs in the Department of Chemistry and Biochemistry and the Department of Plant Biology are central components of the activities of the center.

For more information, visit the center in PS D207, or call 480/965-1963.

CRESMET. See “Center for Research on Education in Science, Mathematics, Engineering, and Technology,” page 32, for information about this joint venture of the Colleges of Education, Engineering and Applied Sciences, and Liberal Arts and Sciences.

Exercise and Sport Research Institute. The Exercise and Sport Research Institute (ESRI) is an interdisciplinary research unit located in the Department of Exercise Science and Physical Education and serves, in part, as a research facility for the interdisciplinary doctoral program in exercise science. Faculty and graduate students within ESRI investigate a wide range of topics concerning physical activity, including different age cohorts, levels of health, levels of ability and fitness; and levels and types of training, and physical and emotional stresses, nutrition, and genetic backgrounds. Where applicable, these aspects are studied using an interdisciplinary approach. ESRI is affiliated with a number of clinical and research institutions in the Phoenix area.

ESRI houses numerous specialized research laboratories. *Biomechanics* applies the laws of mechanics to the study of human movement. Current research examines kinematic and kinetic determinants of locomotion patterns in walking, running, cycling, and swimming; neuromusculoskeletal modeling and computer simulation of locomotion in clinical and sport applications; ergonomics; and mechanisms underlying upper extremity repetitive strain injuries. *Exercise physiology* is the study of physiologic systems (cardiovascular, respiratory, muscular, endocrine, metabolic) under conditions of stress, particularly exercise stress. Both acute exercise responses and chronic adaptations resulting from exercise training are considered in relation to health and performance and are investigated in six specialized labs. The *Exercise Metabolism Lab* focuses on how dietary

nutrients influence resting and exercise metabolism, with a special emphasis on diabetes; the *Exercise Biochemistry Lab* examines subcellular systems involved in the provision and regulation of energy transfer during exercise; and the *Exercise Endocrinology Lab* studies interrelationships of exercise and training with stress, hormones, neurotransmitters, and the immune system. Research conducted in the *Applied Exercise Physiology Lab* is aimed at better understanding how physical activity and exercise influence the health, fitness, and athletic performance of able-bodied and physically-challenged individuals. Research in the *Motor Control Lab* investigates how movement is regulated and controlled via the nervous system in normal and pathological populations. Special emphases include motor deficits attributed to basal ganglia dysfunction and upper extremity coordination, particularly finger and hand posture, in reaching and prehensile movements. *Motor development* studies how human movement is generated and evolves throughout the lifespan. Current research focuses on learning and development of bimanual coordination. Timing and coordination of perceptual-motor skills are measured in normal developing children, persons with Down syndrome, and adults to investigate cerebral asymmetries and specificity of learning. The *Sport and Exercise Psychology Lab* examines the relationship between psychological constructs and physical activity, and the influence of participation in physical activity on psychological phenomena. Current research is designed to examine the influence of physical activity, fitness, and particular sport practices on psychophysiological mechanisms and cognitive functioning; the effect of psychological skills for performance enhancement; motivational aspects of physical activity across the lifespan; and the effects of exercise on mental health.

For more information, visit ESRI in PEBE 159, or call 480/965-7906.

Hispanic Research Center. The Hispanic Research Center (HRC) at ASU is an interdisciplinary unit, dedicated to research and creative activities, that is university-wide but administered through the College of Liberal Arts and Sciences. The HRC performs basic and applied research on a broad range of topics related to Hispanic populations, disseminates research findings to the academic community and the public, engages in creative activities and makes them available generally, and provides public service in areas of importance to Hispanics.

Faculty, staff, and advanced graduate students organize into working groups to develop a broad range of specific projects and lines of inquiry within the general categories of Hispanic entrepreneurship, science and technology, information and data compilation and dissemination, the Hispanic polity, and the arts. Ongoing activities of the HRC, primarily funded by external grants, include the Arizona Hispanic Business Survey, the *Bilingual Review Press*, the Community Art and Research Outreach (CARO), Chicana and Chicano Space: Art Education Web site, Digital Divide Solutions Project, Project 1000, and the Western Alliance to Expand Student Opportunities.

CARO sponsors creative activities and research in collaboration with community-based organizations and ASU faculty.

For more information, visit the HRC in CFS 104, call 480/965-3990, or access the HRC Web site at www.asu.edu/clas/hrc.

Institute of Human Origins. The Institute of Human Origins (IHO), founded in 1981 by Donald Johanson, became part of the College of Liberal Arts and Sciences in 1997. IHO is a multidisciplinary research organization dedicated to the recovery and analysis of the fossil evidence for human evolution and the establishment of a chronological framework for human evolutionary events. IHO's scientists carry out field research at sites in Africa, the Middle East, and Asia. IHO houses the largest collection of *Australopithecus afarensis* casts (including "Lucy," a 3.2 million-year-old human ancestor) in the world as well as an extensive collection of other fossil hominid casts. IHO's library contains more than 3,000 volumes, numerous journals, videotapes, audiotapes, and slides related to human evolution and fossil sites. IHO produces periodic newsletters, offers lecture series, conducts tours and workshops, and supports numerous informal science education outreach projects.

For more information, visit IHO in SS 103, call 480/727-6580, or access the IHO Web site at www.asu.edu/clas/ihoh.

Joan and David Lincoln Center for Applied Ethics. The Joan and David Lincoln Center for Applied Ethics (LCAE) is a university-wide center for applied ethics that is administratively housed in the College of Liberal Arts and Sciences. Its mission is

1. to develop and coordinate a strong focus on theoretical and applied ethics across intellectual disciplines and professional programs within the university,
2. to support teaching and creative research in ethics, and
3. to foster collaboration between the university and its varied publics to address major ethical challenges facing contemporary society.

For more information, visit LCAE in AG 361, or call 480/727-7691.

Latin American Studies Center. Arizona maintains an ever-growing interest in Latin America that draws upon an extensive experience of historical and geographical ties. The Latin American Studies Center is the focal point for these interests at ASU. Through its program, the center serves the university community and maintains strong ties with various Latin American organizations in the state and the nation. Principal activities are coordinating Latin American studies at the undergraduate and graduate levels; sponsoring student exchange programs; organizing events featuring Latin American arts and culture, numerous seminars, and research conferences; publishing a wide range of professional materials; and undertaking and facilitating research about the region.

The center administers student exchange programs with the Catholic University of Bolivia and three Mexican universities—the Autonomous University of Guadalajara, the Autonomous University of Nuevo Leon, and the University of Sonora. Each spring several ASU students are selected to attend courses at the Latin American universities while Bolivian and Mexican students attend ASU. The center also has an exchange agreement with the Pontificia Universidad Catolica del Ecuador for faculty and students as well as summer programs in Quito, Ecuador and Ensenada, Mexico.

The center is a member of the American Modern Language Association, Consortium of U.S. Research Programs for Mexico, Consortium for Latin American Studies Association, Pacific Coast Council on Latin American Studies, Rocky Mountain Council for Latin American Studies, Consortium of Latin American Studies Programs, and Conference on Latin American History.

The center directly encourages research, not only through its research conferences, but also through close coordination with the Latin American collection of Hayden Library and networking with Latin American universities.

For more information, visit the center in SS 213, or call 480/965-5127.

College of Public Programs

Center for Nonprofit Leadership and Management. The mission of the Center for Nonprofit Leadership and Management (CNLM) is “to improve the quality of life in communities by enhancing the performance of nonprofit organizations.” Varied strategies accomplish this mission and include coordination of educational offerings, selected technical assistance to nonprofits, support for research projects for faculty and students, and the convening of nonprofit leaders and managers through a variety of training opportunities. The center supports the activities of three complementary nonprofit management education programs: the ASU American Humanics Program (undergraduate certificate), the Nonprofit Management Institute (extended education certificate), and a graduate certificate in nonprofit leadership and management. For more information, call 480/965-0607, or access the Web site at www.asu.edu/copp/nonprofit.

Center for Urban Inquiry. The Center for Urban Inquiry focuses on civic involvement. The center’s mission is to examine the unique features of the new urban West in the United States, particularly intersections of growth and development with citizen activism and community building. By harnessing the unique resources of the university, the center engages in partnerships with urban citizens, including youths, to increase awareness, promote inclusion, and address needs. Center programs include seed grants to students working in teams in pursuit of urban research and community service; service learning that involves students in community building; technical assistance to neighborhood organizations, schools, and hospitals; and the production of works that appeal broadly to urban audiences, including performances, exhibits, and videos. For more information, call 480/965-9216, or access the center’s Web site at www.asu.edu/copp/urban.

Morrison Institute for Public Policy. Established in 1981 by the Morrison family of Gilbert, Arizona, as a unit within the School of Public Affairs, the institute conducts research on public policy matters, informs policy makers and the public about issues of importance, and advises leaders on choices and actions. Morrison Institute offers a variety of services to public and private sector clients and pursues its own research agenda. Services include policy research, program evaluation, and public outreach. The institute’s interests, research, and publications span such areas as education, urban growth, human services, workforce development, economic development, and arts and culture.

For more information, call 480/965-4525, access the institute’s Web site at www.asu.edu/copp/morrison, or write

MORRISON INSTITUTE FOR PUBLIC POLICY
ARIZONA STATE UNIVERSITY
PO BOX 874405
TEMPE AZ 85287-4405

Herberger College of Fine Arts

Institute for Studies in the Arts. The Institute for Studies in the Arts (ISA) in the Herberger College of Fine Arts serves as a research laboratory for the development of new art forms, new ideas and concepts, and innovative technologies for artistic expression; a network for communication among creative scholars both within and outside the arts; and a resource base for the documentation, evaluation, and dissemination of research in the arts. ISA addresses the needs of a variety of populations through technical and monetary support and sponsorship for research projects, performances, exhibitions, and symposia.

ISA facilities include an experimental media performance space with an adjacent technology prototyping and applications studio in Drama City; the “Intelligent Stage,” an interactive and tele-performance studio with state-of-the-art digital audio and video production and post-production facilities in Matthews Center; a Technology Development Studio for the development of prototype technologies and their application to aesthetic research; and comprehensive archives that document the history of research initiatives supported by the ISA.

ISA is open to a wide range of proposals from faculty, graduate and undergraduate students, and visiting artists, provided such proposals address the ISA mission of experimentation and innovation in the arts. For more information, visit ISA in MCENT 224, call 480/965-9438, or access the ISA Web site at herbergercollege.asu.edu/isa.

Vice Provost for Research

Center for Environmental Studies. Established in 1974, the primary mission of the Center for Environmental Studies is to facilitate collaborations among faculty researchers and to aid decision making about environmental issues. Through its collaborations, both with ASU faculty and partners from government, business, and the educational community, the center advances the identification of key local and global environmental issues and collects reliable information to be used by scholars, policy makers, and the general public. For more information, access the CES Web site at www.asu.edu/ces.

The center is also home to the Central Arizona–Phoenix Long-Term Ecological Research (CAP LTER) project, one of only two urban sites in the NSF-funded LTER network. The CAP LTER project focuses on an arid-land ecosystem profoundly influenced, even defined, by the presence and activities of humans, and involves more than 50 associated faculty from biology, ecology, engineering, geography, geology, sociology, urban planning, and anthropology. For more information, access the CAP LTER Web site at www.asu.edu/ces/CAPLTER.htm.

The center administers an NSF-funded Integrative Graduate Education and Research Training (IGERT) grant to develop a multidisciplinary program in urban ecology. The program’s research component engages students in

wide-ranging and multidisciplinary investigations into the ecology of cities, with the CAP LTER project providing the research infrastructure. For more information, access the IGERT Web site at www.asu.edu/ces/igert.htm.

The center also facilitates applied environmental research projects undertaken by the Southwest Center for Environmental Research and Policy (SCERP), a consortium of five U.S. and four Mexican universities. SCERP develops a research agenda for the study of air and water quality, hazardous waste problems, environmental health issues, and growth management questions in the border region.

For more information, contact the director, Center for Environmental Studies, Tempe Center (University and

Mill), 480/965-2975, or access the center's Web site at www.asu.edu/ces.

ASU East

Sustainable Technologies, Agribusiness, and Resources Center. The focus of the Sustainable Technologies, Agribusiness, and Resources (STAR) Center is to bring together multidisciplinary researchers whose mission is to study sustainable processes and systems, whether natural or human designed, that will be efficient and less consumptive and will promote conservation of the earth. For more information, call 480/727-1240, or access the STAR Center Web site at www.east.asu.edu/research/star.



A team of ASU researchers takes soil samples at Papago Park in Phoenix as part of the ongoing Central Arizona-Phoenix Long Term Environmental Research (CAP LTER) project. The soil testing will continue for 25 years.

Tim Trumble photo

Fees, Deposits, and Other Charges

The Arizona Board of Regents reserves the right to change fees and charges without notice. The latest *Schedule of Classes* usually reflects up-to-date fee amounts. The following fees apply to both credit and noncredit (audit) registrations.

DEFINITIONS

Resident tuition refers to the charge assessed to all resident students who register for classes at ASU. *Nonresident tuition* refers to the charge assessed to nonresident students, as established in Arizona Board of Regents' Policy 4-102.

ACADEMIC YEAR TUITION

The resident and nonresident tuition for fall and spring semesters is shown in the "2000–2001 Resident and Nonresident Tuition" table, on this page. The amounts listed are per semester hour each academic term. For more information on classification for fee status, see "Residency Classification Procedures and Policies," page 44.

Students registered for seven or more hours are considered full-time for tuition payment purposes. See "Enrollment Verification Guidelines," page 95.

Note: The rate for one hour is charged if the student is registered for only a zero-hour class.

Graduate College Differential Fees. Certain graduate programs assess an additional differential fee. These fees differ according to college and/or program. Contact the program advisor for details on these fees.

Summer Sessions Fees. The 2001 registration fee per semester hour is \$119 except for law students. The registration fee per semester hour for law students is \$263. For more information, see the *Summer Sessions Bulletin*.

OTHER FEES, DEPOSITS, AND CHARGES

Special Class Fees and Deposits. Certain university classes require payment of fees or deposits for materials, breakage, and rentals. These fees and deposits are listed in the *Schedule of Classes* for each semester.

Student Recreation Complex Fee. All students (except university employees) who take at least one class at ASU Main must pay a mandatory Student Recreation Complex fee. Full-time (seven or more hours) students are charged \$25 per semester. Part-time students pay \$12 per semester, and summer students pay \$2 per semester hour. See the latest *Schedule of Classes* for more information.

Financial Aid Trust Fee. All students must pay a financial aid trust fee. Full-time students (enrolled for seven or more hours) are charged no more than 1 percent of the current tuition. The fee for students enrolled six or fewer hours is half that charged full-time students. The total summer sessions fee does not exceed the amount for a full-time student. Fees collected from students are matched by the State of Arizona and used to create a Financial Aid Trust Fund, from which student grants are awarded under the usual financial aid eli-

2000–2001 Resident and Nonresident Tuition

Hours	Resident*	Nonresident*
1	\$ 119.00	\$ 405.00
2	238.00	810.00
3	357.00	1,215.00
4	476.00	1,620.00
5	595.00	2,025.00
6	714.00	2,430.00
7	1,136.00	2,835.00
8	1,136.00	3,240.00
9	1,136.00	3,645.00
10	1,136.00	4,050.00
11	1,136.00	4,455.00
12 or more	1,136.00	4,864.00

* Tuition is subject to change for 2001–2002. In addition to tuition, students are charged other fees (e.g., the Student Recreation Complex fee and financial aid trust fee).

gibility criteria used by the ASU Student Financial Assistance office.

Arizona Students' Association (ASA) Fee. The ASA is a nonprofit lobbying organization that represents Arizona's public university students to the Arizona Board of Regents, State Legislature, and U.S. Congress. In 1997, students at the state universities voted to change the mechanism for funding the ASA. A \$1 fee is charged to each student each semester. Any refunds for this fee are provided through the ASA Central Office.

Late Registration. The fee assessed on registrations on or after the first day of each session is \$35. A \$35 late fee is also assessed on registration payments received after the fee payment deadline but processed before the class enrollment purge.

Admission Application. The nonrefundable fee for graduate admission or readmission applications to a degree program is \$45. The nonrefundable fee for graduate nondegree or nondegree readmission applications is \$15.

Transcripts. The Office of the Registrar releases official transcripts *only upon the written request of the student*. The request must include the following information:

1. the student's name and former name(s);
2. the student ID number;
3. the date of birth;
4. the dates of attendance;
5. a return address;
6. specific address to mail transcript;
7. student's signature; and
8. appropriate fees (as described in the text that follows).

The Request for Official Transcript form is available online at www.asu.edu/registrar/forms.

The Office of the Registrar does not issue a transcript if the student has a financial records hold. The student must supply a specific address if the transcript is to be mailed.

The fee for an official transcript for a student not enrolled is \$5 for the first copy. Additional copies ordered at the same time are \$1 each. The fee is \$1 per copy for a student enrolled for a current or future semester.

Unofficial transcripts may be requested in person at the Office of the Registrar, any registrar site, or by mail or fax (480/965-2295) if a signed release is enclosed. There is no charge for an unofficial transcript.

Copies of Education Records Other Than ASU Transcripts. For fewer than six pages, there is no charge. For six to 10 pages, the total charge is \$2. For 11 to 15 pages, the total charge is \$3. Copies of additional pages cost \$1 for every five pages copied.

Comprehensive Examination. This fee is paid by all students seeking to establish credit by examination and is \$50 per semester hour.

Private Music Instruction. The fee for one-half hour of instruction weekly is \$40. The fee for one hour of instruction weekly is \$60. The fee for more than one hour of instruction weekly—for music majors only—is \$60.

Musical Instrument Rental Charge. The charge for use of university-owned musical instruments is \$25. Consult the School of Music for specific information.

Binding and Microfilm Fees. The binding fee for a thesis or dissertation is \$17 per copy. This fee is subject to change. Additional charges may be required depending on the size and nature of the document. The dissertation microfilming fee is \$55 and is subject to change.

Sun Card/ID Card. The replacement fee is \$10.

Parking Decals. A parking decal must be purchased, in person or by using the Park Smart touch-tone telephone system 480/921-PARK (7275), for motor vehicles parked on campus except in areas where metered parking or visitor lots are available. Photo identification is required. Annual decals range from \$50 to \$129 for controlled access parking. Decals are sold on a first-come, first-served basis. For more decal sales information, call 480/965-6124, or visit the Web site at www.asu.edu/dps/pts.

Each vehicle registered at ASU Parking and Transit Services must comply with Arizona emission standards (A.R.S. § 15-1627G) during the entire registration period. The fee for this emission inspection is \$25 to \$35 per vehicle.

Everyone is encouraged to support travel reduction measures by using mass transit, the university shuttle bus, carpooling, bicycling, or walking whenever possible.

Parking Violations. Due to a high demand for parking, regulations are strictly enforced. Fines range from \$10 to \$100. Appeals to parking citations may be filed within 14 calendar days to Parking and Transit Services and, after payment, may be further appealed to the Parking Citation Appeals Board. Unpaid parking citations are delinquent financial obligations subject to the provisions of the “Delinquent Financial Obligations,” page 44. The vehicle of any person owing

three or more unpaid parking citations or \$100 in unpaid parking citations is subject to impoundment. An \$85 minimum fee is assessed if impoundment is required. For more information, call 480/965-4527.

Returned Checks. Checks returned by a bank are assessed a \$15 service charge with repayment needed within five business days of notification. A second \$12 service charge is made if the returned check is not repaid within this five-day period. Repayment of a returned check must typically be in cash.

The university may have arrangements with its bank to redeposit automatically for a second time checks for which there are insufficient funds. No service charge is assessed by ASU until a check is returned to ASU; however, the payer may be assessed a service charge by the payer’s financial institution.

Students paying fees with a check that is subsequently not honored by a financial institution are subject to involuntary withdrawal from the university if repayment is not made. All students involuntarily withdrawn are charged according to the standard refund schedule as of the involuntary withdrawal date, as determined by the university.

On-Campus Housing. The cost of ASU Main housing varies. In 1999–2000 the typical cost was \$2,780 per academic year. Meal plans are purchased separately.

TRANSPORTATION

To reduce air pollution and traffic congestion, students are encouraged to travel to and from campus by means other than automobile and to reduce transportation needs through careful class scheduling. Nearby on-campus parking is limited and tightly controlled.

Alternative transportation modes are used by thousands of ASU students. ASU is served by a regional transit service; monthly and reduced-fare semester passes are available on campus. In addition, an inexpensive express shuttle runs between ASU Main in Tempe and ASU West in north-west Phoenix; another shuttle runs among ASU Main, Mesa Community College, and ASU East in Mesa; and a Free Local Area Shuttle (FLASH) is available around the periphery of ASU Main.

Bicycle ridership at ASU is estimated to be more than 15,000 students daily. Ample racks in many locations enable the parking and securing of bicycles. Bicycle use is restricted only in those areas of campus where pedestrian traffic is sufficiently heavy to make such use a hazard. The Bike Co-op Repair Service provides assistance with bicycle maintenance.

For more information on commute alternatives, call 480/965-1072.

PAYMENT METHODS AND DEADLINES

InTouch. The InTouch system, at 480/350-1500, allows students to register for classes, to drop and add classes, and to make fee payment from any touch-tone phone. Students paying fees with available financial aid, debit cards, Visa, MasterCard, or Discover must use the InTouch system. Refer to the *Schedule of Classes* for available dates and times and more information about the InTouch system.

Debit/Credit Cards. ASU accepts debit cards, Visa, MasterCard, and Discover. Debit/credit card payments through

InTouch are processed online with the bank. See the *Schedule of Classes* for information about using debit/credit cards by mail or campus payment boxes.

Checks. Checks payable for the exact amount of charges and without a restrictive endorsement are generally acceptable, except for students on check-use suspension due to a previously returned check.

Financial Aid. Students receiving financial aid may use their expected aid, except Federal Work-Study, to pay university charges, including fees. Students who wish to do so must follow specified procedures. See the latest *Schedule of Classes* for more information.

Veterans Deferred Payment. The Veterans Readjustment Assistance Act allows veterans to apply for deferred payment of fees, books, materials, and supplies required for courses. To assist eligible students, a Veteran Promissory Note may be issued deferring payment during their first semester of benefits. Contact the Veterans Services Section at SSV 148, or call 480/965-7723 for information on meeting the necessary requirements. The university may deny this privilege with previous delinquent obligations.

Payment Deadlines. Fees must be paid by the deadline dates and times indicated or the registration is voided. A fee payment deadline is printed on all Schedule/Billing Statements and in the *Schedule of Classes*.

REFUNDS

Academic Year Resident and Nonresident Tuition. Students withdrawing from school or individual classes receive a refund as described in the “Fall and Spring Withdrawal Refunds” table:

Fall and Spring Withdrawal Refunds

Withdrawal Date	Refund
Before first day of the semester	100% *
One through seven calendar days	80%
Eight through 14 calendar days	60%
15 through 21 calendar days	40%
22 through 28 calendar days	20%
After 28 calendar days	No refund

* A \$35 processing fee is subtracted per session.

The university provides a prorated refund for first-time students receiving financial aid; therefore, the refund schedule is the minimum amount refundable to these students.

Withdrawal occurs on the calendar day that withdrawal is requested, either in person at a registrar site or by phone using InTouch. Students withdrawing for medical or other extenuating circumstances must contact their college for refunds that may be available under these circumstances.

Summer Sessions Fees. Students withdrawing from any summer session or individual classes receive a refund as described in the “Summer Sessions Withdrawal Refunds” table. *Refunds are based on the session days and not the class meeting dates for any particular class.*

Summer Sessions Withdrawal Refunds

Withdrawal Date	Refund
Before first day of session	100% *
First and second days of session	80%
Third day of session	60%
Fourth day of session	40%
Fifth day of session	20%
After fifth day of session	No refund

* A \$35 processing fee is subtracted per session.

Special Class Fees and Deposits. After the first week of classes, refunds, if any, are determined only by the department or school offering the course. Refund determination is based on withdrawal date, type of activity, and costs already assessed by the department or school.

Private Music Instruction. If a student must drop a music course because of illness or other emergency beyond the student’s control, not more than half of the instruction charge may be refunded, as determined by the School of Music.

Late Registration. This fee is not refundable.

Student Recreation Complex Fee. This fee is refundable only upon complete withdrawal, in percentage increments per the refund schedule.

Financial Aid Trust Fee. This fee is not refundable.

Official Transcripts. Overpayments by mail of \$5 or less are refunded only by specific request.

Graduation Fee. Overpayments by mail of \$5 or less are refunded only by specific request.

Residence Halls. Refunds to students departing from ASU Main residence halls before the end of the academic year are computed on the following basis.

Charges and Deposits. Housing payments and deposits are refunded as prescribed by the Residential Life License Agreement that students sign when they apply for residence hall accommodations. Students should refer to the Residential Life Schedule of Charges and Deadlines for specific information on refunds.

Other University Charges. Other university charges are normally not refundable, except for individual circumstances.

Payment of Refunds. Refunds require student identification and are made payable only to the student for the net amounts due the university. When the last day of a refund period falls on a weekend or holiday, a withdrawal form must be submitted to one of the registrar sites during operating hours on the workday preceding the weekend or holiday. Refunds are normally paid by check, payable to the student, and are mailed to the student’s local address.

Parking Decal Refunds. Prorated refunds are available through the last business day in April.

Forfeiture of Refunds. Refunds are subject to forfeiture unless obtained within 90 days of the last class day of the semester for which the fees were originally paid.

DELINQUENT FINANCIAL OBLIGATIONS

Arizona Board of Regents' Policy 4-103B, which applies to ASU, states the following:

1. Each university shall establish procedures to collect outstanding obligations owed by students and former students.
2. Each university shall maintain a system to record all delinquent financial obligations owed to that university by students and former students.
3. Students with delinquent obligations shall not be allowed to register for classes, purchase parking decals, receive cash refunds, or obtain transcripts, diplomas, or certificates of program completion. The university may allow students to register for classes, obtain transcripts, diplomas, or certificates of program completion if the delinquent obligation is \$25 or less.
4. Unpaid obligations shall remain a matter of record until students and former students satisfy their financial obligations or until satisfactory arrangements for repayment are made with the university.
5. The university may write off delinquent financial obligations of students according to accepted accounting principles and after appropriate collection efforts. No such write-off shall operate to relieve the student of liability for the obligation nor shall such write-off entitle the student to release of any transcripts, diplomas, certificates of program completion, or to register for further university classes until such obligation is actually paid.
6. Each university shall include this policy in its bulletin or catalog.

A late charge of \$12 is assessed for any balances due the university not paid within 30 days of the initial due date, with a second \$12 late charge assessed if these amounts are not paid within 30 days of the first late charge, and a third \$12 late charge is assessed if these charges are not paid within 60 days of the first late charge. Procedures to be followed for disputed charges are available from the Accounts Receivable section of Student Business Services, located in ADM A109.

RESIDENCY CLASSIFICATION PROCEDURES AND POLICIES

The Arizona Board of Regents is required by law to establish uniform guidelines and criteria for classifying students' residency to determine those students who must pay nonresident tuition. The following is a summary of the general guidelines used to determine residency for tuition purposes. All of the evidence is weighed under the presumption that a nonresident student's presence in Arizona is primarily for the purpose of education and not to establish domicile and that decisions of an individual about the intent to establish domicile are generally made after the completion of an education and not before.

To obtain resident status for tuition purposes, independent students must establish their residence in Arizona at least one year immediately before the last day of regular registration for the semester in which they propose to attend ASU. Arizona residence is generally established when indi-

viduals are physically present in the state with the intention of making Arizona their permanent home.

Mere physical presence in Arizona for one year does not automatically establish residency for tuition purposes. Adult students and emancipated minors must combine physical presence in Arizona for one year with objective evidence of their intent to make Arizona their permanent home. If these steps are delayed, the one-year period is extended until both presence and intent have been demonstrated for one full year. In addition to physical presence and intent, the student must demonstrate financial independence for the two tax years immediately preceding the request for resident classification. The student must demonstrate objective evidence of self-support and that he or she was not claimed as an income tax deduction by his or her parents or any other individual for two years. An adult student is defined as being at least 18 years of age at the beginning of the domicile year. For a complete definition of an emancipated minor, refer to the Arizona Board of Regents' residency classification policies, available in the Residency Classification Section, SSV 146.

No person is considered to have gained or lost resident status merely by attending an out-of-state educational institution.

Aliens. Students who are aliens are subject to the same requirements for resident status as are U.S. citizens. In establishing domicile, aliens must not hold a visa that prohibits establishing domicile in Arizona.

Refugees. Refugees may qualify as resident students by virtue of having been granted refugee status in accordance with all applicable laws of the United States and having met all other requirements for residence in Arizona.

Exceptions to the General Residency Rule

Students may be eligible for resident status for tuition purposes if they can meet one of the following criteria on or before the last day of regular registration.

Legal Dependents. If a student and his or her parents are domiciled in Arizona and have not met the one-year residency requirement but the parents are entitled to claim the student as a dependent for federal and state tax purposes, the student may be eligible for resident status for tuition purposes.

Transferred Employees. If students are domiciled in Arizona and have not met the one-year residency requirement but are employees or spouses of employees who have been transferred to Arizona by their employers for employment purposes, the students may be eligible for resident status for tuition purposes.

Members of the Military. If students are not domiciled in Arizona but are members of the U.S. Armed Forces stationed in Arizona or are the spouses or dependent children of a member (as defined in A.R.S. § 43-1001), the students may be eligible for resident status for tuition purposes. If military service is concluded while they are enrolled, students do not lose resident status while they are continuously enrolled in a degree program. If individuals are domiciled in Arizona immediately before becoming members of the U.S. Armed Forces, they do not lose resident status because of their absence while on active duty with the military as long

as they maintain Arizona affiliations and file Arizona state tax.

A student who is a member of an Arizona National Guard or Arizona Reserve unit may be eligible for resident status for tuition purposes. A student may also be eligible if he or she has been honorably discharged from the armed forces of the United States, has declared Arizona as his or her legal residence one year before discharge, and has taken the other appropriate actions, including filing an Arizona income tax return. A student who is the spouse or dependent of a member of the armed forces who has claimed Arizona as his or her legal residence and filed Arizona income tax for one year before enrollment may be eligible for resident status for tuition purposes.

Teachers and Classroom Aides. If a student is under contract to teach on a full-time basis or is employed as a full-time non-certified classroom aide at a school within a school district, the student is eligible to pay resident tuition only for courses necessary to complete the requirements for certification by the State Board of Education.

Native Americans. Students who are members of a Native American tribe whose reservation lies both in Arizona and an adjacent state and who are residents of that reservation may be eligible for resident status for tuition purposes.

Procedures for Establishing Resident Status

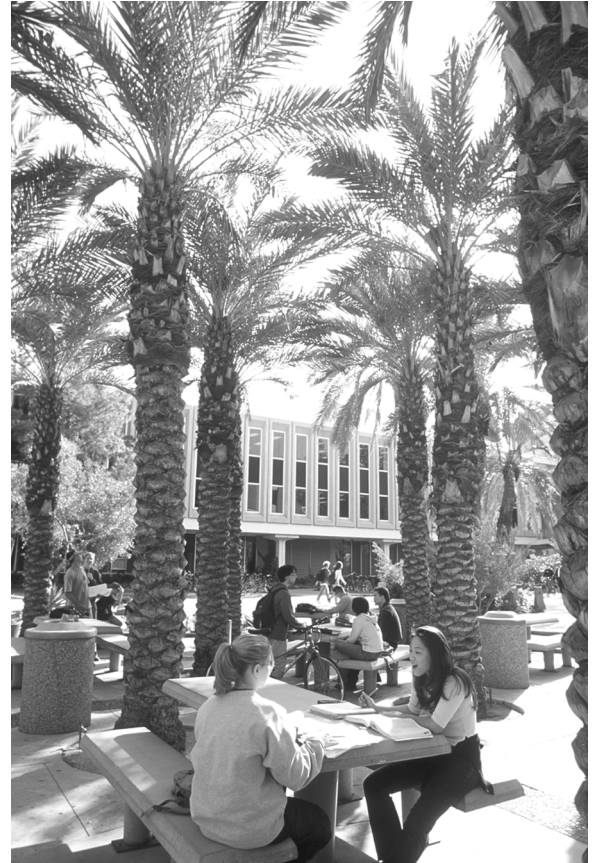
All students are responsible for obtaining residency classification for tuition purposes before registering and paying their fees. This procedure requires students to complete and file an Arizona residency information form. This form is required of all new and returning students as part of the admission or readmission process. Students classified as nonresidents who believe they may qualify for resident status must file a petition with the Residency Classification Section. This petition must be filed by the last day of regular registration. A student seeking resident status must also file supporting documentation necessary to provide a basis for residency classification (source[s] of support, driver's license, voter's registration, vehicle registration, etc.). Students whose residency petitions are in process at the fee payment deadline are responsible for paying nonresident tuition. However, an appropriate refund is issued if resident status is later granted for that semester.

Any student found to have made a false or misleading statement concerning resident status is subject to dismissal from the university.

Failure to file a timely written petition for reclassification of resident status for tuition purposes constitutes a waiver of the student's right to apply for the given semester. Petition

deadlines are published each semester in the *Schedule of Classes*. Extensions to the deadlines are not permitted.

Residency classification is an extremely complex issue. The information presented here is a summary and does not address each individual's situation; therefore, students are encouraged to make a personal visit to the Residency Classification Section to discuss their individual circumstances as soon as possible. Guidelines for determination of residency for tuition purposes are subject to review and change without notice. For more information, call the Residency Classification Section at 480/965-7712, or access the Web site at www.asu.edu/registrar/residency.



The ASU campus offers many great locations for studying outdoors, including the area outside the College of Engineering and Applied Sciences.

John Phillips photo

Financing Graduate Studies

Financial assistance for graduate study consists of scholarships, fellowships, assistantships, student loans, and work-study. Assistance can come from the university, private sources, and/or the federal government. The Graduate College Student Financial Assistance Office provides information and assistance to graduate and professional students. Students can also access the Web site for more information at www.asu.edu/graduate/financial.html or send e-mail to gradaid@asu.edu. For more information, see "Assistantships and Associateships," page 98.

UNIVERSITY SCHOLARSHIP AND FELLOWSHIP PROGRAMS

ASU offers several university-sponsored awards and scholarships for which both the Graduate College and the academic units conduct nominations and selections. To be considered for any of these award programs, students must apply directly to their academic department.

Regents Graduate Academic Scholarships. These scholarships are available on a competitive basis to graduate students with outstanding academic records. This scholarship covers the *resident tuition only (not nonresident tuition)* and is granted for the academic year or one semester only (not including summer sessions). Students must reapply to the academic unit every year.

Applicants must be regularly admitted to a graduate degree program; continuing students must also be in good standing (3.00 postbaccalaureate GPA at ASU). A graduate student may be nominated for this scholarship by the head of the student's academic unit. Application forms and further information are available on the Web at www.asu.edu/graduate. Forms are also available from the Graduate College. Applications should be completed and returned to the academic unit. *The Graduate College does not accept direct applications. Applicants must meet deadlines established by the academic units and the Graduate College.*

Regents Graduate Tuition Scholarships. These scholarships are available on a competitive basis to nonresident graduate students with outstanding academic records. *This scholarship is granted for the academic year or one semester only (not including summer sessions).* Graduate students awarded with this scholarship pay the resident tuition. Applicants must be regularly admitted to a graduate degree program; continuing students must also be in good standing (3.00 postbaccalaureate GPA at ASU). Application forms and further information are available on the Web at www.asu.edu/graduate. Forms are also available from the Graduate College. Applications should be completed and returned to the academic unit. *The Graduate College does not accept direct applications. Applicants must meet deadlines established by their academic unit and the Graduate College.*

University Graduate Scholars Program. This program offers competitive three-year merit packages that include scholarships ranging from \$1,000 to \$5,000, an annual stipend, plus waiver of resident and nonresident tuition. This

fellowship program is for outstanding new graduate students with high credentials such as GRE scores, GPA, publications, and prestigious awards. Applicants should contact the academic unit for information.

Herman E. DeMund Memorial Scholarship. One \$2,000 scholarship is awarded annually to a deserving graduate student at ASU. Students who are regularly admitted to a graduate degree program are eligible to be nominated for this award. Nominations are made by the heads of the individual academic units to the Graduate College, and the recipient is chosen from these nominees. The selection for this award is made on the basis of scholastic ability.

Phelps Dodge Scholarships. Two graduate scholarships of \$5,000 are awarded to regularly admitted graduate students who are residents of Arizona and graduates of ASU. Awards for any academic year are limited to (1) a student chosen from the engineering student body for advanced study in mining, geology, metallurgy, or other fields allied with or pertaining to the mineral industry, or, if no suitable candidate is available for postgraduate study in these fields, for advanced study in any engineering field, and (2) a student chosen from the student body for advanced study in any field that the student may select and for which he or she may be qualified. Nominations are made by the head of the individual academic unit to the Graduate College and the recipients are chosen from those nominees. The selection for these awards is made on the basis of academic achievement.

James J. Sweitzer Memorial Scholarship. This scholarship provides a stipend of \$2,000 to \$3,000 to a graduate student in Agribusiness. Regularly admitted graduate students planning a career in agribusiness are eligible to apply as first- or second-year students. The selection committee considers financial needs but gives preference to high scholarship and potential in the field.

Reiganji Graduate Scholarship Fund. This scholarship fund offers \$1,400 annual scholarships plus waiver of resident and nonresident tuition to students majoring in East Asian history and philosophy.

Travel and Research Grants. The Graduate College collaborates with the Graduate Student Research Office to fund small grants to support graduate student research. These grants usually are made to defray expenses incurred by students completing their theses or dissertations. The Graduate College funds travel grants for masters and doctoral students who wish to present their research results at regional and national conferences. Meeting scholars in their fields and participating with faculty in professional organizations presents opportunities for students to get involved in activities that will become central to their professional lives.

PRIVATE FELLOWSHIPS AND AWARDS

ASU attracts a large number of graduate students who are honored with external sources of assistance such as national research fellowships and prestigious, private scholarships. In addition, the Graduate College assists in nominating

graduate students for national competitions and provides support services to the recipients. These awards are targeted by academic discipline and/or student category.

Achievement Rewards for College Scientists (ARCS). Scholarships are given to gifted and needy scholars in the natural sciences, medicine, and engineering to complete their career preparation. The annual award is \$6,000 in addition to resident and nonresident tuition waivers. ARCS candidates must be nominated through their major department.

Philanthropic Educational Organization National Scholarship Award. This award is offered to outstanding women doctoral students. The successful applicant receives a cash stipend of \$7,000, matched by tuition remission. The award is renewable for a second year. Students must be nominated through their major department.

Ford Foundation Predoctoral Fellowship. This fellowship provides an annual stipend of \$15,000 for three years with tuition scholarships from ASU. The program supports fellows in research-based doctoral programs.

Jacob K. Javits Fellowship Program. This fellowship program offers an annual stipend of \$15,000 based on a fellow's need with tuition scholarships from ASU. This program is designed to assist students of superior ability to pursue studies leading to a doctoral or master's degree in fine arts.

National Science Foundation Graduate Fellowships and Minority Graduate Fellowships. These fellowships provide a stipend of \$15,000 for 12-month tenures. ASU provides additional tuition scholarships to fellows beginning their graduate study in science, mathematics, and engineering.

National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc. (GEM). This fellowship program offers opportunities for underrepresented ethnic minority students to obtain master's degrees in engineering, through a program of paid summer internships and graduate financial assistance. Fellowships consist of a stipend of \$6,000 per academic year; when combined with the summer internship, the total value is between \$20,000 and \$40,000. ASU provides additional support to GEM fellows with tuition scholarships for both resident and nonresident tuition.

Other Forms of Scholarship Support. Students are encouraged to contact the academic unit in which they intend to study and the Graduate College Student Financial Assistance Office to determine if other sources of support are available.

The Graduate College publishes *Grad News*, a newsletter listing current grant and scholarship information. Reference books on national and regional scholarships for which students may be eligible are on reserve at Hayden Library. Announcements are available for review in the center lobby, Wilson Hall, and the Web at www.asu.edu/graduate.



A dancer performs during "Celbytes 2000." The Institute for Studies in the Arts produced the live Webcast, which featured simultaneous artistic performances from two different locations on the ASU campus.

Tim Trumble photo

NEED-BASED FINANCIAL AID

To be considered for need-based support, applicants must complete the Free Application for Federal Student Aid (FAFSA) or the Renewal FAFSA each year.

The FAFSA is available in a variety of formats.

1. The paper FAFSA can be obtained at any U.S. college or university financial aid office, and the Graduate College Student Financial Assistance Office.
2. The electronic FAFSA is available through *FAFSA Express* and *FAFSA on the Web*. Both versions require access to a personal computer, modem, and printer. A copy of the *FAFSA Express* software can be obtained by calling 1-800-801-0576. *FAFSA on the Web*, accessible at www.fafsa.ed.gov, allows completion of the application on the Web site.

Federal Perkins Loan. The Federal Perkins Loan program is funded by the federal government; the school is the actual lender, and repayments after graduation are made to the university at a 5 percent interest rate. Like the subsidized Student Loan, no interest accrues on the Perkins Loan during the enrollment period. Maximum loan awards for 2000–2001 were \$4,000.

William D. Ford Direct Student Loans. Through the William D. Ford Direct Student Loan program, the federal government loans money to students based on the university's determination of the student's financial need and cost of education. Repayment begins after the student graduates, leaves school, or drops below half-time enrollment. There are two loan types under this program: subsidized and unsubsidized. With a subsidized Direct Student Loan, the federal government pays the interest on the loan principal during the student's in-school status, grace, and other authorized periods of deferment.

The school may determine the student to have eligibility for an unsubsidized Direct Student Loan. In this program, the federal government does not pay the interest during the student's in-school status, grace, or other authorized periods of deferment. As the student proceeds through school, interest will accrue and will be added once the student enters the repayment period. Otherwise, conditions and terms for the two programs are the same.

There is a variable interest rate that is adjusted every July 1, but cannot exceed 8.25 percent. The federal government provides several options for repayment once the student has left school. The following total annual loan limits for subsidized and unsubsidized apply: \$8,500 for subsidized and \$10,000 for unsubsidized.

HIGHER EDUCATION TAX INCENTIVES

The Taxpayer Relief Act of 1997 provides assistance (Lifetime Learning Tax Credit) to graduate and professional students in meeting college expenses. For more information, visit the U.S. Department of Education Web site at www.ed.gov.

TAXABILITY OF FINANCIAL AID PROGRAMS

Scholarships, grants, fellowships, and stipends are taxable income to the recipient, except for the portion of these funds used for tuition and other university fees, or books, supplies, and equipment required for the courses being taken. Special tax regulations also apply to nonresident alien students and may require withholding of taxes at the time of aid disbursements to these individuals. Information on the taxability of scholarships can be obtained from the following Internal Revenue Service (IRS) publications and forms: *Publication 4—Student's Guide to Federal Income Tax*; *Publication 519—U.S. Tax Guide for Aliens*; *Publication 520—Scholarships and Fellowships*; Form 1040EZ and Instructions—Income Tax Return for Single and Joint Filers with no dependents; and Form 1040NR and Instructions—U.S. Nonresident Alien Income Tax Return.

These publications and forms can be obtained from the IRS at its toll-free number 1-800-829-FORM (3676). These publications and forms can also be accessed online at www.irs.ustreas.gov/prod/forms_pubs.

FINANCIAL AID FOR INTERNATIONAL STUDENTS

International students are not eligible for Federal Financial Aid but can contact their academic department about Graduate Academic Scholarships and Graduate Tuition Scholarships. Each department or college has different deadline/eligibility requirements for these scholarships. Students may also contact their academic department about teaching or research assistantships. Academic departments provide the appropriate forms to apply for these positions.

CAMPUS SERVICES AND ONLINE SERVICES

Students can access personal information regarding financial aid by using FASTT Web at www.asu.edu/fastt or FASTT Phone at 480/968-4400. Students can check on

1. documents still needed to complete the financial aid file;
2. award information; and
3. financial aid forms in versions that can be printed and mailed or completed and sent across the Web.

For more information about financial assistance, visit the Graduate College Student Financial Assistance Office, located in the center lobby, Wilson Hall, or phone 480/965-3521.

Classification of Courses

COURSE INFORMATION

Information about all lower- and upper-division courses offered at ASU Main and ASU East appears in the *General Catalog*, available on the Web at www.asu.edu/aad/catalogs. Course information at this Web site is more current than in the printed catalog.

ASU Main and ASU East graduate-level courses are described in the *Graduate Catalog*.

ASU West courses are described in the *ASU West Catalog*.

Classes scheduled for the current or upcoming fall or spring semester are listed in the *Schedule of Classes*. Classes scheduled for the summer sessions are listed in the *Summer Sessions Bulletin*. Class schedules are available on the Web at www.asu.edu/registrar/schedule.

COURSE LISTINGS

See “Course Prefix Index,” page 8, for the location of all ASU courses by prefix. See the “Key to Course Listings” diagram on this page.

Campus Code. Campus codes are used in the *General Catalog* and *Graduate Catalog* only for courses in prefixes used by both ASU East and ASU Main. Campus codes are used for all courses offered at ASU Main (M), ASU East (E), and ASU West (W) in the *Schedule of Classes* and the *Summer Sessions Bulletin*.

Semester Offered. In the *General Catalog* and *Graduate Catalog*, the semester offered shows when the academic unit plans to offer the course. Refer to the *Schedule of Classes* and the *Summer Sessions Bulletin* for the actual course offerings.

Prerequisites and Corequisites. Some requirements, known as prerequisites, must be met *before* registering for a course. Other requirements, called corequisites, must be met *while* taking a course. A student registering for a course should be able to show that prerequisites have been met and that corequisites will be met as stated in the catalog or *Schedule of Classes* or must otherwise satisfy the instructor that equivalent preparation has been completed.

General Studies Code. The General Studies requirement does not apply to graduate students.

COURSE NUMBERING SYSTEM

100–299 (Lower-Division) Courses. Lower-division courses are designed primarily for freshmen and sophomores. Certain classes are closed to freshmen who lack the designated prerequisites or whose majors are outside the unit offering the course. This information is available in the *General Catalog*, in the *Schedule of Classes*, or from the student’s academic advisor.

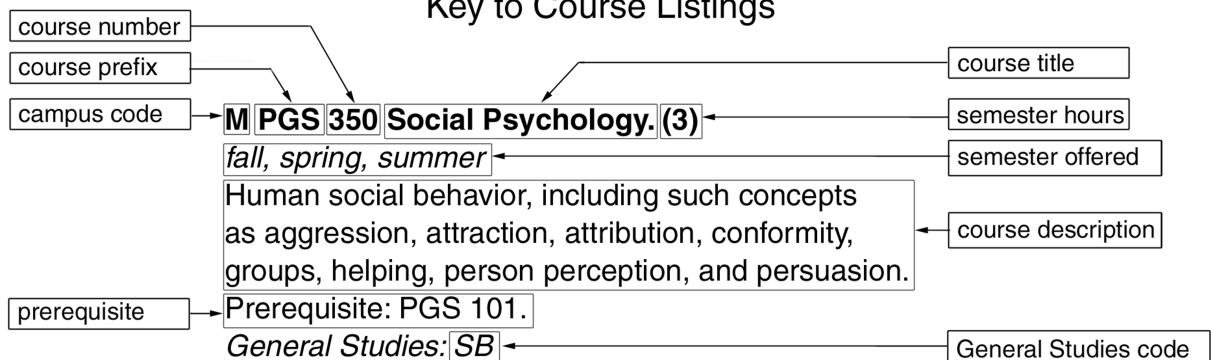
300–499 (Upper-Division) Courses. Upper-division courses are designed primarily for juniors, seniors, and other advanced students. Prerequisites and other restrictions should be noted before registration. Courses at the 400 level apply to graduate degree requirements for some graduate programs when approved by the Graduate College. See “Reserving of Course Credit by Undergraduates,” page 96.

500–799 (Graduate-Level) Courses. Graduate-level courses are designed for graduate students. However, an upper-division undergraduate student may enroll in these courses with the approval of the student’s advisor, the course instructor, the department chair, and the dean of the college in which the course is offered. If the course does not meet an undergraduate graduation requirement, it may be eligible for use in a future graduate program on the same basis as work taken by a nondegree graduate student.

Omnibus Courses

Omnibus numbers are used for courses offered on an experimental or tutorial basis or for courses in which the content is new or periodically changes. Academic units use their prefixes with omnibus course numbers. The general nature of the work required for a particular omnibus course is consistent from unit to unit, but subject matter varies. Omnibus courses are often offered for a variable number of semester hours. See the appropriate academic unit in the *General Catalog* or major in the *Graduate Catalog* for omnibus courses.

Key to Course Listings



OMNIBUS GRADUATE COURSES

500, 600, 700 Research Methods. (1–12)

Course on research methods in a specific discipline.

580, 680, 780 Practicum. (1–12)

Structured practical experience in a professional program, supervised by a practitioner and/or faculty member with whom the student works closely.

583, 683, 783 Field Work. (1–12)

Structured, supervised field experience in a field science or other discipline requiring experience in field techniques.

584, 684, 784 Internship. (1–12)

Structured practical experience following a contract or plan, supervised by faculty and practitioners.

590, 690, 790 Reading and Conference. (1–12)

Independent study in which a student meets regularly with a faculty member to discuss assignments. Course may include such assignments as intensive reading in a specialized area, writing synthesis of literature on a specified topic, writing literature review of a topic.

591, 691, 791 Seminar. (1–12)

A small class emphasizing discussion, presentations by students, and written research papers.

592, 692 Research. (1–12)

Independent study in which a student, under supervision of a faculty member, conducts research that is expected to lead to a specific project such as a thesis or dissertation, report, or publication. Assignments might include data collection, experimental work, data analysis, or preparation of a manuscript.

593, 693, 793 Applied Project. (1–12)

Preparation of a supervised applied project that is a graduation requirement in some professional majors.

594 Conference and Workshop. (1–12)

Topical instruction, usually in compressed format, leading to academic credit. Often offered off campus to groups of professionals.

595, 695, 795 Continuing Registration. (1)

Used in situations where registration is necessary but where credit is not needed. Replaces arbitrary enrollment in reading and conference, research, thesis, dissertation, etc. Used by students when taking comprehensive examinations, defending thesis or dissertation, or fulfilling the continuous enrollment requirement in doctoral programs. Credit is not awarded, and no grade is assigned.

598 Special Topics. (1–4)

Topical courses not offered in regular course rotation—e.g., new courses not in the catalog, courses by visiting faculty, courses on timely topics, highly specialized courses responding to unique student demand.

599 Thesis. (1–12)

Supervised research focused on preparation of thesis, including literature review, research, data collection and analysis, and writing.

792 Research. (1–15)

Independent study in which a student, under supervision of a faculty member, conducts research that is expected to lead to a specific project such as a dissertation, report, or publication. Assignments might include data collection, experimental work, data analysis, or preparation of a manuscript.

799 Dissertation. (1–15)

Supervised research focused on preparation of dissertation, including literature review, research, data collection and analysis, and writing.

The preceding courses are described in announcements of the Graduate College and are also available in the respective departments. Under special circumstances, arrangements may be made at the dean's request, through the approval of the senior vice president and provost, to increase the standard semester hours of credit.

Continuing Registration. Courses numbered 595, 695, and 795, Continuing Registration, carry one semester hour of credit; however, the student receives neither credit nor grade for the course.

Visiting Student Program. The numbers 597, 697, and 797 in the LAW prefix have been reserved for the Visiting Student Program in the College of Law.

Elementary Education Program Courses. Some elementary education methodology courses use the prefix EDB (education development block) for purposes of registration. These courses are reserved for students admitted to professional programs. EDB courses are converted to permanent ASU education courses (with other prefixes) following the drop-add period, as determined by the registrar's calendar.

Graduate College Courses. Courses with the prefix GRD numbered 791 are reserved for doctoral students participating in the Preparing Future Faculty (PFF) program administered by the Graduate College. PFF students are required to take one semester hour for each of the semesters they are enrolled in the program. Students enroll for the first-year exploratory phase. Those accepted into the second-year participatory phase enroll for one semester hour each semester.

International Program Courses. Courses with the prefix IPO (international programs overseas) numbered 495 and 595 are reserved for International Programs study abroad and exchange programs. For most programs, participating students register for 18 semester hours. Following completion of an international program, undergraduate students receive credit for the study completed, with a minimum of 12 semester hours and a maximum of 18 semester hours, graduates with a minimum of six semester hours and a maximum of 12 semester hours.

IPO courses numbered 495 and 595 are converted to ASU credit for recording courses taken abroad.

IPO courses numbered 494 and 598 may be taken for one semester hour. Students register for these courses under the title "Study Abroad." At the conclusion of the program and the transfer of overseas courses to the students' ASU records, a grade of "Y" is entered for the course.

For some special international programs, students register and receive credit for fewer semester hours.

Graduate College

Bianca L. Bernstein, Ph.D., Dean

www.asu.edu/graduate



Raquel Monroe, second from right, reviews the results of her successful master's oral examination in Communication with faculty members Olga Davis, left, Jacqueline Martinez, second from left, and Frederick Corey, associate dean in the College of Public Programs.

Jeremy Babendure photo

Through the faculty, Arizona State University's Graduate College offers programs to meet the educational needs of those who already hold baccalaureate and master's degrees. While many students prepare for careers in research, the professions, and the arts, others study for personal enrichment. Both part-time and full-time students are enrolled in 91 master's and 48 doctoral majors encompassing hundreds of concentrations and specialties. Other students explore new areas of interest or prepare for career advancements apart from formal degree programs. The Graduate College partners with academic programs to assist in attracting and retaining talented graduate students with diverse career goals.

The size, strength, and diversity of the graduate community reflect the university's commitment to high quality education. As a major center for graduate education, ASU supports cultural and intellectual activity as well as research in a broad range of arts and sciences and professional disciplines; in addition, the university conducts research address-

ing the social, cultural, and economic growth and development of Arizona and the Southwest.

One distinctive project that magnifies the Graduate College's dedication to graduate students is the Preparing Future Faculty program, funded by the Pew Charitable Trusts and ASU. The program is designed to educate students about faculty roles and prepare doctoral students specifically for faculty positions in our nation's colleges and universities.

This past year, about 2,000 ASU graduate students were awarded prestigious fellowships and scholarships, exceeding \$3.5 million. These awards were funded by the National Science Foundation, NASA, the Ford Foundation, Fulbright, and other public agencies and private foundations.

ASU assisted more than 2,800 outstanding graduate students through academic and tuition scholarship and other financial support programs—the total financial support amounted to \$15.5 million, exemplifying the university's commitment to enabling student success.

Funded programs, together with more than 30 research centers and institutes, provide assistantships and training for many graduate students; further, the centers coordinate conferences, colloquia, and special seminars to heighten the learning experience. The Office of the Vice Provost for Research provides seed money to enable ASU faculty and students to work at the frontiers of knowledge. Such activities continually encourage the creative embrace of change and experimentation.

ASU provides numerous choices in student life, for personal enrichment as well as cultural interaction. Many internationally known speakers present lectures here, bringing together faculty, graduate students, and the community to engage in stimulating dialogue.

Intellectual Environment. More than 10,000 students from all 50 states and more than 100 nations are enrolled in graduate study at the university. Such size and diversity contribute to a cosmopolitan setting that is ideal for intellectual discourse and stimulation. As a balance to this large grouping of students, individual graduate programs conduct small colloquia and seminars where students and faculty discuss their work in an intimate, intellectual environment supportive of student development. The result is a spirited, lively atmosphere in which students and faculty members get to know each other through collaborative research and intellectual exchange.

GRADUATE PROGRAMS

Degree Programs

Although graduate degree programs differ in many ways, they all share two important characteristics. First, in comparison to baccalaureate programs, they demand a deeper and broader understanding of a body of knowledge in a recognized discipline or profession. Second, in master's and

Interdisciplinary Graduate Degrees and Majors Overseen by the Graduate College

Major	Degree	Concentration	Administered By
Creative Writing	M.F.A.	—	Creative Writing Committee
Curriculum and Instruction	Ph.D.	Art education, curriculum studies, early childhood education, educational media and computers,* elementary education, English education, exercise and wellness education, language and literacy, mathematics education, music education, physical education, science education, special education	Interdisciplinary Committee on Curriculum and Instruction
Exercise Science	Ph.D.	Biomechanics, motor behavior/sport psychology, physiology of exercise	Committee on Exercise Science
Justice Studies	Ph.D.	Criminal and juvenile justice; dispute resolution; law, justice and minority populations; law, policy, and evaluation; women, law, and justice	Committee on Law and Social Sciences
Materials Science	M.S.	—	Committee on the Science and Engineering of Materials
Science and Engineering of Materials	Ph.D.	High-resolution nanostructure analysis, solid-state device materials design	Committee on the Science and Engineering of Materials
Speech and Hearing Science	Ph.D.	Developmental neurolinguistic disorders, neuroauditory processes, neurogerontologic communication disorders	Committee on Speech and Hearing Science
Statistics	M.S.	—	Committee on Statistics

* Applications are not being accepted at this time.

especially in doctoral programs, graduate students prepare to make original contributions to their fields through research and other creative activities of a high order. In contrast, then, to the broad-based baccalaureate degree, graduate degrees are specialized. ASU offers several types and levels of graduate degrees.

For admission information and procedures, access the Web site at www.asu.edu/graduate/admission or refer to the *Application for Graduate Admission* booklet.

Master's and Doctoral Work. Many students pursue a master's degree to satisfy their own quest for learning. In some disciplines, such as dance or architecture, the master's degree is normally the terminal or final degree. In other fields, students enter master's programs as the first step toward more advanced work, such as doctoral studies, which prepare students for a lifetime of intellectual inquiry and creativity or for the application of knowledge to professional practice.

Research Degrees. Students at ASU may pursue research-oriented or practice-oriented degrees. Research-oriented degree programs—the Master of Arts (M.A.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.)—prepare students for careers of research and scholarship in governmental, business, and industrial organizations, or in university or college teaching. Students in these programs develop abilities to evaluate existing knowledge critically and extend it into fresh areas of inquiry and scholarship.

Professional Degrees. The professional or practice-oriented degree programs have slightly different names and distinct academic missions. The names of the degrees are

commonly tied to the academic unit offering the program, for example, Master of Business Administration (M.B.A.), Master of Music (M.M.), and Master of Social Work (M.S.W.). With the objective of preparing students for professional practice, such programs require rigorous preparation in the fundamental literature and scholarship of the field. Some degrees require demonstrated expertise through an internship, an exhibition (art), a performance (dance), or a recital (music). Examples of ASU fields in which academic units offer professional programs include architecture and design, business, education, engineering, health services administration, law, nursing, public administration, and social work.

Nondegree Graduate Study

Many serious students enter graduate studies not intending to obtain a new degree but rather to enhance personal knowledge. They may want to advance in their present career, acquire the background to make a career change, or make up academic deficiencies before entering a degree program. All graduate students, degree or nondegree, enjoy the benefits of cultural and intellectual activities at the university, such as colloquia, seminars, and conferences focusing on the latest scholarship in the field. By consulting with appropriate academic units, students can learn which courses are suitable to their needs.

For admission information and procedures, access the Web site at www.asu.edu/graduate/admission or refer to the *Application for Graduate Admission* booklet.

Student Services for Nondegree Students. The Graduate College maintains an advising office open year-round. See

“Graduate Student Support Services,” page 54, for more information.

Graduate Studies and University Environment

The Graduate College spans the university in supervising graduate studies and offering all postbaccalaureate degrees except the Juris Doctor, which is administered by the College of Law. Since more than 1,600 ASU faculty members teach graduate students in more than 115 instructional units, the Graduate College works closely with the other colleges and academic units. In most cases, graduate instruction is offered by units that also provide related undergraduate programs.

Interdisciplinary Study. Although most graduate programs are offered by academic units, diverse interdisciplinary programs cross academic disciplines and come under the supervision of the Graduate College. Many majors are in fields that are still emerging as recognized academic disciplines and, therefore, do not customarily form the academic basis for departments. Other fields of study are inherently interdisciplinary and do not fit well with conventional disciplines around which departments are formed. Curricula must reflect intrinsically broad disciplinary affinities, and faculty must be drawn from more than one academic unit.

Currently, the Graduate College oversees nine interdisciplinary programs and has joint responsibility with the College of Education for another; several others are planned. Existing programs include the Gerontology Program (Certificate in Gerontology jointly offered by ASU Main and ASU West), Creative Writing (M.F.A.), Curriculum and Instruction (Ph.D.) (jointly administered with the College of Education), Exercise Science (Ph.D.), Justice Studies (Ph.D.), Materials Science (M.S.), Science and Engineering of Materials (Ph.D.), Speech and Hearing Science (Ph.D.), Statistics (M.S.), and Transportation Systems (Certificate in Transportation Systems).

Other interdisciplinary degree programs include Communication (Ph.D.) (administered by the College of Public Programs), History and Theory of Art (Ph.D.) (jointly offered with the University of Arizona) (administered by the School of Art), Humanities (M.A.) (administered by the College of Liberal Arts and Sciences), and Molecular and Cellular Biology (M.S., Ph.D.) (administered by the College of Liberal Arts and Sciences).

Each of these programs utilizes resources and faculty from several disciplines. They promote cooperative research and instruction among faculty who share common interests but are housed in different academic units. They allow students to pursue degrees that are intellectually coherent but that bring together diverse strengths of the university. See the “Interdisciplinary Graduate Degrees and Majors Overseen by the Graduate College” table, page 52.

Interdisciplinary Committee on Linguistics. Linguistics at ASU is interdisciplinary in nature. The linguistics faculty come from the Departments of Anthropology, Communication, Computer Science and Engineering, English, Languages and Literatures, Philosophy, Psychology, and Speech and Hearing Science and from the College of Education.

The Interdisciplinary Committee on Linguistics coordinates linguistics courses and programs, provides advising, and hosts conferences and lectures.

Faculty from three departments (Anthropology, English, Languages and Literatures) offer programs with concentrations in linguistics: the M.A. in Anthropology, M.A. in English, M.A. in Spanish, and Master of Teaching English as a Second Language.

Certificate Programs. A number of certificate programs are offered by various academic units or programs on campus (see “ASU Graduate Degrees,” page 10).

Research Programs. ASU continues to advance as a major research institution. The Office of the Vice Provost for Research provides leadership in obtaining external funding and in coordinating and administering sponsored projects. Many graduate students receive financial support and gain first-hand experience as they participate with faculty members in carrying out these research projects.

Much of this work is associated with campus research centers that help to develop proposals, coordinate activities, and bring together in colloquia and conferences students and faculty with common intellectual interests. Such centers include the Center for Solid-State Science, the Manufacturing Institute, the Institute of Human Origins, the Hispanic Research Center, the Joan and David Lincoln Center for Applied Ethics, and the Prevention Intervention Research Center. For more information, see “Research Centers, Institutes, and Laboratories,” page 32.

Research Facilities. The university lends support to research in diverse ways, including extensive facilities for research and instructional programs. State-of-the-art facilities include an architecture building, a fine arts complex, the Goldwater Center for Science and Engineering, an addition to the Life Sciences Center, and the Computing Commons. The Engineering Research Center, built as part of the Engineering Excellence Program, houses advanced facilities such as the Molecular Beam Epitaxy laboratory and a clean room for microelectronic device fabrication. Among other facilities supporting research on campus are the Institute for Studies in the Arts, in the Herberger College of Fine Arts; the Facility for High Resolution Electron Microscopy, in the College of Liberal Arts and Sciences; and the Southwest Archaeological Collection, in the Department of Anthropology.

Library System. The ASU library system is a major research facility (see “University Libraries and Collections,” page 27). It contains more than 3 million volumes of books and approximately 6.6 million pieces of microforms and subscribes to more than 36,000 journals and serials. Among the nation’s research libraries, it is in the top quarter in annual volume acquisition. It is especially strong in amassing current monographs and serials to support graduate programs. Some of the most important research collections include manuscripts and rare photographs on Arizona and Southwest topics and an excellent collection of social science materials on Southwestern and border studies topics, including materials on northwestern Mexico. In the humanities, the main library has a fine collection of literary works and literary criticism from small and major presses in American and English literature. The Child Drama Collection is also outstanding. A growing rare book and manuscript collection supports the research interests of academic units. The Arthur Young Tax Library emphasizes accounting and law. The Noble Science and Engineering Library is a

designated U.S. Patent Depository and as such is one of fewer than 30 U.S. academic libraries to receive copies of all new patents. The entire collection of U.S. patents in microfilm is housed in the Noble Library.

The libraries contain extensive U.S. and Arizona government documents and selected international documents.

Branch libraries provide important specialized collections. The Music Library contains scores and sound recordings. The Architecture and Environmental Design Library houses a nationally recognized set of materials on solar energy and research collections on the work of Frank Lloyd Wright and Paolo Soleri as well as other Arizona architects.

The libraries offer excellent support to researchers interested in electronic information sources. The online library system incorporates the usual catalog to ASU library holdings as well as several other important electronic reference databases and gateways. Bibliographic information on the library holdings can be accessed from any location in the world via a modem-equipped microcomputer.

The library system belongs to the Center for Research Libraries, permitting access to the center's vast collections of materials for extended loan periods.

Graduate Student Support Services

Providing academic and professional development support to graduate students is an important part of the Graduate College mission. Services include advising, individual mentoring, financial support, orientation sessions, workshops, career seminars, and research conferences.

The Graduate College Student Programs/Services maintains a variety of programs specifically for graduate and nondegree students.

Graduate College Student Financial Assistance Office.

The Graduate College Student Financial Assistance Office meets the needs of graduate and professional students. Students may receive financial services at Wilson Hall, without having to visit other offices on campus. Students are offered general information about graduate financial assistance at ASU, may turn in documents, or receive status information on their student loans. Students can also apply for emergency short-term loans or pick up forms to report special circumstances. Staff members are available to help students with financial assistance concerns. Refer to "Financing Graduate Studies," page 46, for a full description of graduate financial support and services or visit the Web site at www.asu.edu/graduate/financial.html.

Advising and Career/Professional Development. Many graduate students have questions and concerns about which degree to pursue, how to combine their student roles with parenting, partnering and worker roles, and what to do with their degrees upon graduation. The Graduate College provides the following resources.

Advising. The Graduate College's Advising Office offers general information about policies, procedures, requirements, and support services. Appointments are available throughout the year.

Students with regular admission status should contact their academic unit for degree program advising and program of study planning.

Career/Professional Development Seminars. The Graduate College, in conjunction with Counseling & Consultation, offers seminars to groups of graduate students interested in

exploring career-related subject matters. Examples of seminar topics are dual career issues, the impact of values on career decision making, and transferable skills.

Career Planning Services for Graduate Students. In conjunction with Career Services and Counseling & Consultation, the Graduate College provides a brochure listing numerous career planning services for graduate student needs. This publication is also available at career.asu.edu.

Preparing Future Faculty (PFF). PFF is a national program designed to develop new approaches to preparing doctoral students who are seeking careers in the professoriate. A national initiative under the Council of Graduate Schools and the Association of American Colleges and Universities, PFF encourages fresh thinking and planning in faculty preparation, and identifies strategies to improve the quality of teaching and learning.

Preparing Future Professionals (PFP). The PFP program administered by the Graduate College, assists doctoral students interested in pursuing nonacademic professions. PFP parallels the well established and successful PFF program.

Through a series of activities, PFP familiarizes doctoral students with various nonacademic career tracks to help them develop skills to successfully pursue a wide range of career opportunities. For more information, contact the Graduate College at 480/965-3521.

Graduate College Support Program (GCSP). GCSP is designed to increase the number of graduate students from groups underrepresented in their chosen field of study. Students interested in these programs must first go to their respective departments for nomination.

The purpose of the program is to support research and creative activities related to a student's field of study. Nominations are made by departments, and recipients are supervised by a faculty member.

For students who demonstrate financial need through a FAFSA, the Graduate College offers financial assistance and peer mentoring. GCSP is available primarily to first-year students. However, departments are asked to provide a student's subsequent funding. The program is based on financial need and the nominations of students by departments. Financial support is provided in the form of a federal work-study to support field-related research that is supervised by a faculty member. For additional academic support, a student meets weekly with an assigned peer mentor who is two or more years advanced in the academic program.

The Social and Academic Mentor Program. The Graduate College Social and Academic Mentor (SAM) program is designed to recruit top graduate students from domestic, international, and underrepresented populations. Academic units submit applications to the Graduate College to nominate a first-year student (mentee) and peer mentor match. The mentor, two or more years advanced in the program, promotes the mentee's social and academic integration into graduate school using a structured format. The mentor meets weekly with the mentee and schedules regular monthly meetings with the faculty advisor to discuss the mentee's concerns, progress, accomplishments, or department-related matters.

Orientations. Each semester, the Graduate College hosts orientations for new graduate students and teaching assistants (TAs).

In addition to the general orientation, teaching assistants have the opportunity to enrich and enhance their teaching through seminars offered each semester. At least two seminars are mandatory for first-time TAs. Among other topics, TAs can attend sessions on teaching lab sciences, human diversity, critical thinking, classroom management, ethical issues, and multimedia applications in the classroom.

Workshops for Undergraduate Students Considering Graduate Education. The Graduate College holds workshops to address the issues that students contemplating graduate study should consider. The purpose of graduate study, the choices among research and professional degrees, the selection of schools to apply to, and the types and sources of financial support are among the topics discussed.

Student Organizations. The Graduate Student Council is part of the Associated Students of Arizona State University (ASASU), the student government for the university. The Graduate Research Support Office represents graduate student interests within ASASU and the Office of Student Life. It assists the Graduate College in planning orientations and other student-related activities and funds with the Graduate College small research grants to support graduate students' projects. In addition to the council, many other special interest organizations are open to graduate students.

Format Office. The thesis, dissertation, or equivalent is the culmination of an important stage of graduate studies. By researching and writing this final work, graduate students are able to show that they have acquired skills essential to a discipline. The Graduate College publishes a *Format Manual* as a guide in preparing the master's or doctoral document. Both the format manual and forms pertaining to pro-

cedures for completing all graduation requirements are available in the Graduate College lobby in Wilson Hall or on the Web at www.asu.edu/graduate/formatmanual.

Publications Program. The Graduate College publishes a number of brochures, fliers, and other items pertaining to academic program offerings, procedures, student financial assistance, and related topics and events in graduate education. For more information, call the Publications Unit at 480/965-3521.

Graduate Council

The Graduate Council establishes general policies for graduate programs and serves as an advisory board to the dean. As part of its duties, the council reviews proposals for new degree programs and concentrations, regularly conducts reviews of established academic programs, and sets policies and general standards for graduate admissions. Sixteen faculty members and one student serve on the council, representing a wide variety of degree programs, with at least one member representing each college in the university. An Academic Senate representative is also elected to serve. Council members are appointed by the president of the university. See the "Graduate Council 2000–2001" table, on this page.

Offices of the Graduate College

The general offices of the college, including those of the dean, admissions, advising, financial assistance, and postadmissions, are located on the first floor of Wilson Hall in the center of campus. College offices are open from 8:00 A.M. to 6:00 P.M. Monday through Thursday; 8:00 A.M. to 5:00 P.M. on Friday. The Graduate College may be called at 480/965-3521. The Web address is www.asu.edu/graduate.

Graduate Council 2000–2001

Member	Administrative Unit	Campus
Craig Albers, Student Representative	—	—
John Craft	Walter Cronkite School of Journalism and Telecommunication	ASU Main
Anne Feldhaus	Department of Religious Studies	ASU Main
Luis Gomez-Mejia	Department of Management	ASU Main
Norma Hubele	Department of Industrial Engineering	ASU Main
Sarah Hudelson	Division of Curriculum and Instruction	ASU Main
Jane Humble	Department of Information and Management Technology	ASU East
Andrew E. Jackson	Department of Aeronautical Management Technology	ASU East
Kathryn Maxwell	School of Art	ASU Main
Marianne McCarthy	College of Nursing	ASU Main
José Menéndez	Department of Physics and Astronomy	ASU Main
Michael Ormiston	Department of Economics	ASU Main
Filiz Ozel	School of Architecture	ASU Main
Joseph Palais	Department of Electrical Engineering	ASU Main
David Pijawka	School of Planning and Landscape Architecture	ASU Main
Daniel Strouse	College of Law	ASU Main
L. Dean Webb	Division of Educational Leadership and Policy Studies	ASU Main

Morrison School of Agribusiness and Resource Management

Raymond A. Marquardt, Ph.D., Dean

www.east.asu.edu/msabr



Michelle Oleksyszyn, graduate student in the Environmental Resources program, shucks leaves as part of a research project that will help determine how urban development affects the ecosystem in the desert Southwest.

Christine Lambrakis photo

PURPOSE

The Morrison School of Agribusiness and Resource Management (MSABR) is committed to guiding students toward developing an integrated view of agribusiness, food systems, and environmental challenges that confront the world in the 21st century. Globalization, population growth, and new technologies require a sophisticated view toward the production, processing, storage, distribution, and marketing of food and fiber products. Prudent management of natural resources, to ensure that humanity's negative impact on the environment is mitigated, is becoming more and more important.

The Morrison School offers cutting edge programs enabling students to learn effective and responsible methods of agribusiness and environmental resource management. Strong relationships with industry and regulatory bodies afford students numerous opportunities to integrate theory and practice. This applied orientation traditionally makes MSABR students highly marketable upon graduation.

MSABR programs are accessible to full- and part-time students, with many courses taught in both daytime and evenings. Some courses are taught in compressed formats and some online, thus helping students faced with growing time pressures. The faculty is committed to excellence in teaching, research and service, and strives to create a well-rounded experience for its students. The broad and diverse range of faculty research and teaching enables students to individualize their programs of study to fit their own particular career goals.

ORGANIZATION

The Morrison School offers Master of Science degree programs in Agribusiness and Environmental Resources. In addition, the Environmental Resources faculty at ASU Main offer the Ph.D. in Environmental Design and Planning.

The M.S. in Agribusiness degree is supported by faculty with backgrounds in agricultural economics, applied business, food science, rural development, international trade, and a variety of experiences in industry and organizations. Many faculty work closely with agribusiness and business-related firms and in international projects, giving real world relevance to their research.

The M.S. in Environmental Resources degree is supported by faculty with backgrounds in ecology, forest and range management, botany, animal science, rangeland resources, and a wealth of field experiences. Research projects in wildlife inventory, habitat restoration, and GIS and remote sensing, among others, help support the applied nature of the program.

Morrison School of Agribusiness and Resource Management Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Agribusiness	M.S.	Agribusiness management and marketing, food quality assurance	Morrison School of Agribusiness and Resource Management
Environmental Design and Planning*	Ph.D.	Design; history, theory and criticism; planning	Committee on Environmental Design and Planning
Environmental Resources	M.S.	GIS/remote sensing, natural resource management, and range ecology	Morrison School of Agribusiness and Resource Management

* Doctoral courses for these interdisciplinary programs administered by ASU Main are also offered at ASU East.

GRADUATE PROGRAMS

The M.S. in Agribusiness degree offers concentrations in agribusiness management and marketing, and food quality assurance. The degree is designed to prepare students from a variety of backgrounds with a set of critical and analytical business skills while recognizing the unique demands of the agribusiness sector. Graduates are well prepared for successful administrative or managerial careers with either government or private-sector organizations. Students are able to select either a research-oriented program, which leads to the completion of an organized thesis, or a program consisting of course work only (nonthesis option). All students can develop an area of specialization and apply their skills to a real world agribusiness problem through an integrative, capstone course experience. Both the thesis and nonthesis options require the completion of a common set of core courses. For more information regarding the M.S. in Agribusiness degree, access the Web site at www.east.asu.edu/msabr.

The M.S. in Environmental Resources degree is designed to train students who are scientifically competent, aware of the necessity of communicating the importance of sound ecosystem management, and able to work with numerous groups interested in natural resources. Students have the opportunity to study topics such as wildlife inventory and habitat preference, habitat restoration, invasive plant species, Geographic Information Systems (GIS) and remote sensing applications to natural resource management, spatial modeling of urban expansion and the demand on natural resources, indicators of watershed condition, livestock riparian interactions, and influence of urbanization on soil carbon and nitrogen dynamics. All students are required to complete a core of graduate courses, conduct a research project under the direction of faculty, and prepare and defend a research thesis. For more information, access the Web site at cactus.east.asu.edu.

ADMISSION REQUIREMENTS

Admission requirements for the M.S. degrees in Agribusiness and Environmental Resources are based on those of the Graduate College. However, each requires further supporting materials pertaining solely to that degree; therefore, applicants are encouraged to refer to the sections of this catalog that correspond to each program.

SPECIAL PROGRAMS

Cooperative Degree Program. The Morrison School and the American Graduate School of International Management (Thunderbird) have a cooperative agreement for students interested in both agribusiness and international management. This agreement enables ASU students to take up to nine semester hours of course work at Thunderbird. To participate, an ASU student must be enrolled full-time and may only take three semester hours at Thunderbird in any semester. The goal of this agreement is to enhance the educational opportunities available to qualified students while making optimal use of the resources and facilities of both institutions.

Peace Corps Master's International Program. The Morrison School has an agreement with the United States Peace Corps that makes combining graduate studies with Peace Corps service very appealing. Participants can receive up to six semester hours of credit for their independent field work while serving in the Peace Corps. Graduate course work precedes departure to foreign countries. Interested individuals must complete separate applications to ASU and the Peace Corps, and prepare plans of study with their faculty committees regarding studies in the field.

COLLEGE FACILITIES

In addition to the computing resources available to all students at ASU East, the Morrison School of Agribusiness and Resource Management has laboratories dedicated to food safety and science, soil and plant analysis, and GIS modeling. Laboratories are available to students for specific classes and related graduate thesis research.

ADVISING

Advising of graduate students is normally handled by graduate faculty committees. Once admitted, a student can request a temporary faculty advisor in a potential area of concentration in order to prepare a program of study. Students are encouraged to begin discussions with faculty members early in their studies so that course work and potential employment can be geared toward supporting their thesis research. All students, whether in a thesis or nonthesis option, must file a program of study and form a faculty advisory committee.

College of Architecture and Environmental Design

John Meunier, M.Arch., Dean

www.asu.edu/caed



Graduate students critique a student's model at the College of Architecture and Environmental Design.

Tim Trumble photo

PURPOSE

The college provides graduate education for professional, research, and academic careers in architecture, design, landscape architecture, and environmental and urban planning. Students in the master's programs benefit from small classes, seminars, and studios, from close, individual contact and faculty mentorship, and from an interdisciplinary curriculum. Students and faculty make full use of the Phoenix metropolitan area and the Sonoran region as research bases, and they also profit from strong interaction with the professional communities. The faculty have earned national reputations in energy-efficient design, computer-assisted design, corporate interior design, design for special populations, urban design, and environmental policy. Programs of study, including internship and trainee opportunities, give graduates the best possible start on academic, research, and professional careers.

ORGANIZATION

The college has three academic units: the School of Architecture, the School of Design, and the School of Planning and Landscape Architecture. The units and their faculty have strong ties with programs and faculty in business, computer science, construction, engineering, fine arts, geography, biological sciences, environmental resources, and public affairs.

GRADUATE PROGRAMS

The Ph.D. degree program in Environmental Design and Planning is a collegewide interdisciplinary degree offered by faculty representing the different disciplines comprising the Schools of Architecture, Design, and Planning and Landscape Architecture. Environmental Resource faculty from the Morrison School of Agribusiness and Resource Management at ASU East also participate in offering this degree. Three areas of concentration are available: design; planning; and history, theory and criticism.

Faculty in the College of Architecture and Environmental Design offer four master's degree programs through the Graduate College: a professional program leading to the NAAB-accredited Master of Architecture degree (the two-year as well as three-plus-year programs); a research and applications M.S. degree in Building Design; the Master of Science in Design degree with concentrations in graphic design, industrial design, and interior design; and a professional graduate program leading to the PAB-accredited Master of Environmental Planning degree. Faculty in the School of Design offer the professional Master of Science in Design degree with concentrations in graphic design, industrial design, and interior design. Faculty in the School of

Architecture offer the Master of Architecture and the M.S. degree in Building Design. Faculty in the School of Planning and Landscape Architecture offer the Master of Environmental Planning.

ADMISSION REQUIREMENTS

Applicants to each of the five graduate degree programs must meet Graduate College admission requirements, in addition to requirements of the academic unit offering the program. For application requirements and deadlines of the Graduate College, see "Admission to the Graduate College," page 92. For application requirements and deadlines of each program, refer to the specific program section within "Graduate Programs and Courses," page 105.

Doctor of Philosophy Degree in Environmental Design and Planning. Applicants to the Ph.D. program must have completed a master's degree in architecture, environmental resources, graphic design, industrial design, interior design, landscape architecture, or planning, or must be able to demonstrate equivalent standing. The degree is structured as a 54-hour postmasters program, and not as an 84-hour post-baccalaureate program. The following test scores are required: Graduate Record Examination scores and Test of English as a Foreign Language (TOEFL) score of at least 600 from applicants whose native language is not English.

Master of Architecture. Applicants to the two-year program must have completed a four-year baccalaureate degree with a major in architectural studies or a similar preprofessional degree in architecture. The degree must be from an institution offering a National Architectural Accreditation Board-accredited degree in architecture. Applicants to the three-plus-year program must have completed a four-year baccalaureate degree in any discipline. International applicants whose native language is not English must achieve a TOEFL score of 550 or above.

Master of Science Degree in Building Design. Students who have completed a professional baccalaureate degree in architecture (five or six years) and wish to pursue advanced study and research may apply for admission to this program. International applicants whose native language is not English must achieve a TOEFL score of at least 550.

Master of Environmental Planning. Applicants must hold a baccalaureate degree. International applicants whose native language is not English must achieve a TOEFL score of 550 or above.

Master of Science in Design Degree. Applicants must hold a baccalaureate degree in graphic design, industrial design, interior design, or a related design discipline as determined by the School of Design Graduate Program Committee. International applicants whose native language is not English must achieve a TOEFL score of 550 or above.

SPECIAL PROGRAMS

A concurrent Master of Architecture/Master of Business Administration degree program is available. The School of Architecture offers a foreign study abroad program. Also, a selective summer internship program places highly qualified students in nationally known American firms.

The Master of Environmental Planning program has special ties with the professional planning community and

offers students considerable interaction with practitioners in the field, as well as experience in local planning offices and agencies.

All of the master's programs are interdisciplinary in focus and require or strongly recommend course work in other programs, departments, and colleges. Each program works with affiliated and associated faculty from other units within the college. Also, faculty from such areas as geography, engineering, public affairs, business, transportation, environmental studies, and fine arts collaborate with the faculty and graduate students of the college.

COLLEGE FACILITIES

With the opening of the award-winning expansion to the Architecture building in spring of 1989, the college consolidated its facilities into a single complex and more than doubled the space available for instruction, research, and service activities. Expanded facilities include the library, the shop, studios, faculty and administrative offices, and research facilities. Research and special project rooms include a high-bay research laboratory, a lighting laboratory, community outreach and design excellence studios, a materials resource center, as well as a solar instrumentation laboratory and a rooftop outdoor solar and day lighting testing area. The college is especially proud of its computer facilities and the faculty-graduate student computer research laboratory. There is a local area network that ties together faculty, studio, and library resources. Emphasis is on mini- and microcomputer modeling, simulation, and design applications (see "Computing Facilities and Services," page 30). Teaching and research activities are also supported by a media center with photography and video services and a slide and media library. Individual studio work space is available to graduate students and the expansion features extensive jury, review, and display space.

The Gallery of Design is one of eight university galleries and museums. It provides premium space for traveling exhibitions and exhibitions of student and faculty work.

Housed in the College of Architecture and Environmental Design/North building, the college's Design Library has a spacious and welcoming interior, with cherry wood furnishings. A branch of the University Libraries, the Architecture and Environmental Design (AED) Library provides access to books, periodicals, reference materials, and product catalogs. The collection includes approximately 35,000 volumes. There are also 150 current periodical subscriptions available. ASU Libraries provide access to numerous online databases, including the *Avery Index to Architectural Periodicals*.

Rare and unusual materials related to architecture and environmental design reside in the Special Collections area. Notable among these are the extensive collections of books and ephemera on Paolo Soleri and Frank Lloyd Wright.

The rapidly growing Archival Drawings Collection is also part of the AED Library's Special Collections area. Included are the archival drawings and papers of several noteworthy architects including: Alfred N. Beadle, William P. Bruder, Blaine Drake, Albert Chase McArthur, Victor Olgyay, Paul Schweikher, Calvin Straub, Marcus Whiffen, and Martin Ray Young, Jr. The Archival Drawings Collection also contains documentation of the company town of Litchfield Park, the Rio Salado Project, the Phoenix Civic Plaza design competition, and the Metropolitan Canal Alliance.

College of Architecture and Environmental Design Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Architecture	M.Arch.	—	School of Architecture
Building Design	M.S.	Design knowledge and computing, energy performance and climate-responsive architecture, facilities development and management	School of Architecture
Design	M.S.D.	Graphic design, industrial design, interior design	School of Design
Environmental Design and Planning*	Ph.D.	Design; history, theory, and criticism; planning	College of Architecture and Environmental Design
Environmental Planning	M.E.P.	Landscape ecological planning, urban and regional development, urban design	School of Planning and Landscape Architecture

* Doctoral courses for these interdisciplinary programs administered by ASU Main are also offered at ASU East.

ADVISING

Architecture. Students should contact their academic advisor for general information about the school's programs and procedures. In addition, a graduate coordinator is available for preadmission and general advising. Call 480/965-3536 or e-mail arch.grad@asu.edu for more information.

Design. Preadmission information, advising, and continued support are provided by the director of the school and the graduate program coordinator. Call 480/965-4135 for more information.

Planning. The school director and Master of Environmental Planning program coordinator provide preadmission information and general advising. Each admitted student is initially assigned a faculty advisor but may later select a supervisory chair. This faculty member later serves as a chair of the committee. Call 480/965-7167 for more information.

ACCREDITATION

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. (A

program may be granted a five-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.)

Master degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the preprofessional degree is not, by itself, recognized as an accredited degree.

The Master of Architecture program at ASU is fully accredited by the NAAB. The Master of Architecture requires a minimum of three years of study following an unrelated bachelor's degree or two years following a related preprofessional bachelor's degree. This professional degree is structured to educate those who aspire to registration/licensure as architects.

The School of Architecture is a full member of the Association of Collegiate Schools of Architecture and the Architectural Research Centers Consortium.

The programs in the School of Planning and Landscape Architecture are affiliated with the Association of Collegiate Schools of Planning and the Council of Educators in Landscape Architecture.

The Master of Environmental Planning program is accredited by the Planning Accreditation Board while the Bachelor of Science in Landscape Architecture program is accredited by the Landscape Architecture Accreditation Board.

College of Business

Larry E. Penley, Ph.D., Dean

www.cob.asu.edu



Professor Arthur Blakemore lectures to graduate students during an economics class.

Tim Trumble photo

PURPOSE

The College of Business is a professional school that pursues excellence in instruction and research. The pursuit of excellence in programs of instruction implies that the college admits only students who are especially well qualified for the study of business and who will, upon graduation, compete successfully for highly desirable positions, both nationally and internationally.

The mission of the College of Business is to expand the knowledge of business and to educate men and women for managerial leadership through research activities and professional educational programs that address issues of importance to future managers in a world characterized by racial, cultural, and gender diversity in the work force; demands for continuous improvements in quality; growing technological sophistication; and globalized markets.

The College of Business is a comprehensive research school of business that selects and retains faculty based on their ability to use their teaching and research skills to fulfill its mission.

The College of Business—through its research support, its Seidman Institute programs and centers, and its doctoral programs—develops knowledge that is important to managers and the management of organizations. It endorses joint research projects that are not only supported by business but include managers as partners in the research objectives, processes, and outcomes.

The College of Business anticipates that its mission will lead to research and professional degree programs that will result in its being recognized among the top schools of business in the U.S. Strategies to achieve its mission include an emphasis on the M.B.A. degree: increasing its quality such that it is competitive with the best 25 programs found at other large public schools of business, and developing a curriculum that incorporates the knowledge, skills, and abilities identified in the mission of the college.

Strategies relative to the doctoral program also include raising admission standards, increasing stipends, and assuring that students possess the teaching and research skills necessary for placement at peer schools of business. Consistent with the mission, an additional strategy is to improve the retention and graduation rates of minority students through programs at the M.B.A. and doctoral levels.

Finally, the college will, through its Seidman Institute, increase the level of funded research by adding support services to facilitate grant preparation and by clarifying the mission of research centers as liaisons between faculty and businesses.

ORGANIZATION

The college's seven academic units and several centers serve more than 1,400 graduate students enrolled in eight graduate degree programs. Academic units contributing to

graduate offerings include the School of Accountancy and Information Management, the School of Health Administration and Policy, and the Departments of Economics, Finance, Management, Marketing, and Supply Chain Management. The Seidman Institute serves as the college's focal point for applied research, and several centers are organized in conjunction with the Seidman Institute: the Arizona Real Estate Center, the Bank One Economic Outlook Center, the Center for Advanced Purchasing Studies, the Center for Business Research, and the Center for Services Marketing and Management.

GRADUATE PROGRAMS

The M.B.A. program is the premier professional degree in the College of Business. The college offers the traditional full-time program, an Executive M.B.A. program, an evening program for working managers, and a program for high technology professionals at the ASU Research Park. The faculty also offer the Ph.D. degree in Economics and in Business Administration, with concentrations in accountancy, computer information systems, finance, health services research, management, marketing, and supply chain management. Other master's offerings include the Master of Accountancy and Information Systems, Master of Health Services Administration, and M.S. degrees in Economics and in Information Management, an interdisciplinary program leading to a M.S. degree in Statistics, and the Master of Taxation.

ADMISSION REQUIREMENTS

Applicants to all degree programs must meet the minimum Graduate College academic requirements. Admission is highly competitive and selective. Acceptance is based on the applicant's previous college record, all relevant data provided with the application, and scores from the Graduate Management Admission Test or the Graduate Record Examination (GRE). (GRE scores are required for the Economics programs only.) Certain degree programs require applicants to submit a statement of purpose and letters of recommendation. In addition, the Test of English as a Foreign Language is required of international applicants whose native language is not English.

SPECIAL PROGRAMS

Dual/Concurrent Degree Programs. The College of Business and the American Graduate School of International Management (Thunderbird) have developed a dual degree and cross-registration graduate program for students interested in both business administration and international management. Thunderbird is an internationally recognized private graduate school, located in the Phoenix metropolitan area, offering course work in international studies, modern languages and world business. The dual degree program is designed to allow a limited number of qualified graduate students to pursue an M.B.A. degree at ASU and a Master of International Management (M.I.M.) degree at Thunderbird, allowing students to earn two degrees in less time than if done separately. Applicants must be regularly admitted to both programs and may begin at either location.

The College of Business also offers dual degree programs with Groupe Ecole Supérieure de Commerce Toulouse in Toulouse, France; Universidad Carlos III de Madrid in Spain; Instituto Tecnológico y de Estudios Superiores de

Monterrey in Mexico City, Mexico; and ESAN Business School in Latin America. Call 480/965-3332 for more information.

The college also offers the following concurrent degrees:

1. Master of Science (M.S.) in Economics/Juris Doctor (J.D.);
2. M.B.A./J.D.;
3. M.B.A./Master of Accountancy and Information Systems;
4. M.B.A./Master of Architecture;
5. M.B.A./M.S. in Information Management;
6. M.B.A./Master of Health Services Administration (M.H.S.A.);
7. M.B.A./M.S. in Economics;
8. M.H.S.A./J.D.; and
9. M.H.S.A./M.S. in Nursing.

Separate applications are required for each degree and each application is reviewed independently. It is recommended that the student apply simultaneously to both of the dual/concurrent degree programs. The M.B.A./J.D. is best completed by attending one year in the law school, then attending the M.B.A. program after the first or second year, and finally returning to the law school to complete the third year. Students are not admitted from the law school after the third year.

INSTITUTES/RESEARCH CENTERS

L. William Seidman Research Institute. The L. William Seidman Research Institute encourages, promotes, and supports multidisciplinary, cross-disciplinary, and applied research on a wide range of business topics. The institute serves as the "port-of-entry" for applied business research in the College of Business as well as an incubator to transfer knowledge to the business community. The institute also acts as a facilitator for postdoctoral, continuing, and executive business education that is taught by ASU faculty. In addition, the institute contributes funding for operations.

Arizona Real Estate Center. The Arizona Real Estate Center collects and analyzes data concerning the multifaceted real estate market to provide insight into solutions for problems confronting the real estate industry.

Bank One Economic Outlook Center. The Bank One Economic Outlook Center serves as the economic forecasting unit of the college and is responsible for the publication of the Arizona Blue Chip, Western Blue Chip, and Blue Chip Job Growth Update. The center sponsors seminars and workshops on the national and regional economies.

Center for Advanced Purchasing Studies. The Center for Advanced Purchasing Studies is a national affiliation agreement between the College of Business at ASU and the National Association of Purchasing Management. The center conducts in-depth research into the problems facing the purchasing profession today and the requirements of the future.

Center for the Advancement of Small Business. Endowed with private funding, the center's mission is to enhance the formation and management of small- and

medium-size companies to enable them to compete in the global economy of the 21st century. The primary goal is to ensure that ASU students from all disciplines are provided with programs that prepare them for positions of leadership in small- and medium-size businesses.

Center for Business Research. The Center for Business Research collects, analyzes, and disseminates information on the economy and business climate of Arizona. Analyses of Gross State Product, prices, income, employment, and demographic data for Arizona are made available to business and the general public. The center coordinates interdisciplinary sponsored-research efforts to provide useful information to business and a learning experience for students and faculty researchers.

Center for Services Marketing and Management. The Center for Services Marketing and Management is North America's leading university-based center for the study of services marketing and management. The center conducts extensive research in the field; offers specialized education and training to services executives; and provides the latest services information to organizations engaged in banking, insurance, health care, tourism, transportation, and other service industries. Its charter members include some of America's foremost services firms and nonservices firms.

Manufacturing Institute. The Manufacturing Institute is a joint venture of the College of Business and the College of Engineering and Applied Sciences. The institute was estab-

lished to enhance manufacturing research and industrial collaboration between the two colleges. The mission of the institute involves integrating aspects of manufacturing in both the business and engineering areas, helping to fulfill ASU's goal of becoming one of the leading educational and research institutions in both manufacturing enterprise and manufacturing process technology issues.

Dean's Council of 100. The Dean's Council of 100, a prestigious group of area business leaders, represents the college's innovative partnership between business and education. A major goal of the council is the development of private support for the priority needs of the College of Business. Membership is by invitation only.

Economic Club of Phoenix. The Economic Club of Phoenix is composed of business, labor, government, and academic leaders who recognize that, as frontrunners in one of the nation's fastest-growing metropolitan areas, they need information and access to expertise to deal effectively with rapid economic changes. Its programs bring current and future leaders together and provide them with the opportunity to meet and hear influential speakers.

Council of Emeritus Advisers. The Council of Emeritus Advisers founded by the College of Business and Dean's Council of 100, is a select group of retired executives who advise the dean and invite nationally known experts to Arizona as visiting scholars, lecturers, and speakers.



ASU students enjoy the beauty and solitude of the elaborate fountain and waterway system near the College of Business.

Dean's Board of Excellence. The Dean's Board of Excellence is composed of young business and community leaders committed to promoting excellence by awarding outstanding student and faculty performance. The Dean's Board of Excellence also enhances relations between the college and the business community through a discussion forum and communications with the dean.

M.B.A. Council. The M.B.A. Council plays an active role in linking students with alumni to enhance the M.B.A. student experience. The M.B.A. Council also assists to unite alumni and promote the national reputation of the M.B.A. program.

Washington Campus. Founded in 1978 by William Seidman and other leaders in business, government, and higher education, the Washington Campus is a nonpartisan, not-for-profit organization committed to educating business executives on the public policy process. The campus is a consortium of the business schools of 17 U.S. universities. Located in Washington, D.C., it draws upon the unique resources of the nation's capital to provide business-oriented education on the institutions and decision-making processes of government. Participants earn graduate credit, observe the intricacies of national politics, and enjoy the excitement of the nation's capital.

COLLEGE FACILITIES

The College of Business offers one of the most modern and sophisticated environments available for professional graduate study. The college facilities provide attractive and comfortable classrooms, computer systems, study areas, a television studio, modern auditoriums, and a graduate student reading room and lounge. Both mainframe interactive and networked microcomputer facilities, in addition to wireless capabilities, are available to graduate students throughout the two business buildings. Refer to "Computing Facilities and Services," page 30.

ADVISING

Information sessions are held daily (Monday, Wednesday, and Friday at 10:00 A.M. and Tuesday and Thursday at 2:00 P.M.) in the M.B.A. Program Office, BA 140. Summer hours may vary. M.B.A. brochures may be obtained at the office; call 480/965-3332, or send e-mail to asu.mba@asu.edu.

ACCREDITATION

The College of Business and its School of Accountancy and Information Management are accredited by the American Assembly of Collegiate Schools of Business (AACSB). The AACSB is the recognized accrediting agency in the field of business education. The School of Health Administration and Policy is accredited by the Accrediting Commission on Education for Health Services Administration.

College of Business Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Accountancy and Information Systems	M.A.I.S.	—	School of Accountancy and Information Management
Business Administration	M.B.A.	—	College of Business
	Ph.D.	Accountancy, computer information systems, finance, health services research, ¹ management, marketing, supply chain management	College of Business
Economics	M.S., Ph.D.	—	Department of Economics
Health Services Administration	M.H.S.A.	—	School of Health Administration and Policy
Information Management	M.S.	—	School of Accountancy and Information Management
Public Health	M.P.H. ²	Health administration and policy	School of Health Administration and Policy
Statistics	M.S. ³	—	Committee on Statistics
Taxation	M.Tax.	—	School of Accountancy and Information Management

¹ Applications are not being accepted at this time.

² This collaborative program is offered by the three state universities.

³ This program is administered by the Graduate College.

East College

David E. Schwalm, Dean

www.east.asu.edu/ecollege



Mohammed Armia, an ASU East graduate student, prefers the small community feel, quiet study environment, and increased interactions he has experienced among students, faculty, and staff at ASU East.

Dave Tevis photo

PURPOSE

East College was established as the initial administrative home for all new ASU East undergraduate and graduate programs outside of agribusiness and technology. The college

also provides general studies and other supporting course work for all students enrolled at ASU East. East College offers seven undergraduate and two graduate degrees.

ORGANIZATION

East College is organized into six faculties or departments:

Applied Psychology, Faculty of
Business Administration, Faculty of
Elementary Education, Faculty of
Exercise and Wellness, Faculty of
Multimedia Writing and Technical Communication,
Faculty of
Nutrition, Department of

GRADUATE PROGRAMS

Graduate degree programs as shown in the “East College Graduate Degrees and Majors” table, on this page, are offered by the faculty within the college.

ADMISSION REQUIREMENTS

Applicants to East College graduate degree programs must meet the minimum Graduate College academic requirements. Individual programs may require additional supporting materials. Applicants should refer to requirements specified by each East College graduate degree program.

COLLEGE FACILITIES

East College is located at ASU East, the newest of the ASU campuses. The easily accessible campus offers students modern mediated classrooms, state-of-the-art computer facilities, electronic access to library resources, and a range of on-campus housing options. ASU East students also have access to ASU Main resources and research facilities. A shuttle runs regularly between the two campuses.

ADVISING

Career advising is available on campus and through Career Services at ASU Main. Academic advising is provided by the department offering the degree program.

East College Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Curriculum and Instruction*	Ph.D.	Exercise and wellness education	Interdisciplinary Committee on Curriculum and Instruction
Exercise and Wellness	M.S.	—	East College
Nutrition	M.S.	—	Department of Nutrition

* Doctoral courses for this interdisciplinary program administered by ASU Main are offered at ASU East.

College of Education

David C. Berliner, Ph.D., Dean

www.ed.asu.edu/coe



Farmer Education Building in the background of Forest Mall

Jean Laaninen photo

PURPOSE

The College of Education is committed to the development of innovative programs that prepare graduate students for leadership roles in solving educational problems. The college provides a stimulating, challenging forum in which research and practice are viewed as essential and complementary. Faculty members are dedicated to producing quality scholarship and research that lead to excellence in teaching, professional practice, and administration of educational institutions.

ORGANIZATION

The College of Education is organized into three divisions.

Division of Curriculum and Instruction

Nicholas R. Appleton, Director

(ED 426) 480/965-1644

cnigrad@asu.edu

coe.asu.edu/candi

Research Clusters. Research clusters have been established for existing concentration areas to promote and develop support of academic scholarly interests. Cluster areas include: curriculum studies, early childhood, equity and diversity and citizenship, gender, language and literacy, mathematics, middle level interest, science education, special education, and teacher education.

Graduate programs offered by faculty of the Division of Curriculum and Instruction, through the Graduate College, prepare students for positions in schools, colleges, universities, government agencies, and public or private organizations. Graduates work as educational leaders, researchers, media and computer specialists, and librarians. This division offers programs that prepare students for Arizona State teacher certification in the following areas: special, elementary, or secondary education. It is designed for students who have graduated from accredited colleges or universities with majors other than education. If desired, a master's degree may be pursued concurrently with teacher certification.

The M.A. and M.Ed. degrees in Curriculum and Instruction offer areas of concentration in bilingual education, communication arts, early childhood education, elementary education, English as a second language, Indian education, mathematics education, reading education, science education, secondary education, and social studies education. The M.Ed. offers a concentration in professional studies.

The Ed.D. degree in Curriculum and Instruction offers areas of concentration in bilingual education, communication arts, curriculum studies, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, science education, secondary education, and social studies education.

The division is committed to research. Members of the faculty edit several national, scholarly journals; publish and present research papers; and direct funded research. Faculty members encourage and assist graduate students in conducting research, writing for publication, and making presentations at professional conferences. Particular research interests of the faculty are noted under each degree major.

Division of Educational Leadership and Policy Studies

Terrence Wiley, Director
(ED 120) 480/965-6357
delps@asu.edu
coe.asu.edu/elps

Program Areas

Education Policy Studies
Educational Administration and Supervision
Higher and Postsecondary Education
Social and Philosophical Foundations of Education

Degrees: M.A., M.Ed., Ed.D., Ph.D.

Graduate programs in this division are designed to develop leaders, researchers, and policy analysts for careers in schools, colleges, and private and government agencies. Graduates will be able to examine educational institutions, theories, and practices within broad economic, historic, political, social, and intellectual contexts in this country and abroad.

Two basic emphases exist within the division's programs. One strand focuses on the administration and policies of educational practices from preschool through secondary education. The other strand focuses on the administration and policies of postsecondary education. Specific details of these strands are given under the headings of the degree offerings in Educational Administration and Supervision, Educational Leadership and Policy Studies, Higher and Postsecondary Education, and Social and Philosophical Foundations.

Faculty within the division are involved in both data-based and theoretical research. Qualitative and quantitative paradigms are employed. Students have the opportunity to work on research projects in the College of Education and in school districts and educational agencies throughout the country.

Division of Psychology in Education

Elsie Moore, Director
(EDB 302) 480/965-3384
dpe@asu.edu
seamonkey.ed.asu.edu/~gail/division/divintro.htm

Program Areas

Counseling Psychology
Counselor Education
Educational Psychology
 Learning
 Lifespan Developmental Psychology
 Measurement, Statistics, and Methodological Studies
 School Psychology
Educational Technology

Degrees: M.A., M.Ed., M.C., Ph.D.

All program areas within this division strongly emphasize research activities. Areas of concentration within the Ph.D. in Educational Psychology include learning; lifespan developmental psychology; measurement, statistics, and methodological studies; and school psychology. The Ph.D. program in Counseling Psychology and Educational Psychology concentration in school psychology are accredited by the American Psychological Association and are based upon the scientist-practitioner model. The Master of Counseling program in community counseling is accredited by the Council for the Accreditation of Counseling and Related Educational programs (CACREP).

Members of the faculty are actively involved in a variety of research and other scholarly activities, including basic and applied educational research, editing and reviewing for a number of refereed journals, publishing and presenting research papers, and seeking external funding for research projects. The faculty encourage and assist graduate students' research, publications, and presentations at professional conferences. Particular research interests of the faculty are noted under each degree major.

GRADUATE PROGRAMS

The College of Education offers degrees for the practitioner and for the academic researcher. The Master of Education and the Doctor of Education are designed for teachers and other practitioners working directly with students and schools. The Master of Counseling is designed to prepare helping professionals for work in a variety of counseling settings. The M.A. and Ph.D. degrees are designed for persons interested in careers in universities and other research settings. The M.A. and Ph.D. programs emphasize theory development, research methods, and acquisition of a broad base of knowledge about education, as well as in-depth knowledge of a chosen field of specialization.

The Interdisciplinary Committee on Curriculum and Instruction offers an interdisciplinary graduate program leading to the Ph.D. degree in Curriculum and Instruction. Areas of concentration are as follows: art education, curriculum studies, early childhood education, educational media and computers, elementary education, English education, exercise and wellness education, language and literacy, mathematics education, music education, physical education, science education, and special education. The interdisciplinary committee sets guidelines and supervises programs of study, while an executive committee, appointed by the dean of the College of Education and the dean of the Graduate College, has primary responsibility for the operation of the program. It is composed of faculty representing the various concentrations.

Most graduate programs of the College of Education include a core of courses designed to give students an understanding of the context of American education and of the methods of scholarship by which the understanding of the educational system is deepened.

Core course requirements along with specific requirements for the various types of degrees are given under the appropriate majors. The table presents a summary of those degrees authorized by the Arizona Board of Regents. Contact the division offices for further information about degrees offered through each faculty group. Several of the degrees have various concentrations.

College of Education Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Counseling	M.C.	—	Division of Psychology in Education
Counseling Psychology	Ph.D.	—	Division of Psychology in Education
Counselor Education	M.Ed.	—	Division of Psychology in Education
Curriculum and Instruction	M.A.	Bilingual education, communication arts, early childhood education, elementary education, English as a second language, Indian education, mathematics education, reading education, science education, secondary education, social studies education	Division of Curriculum and Instruction
	M.Ed.	Bilingual education, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, professional studies, science education, secondary education, social studies education	Division of Curriculum and Instruction
	Ed.D.	Bilingual education, communication arts, curriculum studies, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, science education, secondary education, social studies education	Division of Curriculum and Instruction
	Ph.D. ¹	Art education, ² curriculum studies, early childhood education, educational media and computers, ³ elementary education, English education, exercise and wellness education, ⁴ language and literacy, mathematics education, music education, physical education, science education, special education	Interdisciplinary Committee on Curriculum and Instruction
Educational Administration and Supervision	M.Ed., Ed.D.	—	Division of Educational Leadership and Policy Studies
Educational Leadership and Policy Studies	Ph.D.	—	Division of Educational Leadership and Policy Studies
Educational Psychology	M.A., M.Ed.	—	Division of Psychology in Education
	Ph.D.	Learning; lifespan developmental psychology; measurement, statistics, and methodological studies; school psychology	Division of Psychology in Education
Educational Technology	M.Ed., Ph.D.	—	Division of Psychology in Education
Higher and Postsecondary Education	M.Ed., Ed.D.	Higher education	Division of Educational Leadership and Policy Studies
Social and Philosophical Foundations of Education	M.A.	—	Division of Educational Leadership and Policy Studies
Special Education	M.A.	—	Division of Curriculum and Instruction
	M.Ed.	Gifted mildly disabled, infants and young children, multicultural exceptional, severely/multiply disabled	Division of Curriculum and Instruction

¹ Program is administered in collaboration with the College of Education and the Graduate College.

² Concentration is administered in collaboration with the Herberger College of Fine Arts.

³ Applications are not being accepted at this time.

⁴ Doctoral courses for this interdisciplinary program administered by ASU Main are offered by ASU East.

ADMISSION REQUIREMENTS

Applicants must meet the general admission requirements established by the Graduate College. For the M.Ed. and M.C. degrees, test scores from the Miller Analogies Test or the Graduate Record Examination are required.

Individual divisions or programs may have admission standards higher than these minimums. Also, some units are limited by the number of faculty members or resources they have, and in keeping with the college's goals of providing a high quality education for all enrolled students, only a small proportion of the qualified students who apply are admitted. Students should consult the division director or program coordinator for specific admission requirements.

SPECIAL PROGRAMS

Research and services to students and the community are provided through two centers authorized by the Arizona Board of Regents: the Center for Bilingual Education and Research and the Center for Indian Education. The College of Education offers graduate course work pertaining to the development and education of children and youth from diverse cultural, linguistic, and racial/ethnic populations. Faculty affiliated with multicultural education are actively involved in research related to effective schooling for children of Hispanic American and American Indian heritage, parents as partners in education, bilingual education, and English as a second language.

The college's Technology Based Learning and Research Facility conducts research activity related to software evaluation and the use of microcomputers in schools.

CERTIFICATION AND ENDORSEMENT

Postbaccalaureate programs that lead to initial teaching certification are designed for people who hold bachelor's degrees in areas other than education. Postbaccalaureate programs are available in one of the following areas: elementary education, principalship, secondary education, special education, superintendent, and supervisor. Programs to earn endorsements, which are added to teaching certificates, include bilingual education, educating the gifted, library science, middle school education, reading, and teaching English as a second language. Programs that prepare stu-

dents for certification by the State as a school counselor are offered by the Counselor Education Program.

COLLEGE FACILITIES

In addition to the special programs mentioned earlier, other administrative units and centers provide services to students and the community. These include the College of Education Preschool, which provides young children a variety of learning experiences designed to encourage the development of thinking skills, intellectual curiosity, creative expression, and the foundation upon which academic skills will later be built. The preschool provides on-site observation opportunities for students preparing to become early childhood teachers.

The Counselor Training Center provides counseling for ASU students, faculty, staff, and the community at large, regarding personal relationships, and career development issues. Counseling is conducted by graduate students in counseling and counseling psychology under the supervision of licensed psychologists.

ADVISING

General career advising in a program can be obtained by contacting the director of the division or the coordinator of the program in which a degree is offered. After admission to a degree program, specific advice related to degree activities is provided by supervisory committees.

ACCREDITATION AND AFFILIATION

The Ph.D. programs in Counseling Psychology and the Educational Psychology concentration in school psychology are accredited by the American Psychological Association. The school psychology program is also approved by the National Association of School Psychologists. The Master of Counseling is accredited by the Council for Accreditation of Counseling and Related Educational Programs. The College of Education is approved by the State Board of Education (Arizona). The college is affiliated and has membership with the American Association of Colleges for Teacher Education, the American Educational Research Association, the Association of Colleges and Schools of Education in State Universities and Land Grant Colleges, and the University Council for Educational Administration.

College of Engineering and Applied Sciences

Peter E. Crouch, Ph.D., Dean

www.eas.asu.edu



The Goldwater Center for Engineering Research

John Phillips photo

PURPOSE

Faculty in the College of Engineering and Applied Sciences offer opportunities for graduate study through the Del E. Webb School of Construction and the School of Engineering. Degrees offered include the Master of Engineering (a tri-university degree program), the Master of Science in Engineering, the M.S. in the fields of engineering and computer science, the Master of Computer Science, the M.S. degree in Construction, and the Ph.D. in the fields of engineering and computer science.

The primary purpose of a graduate education is to provide the student with advanced training for a professional, teaching, or research career. The graduate program in the School of Engineering is designed to bridge the gap between knowledge of engineering sciences and creative engineering practice, while at the same time increasing the student's depth and breadth of knowledge in an area of emphasis. The performance of scholarly research and the acceptance of professional responsibility for the documented results are considered essential requirements for graduate degrees and entrance into professional careers.

Information about the College of Engineering and Applied Sciences can be accessed via the World Wide Web at www.eas.asu.edu. The individual department and research program Web pages may also be accessed through this main address.

ORGANIZATION

The College of Engineering and Applied Sciences is organized as follows:

Del E. Webb School of Construction

School of Engineering

Department of Bioengineering

Department of Chemical and Materials Engineering

Department of Civil and Environmental Engineering

Department of Computer Science and Engineering

Department of Electrical Engineering

Department of Industrial Engineering

Department of Mechanical and Aerospace
Engineering

Each academic unit, headed by a chair or director, offers various undergraduate and graduate degree programs. Faculty from these academic units participate in the research programs offered through the college research centers as well as individual laboratories and facilities. Drawing on the interests, strengths, and resources of academic units in the College of Engineering and Applied Sciences and other schools and colleges within the university, interdisciplinary research centers coordinate research, sponsor conferences

College of Engineering and Applied Sciences Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Del E. Webb School of Construction			
Construction	M.S.	Construction science, facilities, management	Del E. Webb School of Construction
School of Engineering			
Aerospace Engineering	M.S., M.S.E., Ph.D.	—	Department of Mechanical and Aerospace Engineering
Bioengineering	M.S., Ph.D.	—	Department of Bioengineering
Chemical Engineering	M.S., M.S.E., Ph.D.	—	Department of Chemical and Materials Engineering
Civil Engineering	M.S., M.S.E., Ph.D.	—	Department of Civil and Environmental Engineering
Computer Science	M.C.S., M.S., Ph.D.	—	Department of Computer Science and Engineering
Electrical Engineering	M.S., M.S.E., Ph.D.	—	Department of Electrical Engineering
Engineering	M.E. ¹	—	School of Engineering
Engineering Science	M.S., M.S.E., Ph.D.	—	School of Engineering
Industrial Engineering	M.S., M.S.E., Ph.D.	—	Department of Industrial Engineering
Materials Engineering	M.S., M.S.E.	—	Department of Chemical and Materials Engineering
Materials Science	M.S. ²	—	Committee on Science and Engineering of Materials
Mechanical Engineering	M.S., M.S.E., Ph.D.	—	Department of Mechanical and Aerospace Engineering
Science and Engineering of Materials	Ph.D. ²	High-resolution nanostructure analysis, solid-state device materials design	Committee on Science and Engineering of Materials

¹ This collaborative program is offered by the three state universities.

² This program is administered by the Graduate College.

and continuing education courses, and serve as liaison between the academic and industrial or technical communities.

ADMISSION REQUIREMENTS

Applicants must meet the general admission requirements established by the Graduate College. Additional supporting materials may be required by individual academic units. These materials may include test scores from the Graduate Record Examination, letters of recommendation, and statements of educational and professional goals. International applicants whose native language is not English must also submit Test of English as a Foreign Language (TOEFL) scores. See the requirements listed under each major in this catalog for specific TOEFL information.

General information on admission, expenses, and other such topics may be obtained from the Office of the Associate Dean for Academic Affairs via the college's Web site at www.eas.asu.edu or by e-mail at asuengr@asu.edu. Specific questions on a program should be addressed to the academic unit.

GRADUATE PROGRAMS

Through the Graduate College, faculty in the College of Engineering and Applied Sciences offer various graduate programs leading to the M.S., Master of Engineering, Master of Computer Science, and Ph.D.

The college is committed to becoming a nationally prominent center for graduate research. Faculty members conduct research on government or industry-sponsored programs in such areas as aerodynamics, biomedical engineering, biotechnology, computer design, computer-integrated manufacturing, construction management, environmental fluid dynamics, innovative engineering education, microelectronics manufacturing, power systems, semiconductor materials and devices, signal processing, solar energy, solid-state electronic devices, structural dynamics, telecommunications, thermosciences, and transportation infrastructure. The research activities of the academic units within the college are complemented and supported by the work of centers for research and development.

Research in the Center for Low Power Electronics focuses on the following technical areas:

1. basic materials, alternative materials, and their fabrication;
2. device design optimization;
3. design of digital, analog, and hybrid low power circuits; and
4. power-based physical design for single and multichip VLSI systems.

Faculty and graduate students in the college participate in programs of the Center for Solid-State Electronics Research, coordinating the work of researchers from various units. The center emphasizes the development of solid-state

electronics research and teaching and facilitates interaction with the electronics industry. The center operates modern, sophisticated research facilities, organizes colloquia and symposia, collaborates with external researchers, and sponsors visiting professorships.

The college's Telecommunications Research Center focuses, plans, and promotes the research activities of the faculty with interests in antennas, propagation, and scattering; microwave circuits, devices, and measurements; optical communications; signal processing; and switching and data communications. The center conducts research, develops technologies, and provides educational programs. Industrial and multidisciplinary programs are encouraged. The center operates modern research laboratories, including an excellent, spacious electromagnetic anechoic chamber.

The Manufacturing Institute was established to broaden the scope of manufacturing research in the university to include research at the interface between the College of Business and the College of Engineering and Applied Sciences as well as research in manufacturing processes. The institute has codirectors from both colleges and also enjoys active industry involvement.

The Center for Systems Science and Engineering is jointly sponsored by the College of Engineering and Applied Sciences and the College of Liberal Arts and Sciences. Its main goals are the creation and enhancement of interdisciplinary and cooperative research, graduate education, and public service programs in the areas of systems science, applied mathematics, and computation. The center's focal areas include nonlinear and adaptive systems, large scale systems, and scientific computing and simulation.

The Center for Research on Education in Science, Mathematics, Engineering, and Technology (CRESMET) is a collaborative effort between CEAS, the College of Liberal Arts and Sciences, and the College of Education. The mission of this center is to research, develop, and assess educational theories, curricula, and administrative policies that impact science, mathematics, engineering, and technology education, and to encourage and support wide-scale sharing and implementation of effective approaches to producing a more scientifically and technologically literate populace, and more capable science, math, engineering, and technology graduates. Partnership-building with individuals, programs, and organizations throughout the K-12 education system is an important role for this center, which is ideally positioned to exploit the synergism that can result from linking all educational levels in these disciplines together to foster improvements.

The Center for Professional Development coordinates continuing education services for the local, national, and international technical community, sponsoring conferences, seminars, institutes, and short courses for professionals in the rapidly changing fields of science and technology. The center also coordinates distance-learning and media-delivered programs via television, satellite, and Web connections.

The College of Engineering and Applied Sciences serves the high technology community through the Interactive Instructional Television Program. The system allows employees of participating companies to attend graduate-level courses, special interest seminars, and video teleconferences without leaving their place of employment. In cooperation with the National Technological University, the college also provides instruction via satellite.



Graduate students from the Del E. Webb School of Construction work together at a construction site on campus.

Tim Trumble photo

The College of Engineering and Applied Sciences and the industrial and business communities of Arizona interact regularly through the Dean's Advisory Council. The council's primary purpose is to assist the college in its threefold mission:

1. to provide undergraduate and graduate students with a variety of high-quality educational opportunities that will serve their professional interests into the 21st century,
2. to enhance the economic well-being of Arizona and the nation, and
3. to meet the rapidly expanding need for research and educational support of the high-technology industry of Arizona.

The Engineering Excellence 2000 program sponsored by the college and the Arizona industrial and business communities has been instrumental in dramatically increasing state, federal, and private funding of undergraduate and graduate instruction and the college's research programs. Currently, the School of Engineering, which houses the college's six engineering departments, is emphasizing research in the areas of electronics/materials, manufacturing, communications and information systems, environmental engineering, biotechnology, and software engineering. The college's Del E. Webb School of Construction enjoys great community support for its active graduate program in construction sciences and facilities management.

Arizona's three state universities—Arizona State University, Northern Arizona University, and the University of Arizona—are cooperating in the offering of a new tri-university degree program: the Master of Engineering. The Master of Engineering is a graduate degree program that is intended to meet the educational needs of Arizona's practicing engineers. With input from industry professionals, the three universities expect to develop courses that address the enhancement and development of skills, knowledge, and understanding that are critical to today's practicing engineer. These courses will be offered through a variety of distance-delivery methods and in flexible formats. Students enrolled in the program will be able to take advantage of course offerings at any of the three universities. These offerings reflect the diversity of strengths across the state. The Master of Engineering offers the practicing engineer the opportunity to design, in conjunction with an advisory committee, a program of study that can reflect the increasingly interdisciplinary nature of engineering practice.

For more information on this degree program, see "Master of Engineering," page 200, visit the program's Web site at truniv.engr.arizona.edu, contact the College of Engineering and Applied Sciences at 480/965-1726, or send e-mail to m.eng@asu.edu.

COLLEGE FACILITIES

Numerous well-equipped laboratories, extensive library holdings, and widely available computer services encourage the best in research and graduate training. Laboratories include facilities for environmental fluid dynamics, interactive nonvisualization via scanning probe microscopy, materials and surface characterization, mechanical testing, molecular beam epitaxy, neuromechanical control, rapid manufacturing processes, transmission microscopy, and surface research, to name only a few of the diverse capabilities

of the college's physical resources. Supporting the work of researchers, a well-equipped and well-staffed machine and structures fabrication shop makes special-purpose equipment for student and faculty projects. For more information about laboratories, consult the descriptions of individual programs and centers for research in this catalog.

The College of Engineering and Applied Sciences offers extensive computing facilities to its faculty and graduate students. The college centrally maintains computing resources for general engineering use, including a large Sun SPARCcenter 2000 superserver, Hewlett Packard 9000 superserver, and an IBM Netfinity Quad M7000 NT Server. Also available are specialty computers for World Wide Web services, electronic mail, Internet collaboration, and special applications. Distributed throughout the college are several thousands of networked UNIX workstations and PCs accessing UNIX or NT servers available for research and instruction. UNIX workstations are provided by manufacturers such as Sun Microsystems, Hewlett Packard, Silicon Graphics, and Digital Equipment Corporation. All college computing resources are interconnected via the Internet standard TCP/IP on 10Mb or 100Mb dedicated ethernet.

ACADEMIC STANDARDS

Retention. A student who has been admitted to a graduate program of study in the College of Engineering and Applied Sciences, on either a regular or provisional basis, must maintain a 3.00 or higher GPA in all work taken for graduate credit as well as an overall 3.00 GPA in all studies at ASU.

A student is placed on academic probation if

1. the student's GPA falls below 3.00 in the approved program of study;
2. the student's overall GPA for all postbaccalaureate courses taken at ASU falls below 3.00;
3. the student receives a "D" or "E" in a required deficiency or in a course at the 400 level or above; or
4. for reasons other than above, the student fails to make satisfactory progress toward a degree.

A student is recommended for withdrawal from a graduate program if

1. the student is on academic probation because his or her GPA has fallen below 3.00 in the approved program of study or for all postbaccalaureate courses taken at ASU and fails to bring the GPA to 3.00 or above by the time the next nine semester hours are completed;
2. the student receives a "D" or lower grade while on academic probation for any reason;
3. the student fails to obtain at least a 3.00 GPA in all courses cited as deficiencies upon admission to a graduate program;
4. the student fails to meet any other conditions imposed as part of the probation; or
5. for reasons other than above, the student fails to make satisfactory progress toward a degree.

A student may appeal any action concerning academic probation and withdrawal by petitioning the graduate affairs committee within the student's academic unit.

The Katherine K. Herberger College of Fine Arts

J. Robert Wills, Ph.D., Dean

herbergercollege.asu.edu



Music professor Timothy Russell (right) critiques a composition by graduate student Stephen Grieco (left).

Tim Trumble photo

PURPOSE

The Katherine K. Herberger College of Fine Arts at ASU offers preprofessional and professional education in the arts disciplines and opportunities for nonmajors to become culturally literate through participation and involvement in the creative and performing arts.

At the graduate level, the college provides students the opportunity to participate with faculty mentors in research, performance and performance practices, and other creative activities.

As the largest and most diverse fine arts academic unit in the Southwest, and one of the largest in North America, the college has an implicit responsibility to maintain quality and leadership in all aspects of its activities. Through its programs in art, dance, music, and theatre, the college reflects a wide range of challenges facing the artist and scholar into the 21st century.

ORGANIZATION

The college houses the School of Art, the Department of Dance, the School of Music, the Department of Theatre, the University Art Museum, and the Institute for Studies in the Arts. An average of 2,000 students per semester enroll as majors in various degree programs offered through these units. Approximately one third of these are graduate students.

GRADUATE PROGRAMS

Faculty in the School of Art, Department of Dance, School of Music, and Department of Theatre offer both research and professional degrees through the Graduate College: the M.A., Master of Fine Arts, Master of Music, Doctor of Musical Arts, and Ph.D. degrees. A full range of majors and concentrations is available.

ADMISSION REQUIREMENTS

Admission requirements vary according to degree programs. However, applicants must first meet all admission requirements of the Graduate College. Most programs require a bachelor's degree with a major in the selected area; many of them also require an audition. See the specific degree program for pertinent admission requirements.

SPECIAL PROGRAMS

Together with faculty, visiting scholars, and artists-in-residence, graduate students in all fields of the college participate in dynamic, innovative programs. The creative energy that infuses the visual and performing arts finds expression in research and study.

Herberger College of Fine Arts Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Art	M.A.	Art education, art history	School of Art
	M.F.A.	Ceramics, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, sculpture, wood	School of Art
Composition	M.M.	—	School of Music
Creative Writing	M.F.A. ¹	—	Creative Writing Committee
Curriculum and Instruction	Ph.D. ²	Art education	School of Art
Dance	M.F.A.	—	Department of Dance
History and Theory of Art ³	Ph.D.	—	School of Art
Music	M.A.	Ethnomusicology, music history and literature, music theory	School of Music
	D.M.A.	Choral conducting; music composition; music education; solo performance (instrumental, keyboard, piano pedagogy, voice)	School of Music
Music Education	M.M.	Choral music, general music, instrumental music, jazz studies	School of Music
Performance	M.M.	Music theatre/opera musical direction; music theatre/opera performance; performance pedagogy; piano accompanying; solo performance (instrumental, keyboard, voice)	School of Music
Theatre	M.A.	—	Department of Theatre
	M.F.A.	Performance, scenography, theatre for youth	Department of Theatre
	Ph.D.	Theatre for youth	Department of Theatre

¹ This program is administered by the Graduate College. See "Graduate College," page 51.

² This program is administered in collaboration with the College of Education and the Graduate College.

³ This major is jointly offered with the University of Arizona.

The School of Art offers opportunities to explore and refine a new artistic medium: computer graphics. Students may work with software for "painting," solid modeling, animated solid modeling, and live video mapping. While computer graphics makes use of the latest technology, other areas preserve and revitalize established media. The neon studio contributes to the revival of interest in neon as an artistic medium and trains students in this difficult craft. The Northlight Gallery has also become known internationally for photographic exhibitions. Graduate students gain valuable experience in the gallery.

In addition, the School of Art has three traveling fellowships that allow students to study or conduct research abroad. The Anthony Gully Travel Fellowship and the Rabiner Memorial Fellowship are for Art History students. The Nathan Cummings Travel Fellowship is for M.F.A. students.

Recognized as one of the top programs in the country, the Department of Dance emphasizes the choreography, performance, and theory of modern dance. Nationally prominent faculty and visiting artists create repertory for dance majors and for the Dance Arizona Repertory Theatre (DART), a student touring outreach company. An ambitious performance program offers to the public several concerts each year with additional works created and performed by graduate and undergraduate students. Students work closely with major artists and companies who visit campus annually, and with researchers in the areas of dance science, dance in relation to technology, dance music composition, labanotation, and sound and video production. ASU students and faculty

have consistently taken top honors at the regional and national festivals of the American College Dance Festival Association.

As the research center for the college, the Institute for Studies in the Arts serves as a laboratory for the development and funding of creative ideas and for the exploration of new tools and technologies for artistic expression, a network for communication among creative scholars both within and outside the arts, and a resource base for the documentation, evaluation, and dissemination of research in the arts. Through technical and monetary support, the institute sponsors a wide variety of projects that address its mission of experimentation and innovation.

Faculty in the School of Music include a wide range of performers, teachers, conductors, composers, and scholars, whose knowledge and guidance support the training of students in the Doctor of Musical Arts and master's degree programs. Individuals who hold graduate degrees from ASU's School of Music hold prestigious performing and university teaching positions throughout the nation. The graduate programs are indeed comprehensive and provide for wide and diverse opportunities in performance, course work, and research.

Three concentrations are available in the M.F.A. in Theatre program: performance, scenography, and theatre for youth. The concentration in performance challenges performing artists to reinvigorate the classics, develop new works, explore new theatrical forms, and discover changing relationships between art and technology. The Ph.D. in Theatre program offers a concentration in theatre for youth.

The Department of Theatre, with its strong playwriting program, has a special interest in new scripts that bring a wealth of professional productions and workshops to campus for the benefit of all students. The Department of Theatre takes special pride in its nationally and internationally acclaimed theatre for youth program, which provides comprehensive graduate training and attracts students, scholars, and artists from around the world. Graduate students are challenged to excel in every aspect of theatrical training. They are offered acting, directing, and other production opportunities for mainstage, studio, and touring shows, as well as research and teaching opportunities on and off campus. The program has developed Hayden Library's Child Drama Collection, which includes rare books, plays, memorabilia and personal and national association archives. It is the most complete and comprehensive child drama collection in the English-speaking world.

Students in the scenography program are actively involved in all aspects of design and technology for mainstage and studio productions and receive regional and national awards on a regular basis for their work.

The playwriting program enriches graduate study and brings together talented students with those who practice the theatrical arts.

The M.F.A. in Creative Writing encourages graduate students to work closely with writers of drama, fiction, and poetry, and with directors and producers from the Departments of English and Theatre. This interdisciplinary program, involving the artistic, research, and teaching interests of faculty in these departments, offers students a unique opportunity to tailor a course of study to fit individual needs, talents, and goals.

COLLEGE FACILITIES

The arts programs are housed in the following buildings: Art Building; Dixie Gammage Hall; Physical Education Building East; Gammage Center for the Performing Arts; Matthews Center; Matthews Hall; the J. Russell and Bonita Nelson Fine Arts Center, which includes the University Art Museum; the 496-seat Paul V. Galvin Playhouse; six theatre studios; a 7,000-square-foot Experimental Dance Lab; a dance studio theatre; and a video lab. The Music Building and expansion wing house four performance halls ranging in size from the 125-seat Recital Hall to the 500-seat Music Theatre and the 350-seat Katzin Concert Hall, which is used primarily for solo and chamber music recitals. The Katzin Concert Hall contains a nine-foot Hamburg Concert Stein-

way piano. The new 175-seat Organ Hall was designed to house the Paul Fritts Tracker Organ, an instrument reflecting the aesthetics and style of North German organ building in the 17th century. The Theatre Department also stages productions in the renovated Lyceum Theatre and Prism Theatre. Many of these facilities are equipped with studios and laboratories, where needed.

The University Art Museum's collections are housed in a large complex of galleries and art study rooms in two locations: the Nelson Fine Arts Center and the second floor of the Matthews Center. The Oliver B. James Collection of American Art ranges from the early 18th century to the contemporary and includes major works by Stuart, Ryder, Homer, and the Ash Can School painters. Master works by great print-makers such as Durer, Rembrandt, Whistler, and Hogarth are often featured in special exhibitions selected from the university's extensive print collection.

The gallery devoted to Latin American art features folk art as well as paintings by celebrated 20th-century artists Rivera, Siquerios, and Tamayo. The museum also displays many fine examples of 19th- and 20th-century crafts, paintings, and sculpture.

The contemporary art holdings include works by Vernon Fisher, Leon Golub, Sue Coe, Luis Jimenez, and Robert Colescott. Exhibitions curated by the museum emphasize contemporary art and new media, crafts, and Mexican art.

All units have developed computer facilities for graduate student training. Also refer to "Computing Facilities and Services," page 30.

ADVISING

Advising is handled as a decentralized activity within the college. To offer personalized attention, each academic unit establishes its own graduate advising procedures. Students are encouraged to make appointments through the central office of their major discipline.

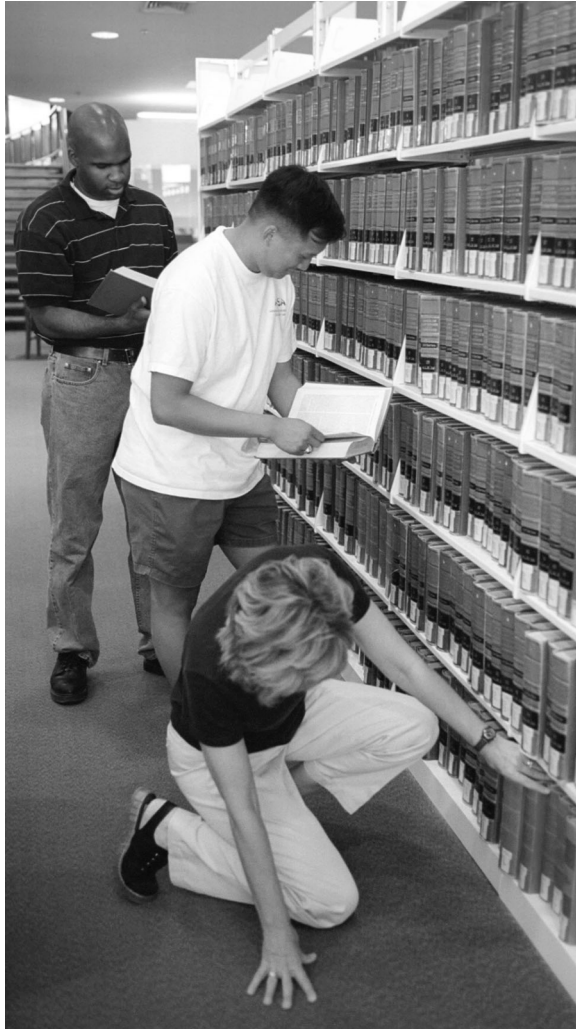
ACCREDITATION

While all of the arts programs in the college meet or exceed standards established by various arts accrediting agencies, the School of Music and the Department of Theatre hold formal memberships; the School of Music by the National Association of Schools of Music, and the Department of Theatre by the National Association of Schools of Theatre.

College of Law

Patricia D. White, J.D., Dean

www.law.asu.edu



Law students doing research at the John J. Ross–William Blakley Law Library

Tim Trumble photo

PURPOSE

The prime function of the College of Law is to train men and women for the practicing legal profession and related professional assignments. In addition, the college has the responsibility to contribute to the quality of justice administered in society.

ORGANIZATION

Law Building and Law Library

The John S. Armstrong Law Building is located near other colleges on the university's main campus, not far from Hayden Library. The Law Building provides every modern facility for legal education and has been described by experts involved in the planning of law buildings as setting a new standard in functional design.

The award-winning John J. Ross–William C. Blakley Law Library, named in memory of two prominent Phoenix attorneys, is one of the finest law libraries in the Southwest. The library houses a collection of more than 351,000 volumes and microform volume equivalents. The collection includes a broad selection of Anglo-American case reports and statutes as well as legal treatises, periodicals, encyclopedias, digests, citators, and administrative materials. The collection also includes a growing selection of special materials dealing with international law, Indian law, Mexican law, and law and technology.

Students also have ready access to the other campus libraries, including the Charles Trumbell Hayden Library, the Daniel E. Noble Science and Engineering Library, the Architecture and Environmental Design Library, and the Music Library. The collections maintained in all university libraries comprise more than 3 million volumes.

GRADUATE PROGRAMS

Juris Doctor Degree

The College of Law offers a three-year program of professional study at the graduate level leading to the degree of Juris Doctor (J.D.).

Dual/Concurrent Degree Programs

Law students wishing to pursue a joint degree program at ASU must have a joint degree application and program of study approved by the associate dean of the College of Law before pursuing the joint degree.

Certificate Programs

See "Indian Legal Program," page 78.

SPECIAL PROGRAMS

Center for the Study of Law, Science, and Technology

The Center for the Study of Law, Science, and Technology is a multidisciplinary research center created by the

Arizona Board of Regents in 1984. The center publishes research studies, sponsors seminars and symposia, and houses visiting scholars and teachers. Through these programs, the center seeks to contribute to the formulation and improvement of law and public policy affecting science and technology and to the wise application of science and technology in the legal system.

The College of Law offers a substantial number of courses in the law, science, and technology area, including bioethics law and psychiatry, environmental law, health care law, intellectual property, land use regulation, law and evolutionary biology, law and medicine, law and social science, mass communication, natural resources law, patent law, regulatory problems in law, science and technology, and water law. Each semester, the center publishes a student guide to other less obvious courses that contain science and technology issues. In recent semesters, this guide has listed courses in AIDS and the law, commercial law, employment law, law and the handicapped, antitrust, statistical proof in employment discrimination litigation, and several courses offered by other departments on campus available for registration by law students. In addition to regular course offerings, students can arrange independent studies with supervising faculty on topics of special interest to them. The center also invites guest speakers from legal or scientific fields to visit with interested law students, generally during the noon hour.

In cooperation with the American Bar Association Section on Science and Technology and under the leadership of a faculty editor, second- and third-year students edit *Jurimetrics: The Journal of Law, Science and Technology*. Student editors edit submitted works and write original articles for the journal.

Clinical Programs

The College of Law's clinical program is a rigorous in-house program that provides third-year students, under the close supervision of an ASU faculty member, the opportunity to represent clients in court. Four live-client clinics, the Civil Practice Clinic, the Criminal Practice Clinic, the Public Defender Clinic, and the Mediation Clinic provide students with an opportunity to choose from civil or criminal representation or to serve as mediators in disputes that are resolved outside the court system.

The Civil Practice Clinic operates as a functioning law firm within the college, while Criminal Practice and Public Defender Clinic students work in offices located within agencies or courthouses. Second-year students are offered simulation-based courses in Lawyering Theory and Practice in preparation for enrollment in a live-client clinic. Other simulation courses include Trial Advocacy, Pre-Trial Practice, and Negotiations.

Indian Legal Program

The College of Law offers an Indian Legal Program intended to serve tribal courts and governments by providing information on legal issues. The program also provides education and general scholarship on Indian law. Through a Certificate in Indian Law, the college provides its students with a quality legal education and an opportunity to gain specific knowledge and expertise in Indian law. Students in the College of Law have the opportunity to participate in all phases of the Indian Legal Program and gain an in-depth understanding of the legal issues affecting Indian tribes and peoples. Courses on Federal Indian law and seminars on

advanced Indian law topics such as American Indian cultural resources protection, economic development, tribal environmental law, and tribal law are part of the curriculum. Students also have the opportunity to participate in internships with local tribal courts, the Native American Rights Fund, the U.S. Department of the Interior, or the Senate Committee on Indian Affairs in Washington, D.C. This variety of academic and work experience provides the students with an outstanding legal education and a firm grounding in both the theoretical and practical aspects of Indian law.

Law Journal

The College of Law publishes a professional law review, the *Arizona State Law Journal*, edited by students of the second- and third-year classes. Membership on the law journal is determined by grade performance in the first year and by submitting written work in a writing competition. Participation on law review is hard but rewarding work. For those eligible, the review provides one of the finest avenues for legal education thus far developed. Its work contributes to the student's intellectual advancement, to the development of law and the legal profession, and to the stature of the law school.

ADMISSION REQUIREMENTS

First-year students must begin their course of study in fall semester. The formal requirements for admission to the College of Law are (1) an undergraduate degree from an accredited four-year college or university and (2) a score on the Law School Admission Test (LSAT), administered by Law Services.

Each applicant for admission to the Juris Doctor (J.D.) program must have earned an undergraduate degree from an accredited four-year college or university (B.A., B.S., or other equivalent). The College of Law Admissions Office considers an applicant's file complete only if it includes each of the following:

1. a completed Application for Admission form;
2. a completed Arizona residency information form if claiming Arizona residency;
3. a \$45 application fee;
4. a personal statement that does not exceed three typed pages in length; and
5. a Law School Data Assembly Service (LSDAS) report with all transcripts and the Law School Admissions Test (LSAT) score(s) from the Law School Admission Services (LSAS).

To be assured consideration, all application materials must be complete by March 1.

Further detailed information concerning the course of study, admission practices, expenses, and financial assistance can be found in the *Bulletin of the College of Law*. To request the bulletin or application forms, call 480/965-7207 or write

ADMISSIONS OFFICE
COLLEGE OF LAW
ARIZONA STATE UNIVERSITY
P.O. BOX 877906
TEMPE, AZ 85287-7906

For general information about the College of Law, call 480/965-1474 or access the college's Web site at www.law.asu.edu.

COURSE OF STUDY

The program of study in the College of Law is designed for full-time students. In the first year of the three-year program, the course of study is prescribed and incorporates the time-proven techniques of legal education. Through case methods, problem methods, moot court experience, and other techniques, the first year gives students an intensive exposure to basic legal processes.

As part of the program, first-year students are assigned to small sections. In the Legal Research and Writing program, first-year students prepare legal briefs and memoranda and receive feedback through the use of practice examinations. The program focuses on the development of writing and organizational skills necessary for success in law school and in the practice of law. The second and third years cover a wide range of courses varying in format as well as subject matter, allowing students to pursue both the basic subjects of law study and more specialized interests. By offering great freedom in the selection of subjects, the educational experience of the second and third years sharply contrasts with the curriculum of the first year. In addition, the college offers a number of faculty-supervised clinical education programs and a program of supervised externships.

Retention Standards. To be eligible to continue in the College of Law, students must maintain a cumulative weighted GPA of 70 or higher at the end of each semester or summer session. Any student who fails to achieve a 70 GPA in any one semester, regardless of the cumulative GPA, is automatically placed on probation. Continuation of enrollment by probationary students is based upon such terms and conditions as the college may impose.

A student whose cumulative GPA falls below the required level or whose semester GPA is less than 70 in two consecutive semesters is dismissed but may apply to the Office of the Dean for readmission. The Office of the Dean refers the application to a faculty Committee on Readmission. In cases where the GPA deficiency is slight and evidence of extenuating circumstances is convincing, readmission may be granted on a probationary status after a review of the reasons contributing to unsatisfactory performance and a finding that there is a substantial prospect for future acceptable academic performance. Continuation in school thereafter may be conditioned on achieving a level of performance higher than the overall 70 GPA. Further detailed information concerning the college's retention standards can be found in the *Bulletin of the College of Law*.

Honor Code. The legal profession, a self-regulating association, depends on the integrity, honor, and personal morality of each member. Similarly, the integrity and value of an ASU College of Law degree depends on a reputation for fair competition. The college's *Honor Code* is intended as a measure to preserve the integrity of the school's diploma and to create an arena in which students can compete fairly and confidently. Copies of the *Honor Code* are available from the assistant dean in the college's Student Services Office.

ADVISING

Preadmission information, advising, and continued support for the J.D. is provided by the College of Law Admissions Office, 480/965-1474.

ACCREDITATION

The college is fully accredited by the American Bar Association and is a member of the Association of American Law Schools.

College of Liberal Arts and Sciences

Gary S. Krahenbuhl, Ed.D., Dean

www.asu.edu/clas



The Agriculture Building on the ASU Main campus

H. Val Peterson photo

PURPOSE

The graduate programs in the College of Liberal Arts and Sciences are characterized by both a diversity of disciplines and a commonality of purpose. The disciplinary diversity of the college is broad by intent, embracing those branches of learning most central to the foundations of society in the humanities and the sciences. Unity of purpose is achieved through a common commitment to intellectual integrity, to research, and to the preservation of freedom of academic inquiry, as well as through informal exchanges and cross-disciplinary centers.

The College of Liberal Arts and Sciences has active research programs in all units offering advanced degrees. In recent years, the rapid addition of excellent faculty has enhanced the cadre of senior scholars and scientists with whom graduate students work.

ORGANIZATION

The College of Liberal Arts and Sciences, which offers graduate study in the humanities, the mathematical and the natural sciences, and the social sciences, brings together highly qualified faculty and advanced students to share learning and discovery in 20 academic units and in a number of interdisciplinary centers. In lectures and seminars, in laboratories and libraries, in creative endeavors, field experiences, and research projects, faculty and students cooperate in preserving, evaluating, and expanding knowledge.

GRADUATE PROGRAMS

In cooperation with the Graduate College, faculty affiliated with various departments and units within the College of Liberal Arts and Sciences offer three research-oriented degrees: the M.A., the M.S., and the Ph.D. In addition, four professional degrees are offered: the Master of Natural Science, the Master of Teaching English as a Second Language, the Master of Physical Education, and the Master of Fine Arts, an interdisciplinary creative writing program offered in cooperation with the Herberger College of Fine Arts. The interdisciplinary master's program in Humanities draws faculty expertise from the Departments of Anthropology, Dance, English, History, Languages and Literatures, Philosophy, Religious Studies, and the School of Art. Interdisciplinary programs leading to the Ph.D. degree are offered in Exercise Science, Molecular and Cellular Biology, Science and Engineering of Materials, and Speech and Hearing Science. Many departments within the college participate in the Master of Education, Doctor of Education, and Doctor of Philosophy degrees offered and administered through the College of Education. Members of the Department of Mathematics faculty participate in the interdiscipli-

nary M.S. degree in Statistics (with College of Business faculty); members of the Departments of Biology, Chemistry and Biochemistry, Microbiology, and Plant Biology participate in the interdisciplinary M.S. and Ph.D. in Molecular and Cellular Biology; members of the faculty in the Departments of Anthropology, History, Languages and Literatures, Philosophy, Political Science, Psychology, Religious Studies, and Sociology participate in the interdisciplinary Ph.D. in Justice Studies program; members of the Departments of Geography, Political Science, and Sociology faculty contribute to the interdisciplinary Doctor of Public Administration program; and members of the Departments of English, Family and Human Development, Sociology, and Speech and Hearing Science faculty participate in the interdisciplinary Ph.D. degree in Communication.

One of the unique features of an interdisciplinary program is that it draws upon faculty research and teaching interests from a number of academic units; thus a student may tailor a course of study to fit individual needs and goals.

ADMISSION REQUIREMENTS

Applicants to graduate programs within the College of Liberal Arts and Sciences must meet general requirements for admission established by the Graduate College (see "Admission to the Graduate College," page 92). In addition, academic units usually require test scores from the Graduate Record Examination and Miller Analogies Test, letters of recommendation, and a statement of purpose. Consult the individual degree programs for particular requirements. International applicants must also submit Test of English as a Foreign Language (TOEFL) scores and are advised to submit application materials well in advance of deadlines.

SPECIAL PROGRAMS

The college is characterized by the development of program thrusts in new areas, many of which are interdisciplinary in content. There is special strength, for example, in planetary geology, as well as in more traditional geological subdisciplines; in geochemistry, as well as in biochemistry and solid-state and materials science; and in magnetic properties of materials, as well as nuclear physics and surface physics. In psychology, traditional social, developmental, and clinical research is augmented by a new interest in preventive mental health. Flexibility and forward-looking program development pervade all college programs. The interdisciplinary degree in Exercise Science is internationally recognized. The graduate Creative Writing program brings talented students together with distinguished poets, playwrights, and novelists. The Teaching English as a Second Language program attracts students from all over the world. The Southwest environment has favorably affected program development in several ways, ranging from research activities in water resources, archaeology, and fluvial geomorphology to distinguished programs in Hispanic language, literature, culture, and history.

In addition to traditional and innovative programs within departments, there are multidisciplinary research centers within the college, bringing together faculty from various departments. These include the Centers for Asian Studies, Exercise and Sport Research, Hispanic Research, Latin American Studies, Medieval and Renaissance Studies, Meteorite Studies, and Solid-State Science. Centers sponsor colloquia, workshops, conferences, and visiting scholars. They administer international exchange programs, enhance library holdings and other collections, publish papers and monographs, maintain archives, and employ graduate research assistants.

COLLEGE FACILITIES

Strong and nationally funded research facilities, like the Facility for High Resolution Electron Microscopy and the Planetary Geology Laboratory have attained national and international prominence. Important research collections include one of the largest meteorite collections in the world, the holdings of the anthropology archives and museum, the space photography collection, the Herbarium, and extensive library holdings, including important manuscript collections in late 19th-century British literature and historical documents of the Southwest.

Graduate students in all disciplines have access to outstanding computer facilities. Mainframe computing for research is provided free of charge. There are substantial microcomputer facilities within individual academic units as well as clusters serving the humanities and social sciences. Minicomputer capabilities are found in various academic units. Also refer to "Computing Facilities and Services," page 30.

FINANCIAL ASSISTANCE AND SUPPORT

In addition to the usual support for graduate students in the form of stipends and teaching and research assistantships, there is a vigorous funding program to support graduate student research. Not only do graduate students obtain grants from external sources to support their research projects, they also receive support from the college and university to present papers at professional meetings.

ADVISING

Faculty advisors in each academic unit provide guidance to graduate students from admission through completion of the program. Consult the director of graduate studies in the appropriate academic unit. Graduate students must follow an approved program of study filed with the Graduate College. The calendar for enrollment activities is published in the schedule of classes for each semester. Teaching and research assistants, who are required to be enrolled in at least six hours, as well as those enrolled for individual project, thesis and dissertation credit, are subject to the same calendar deadlines as students enrolled in regularly scheduled classes.

College of Liberal Arts and Sciences Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Anthropology	M.A. ¹	Archaeology, bioarchaeology, linguistics, medical anthropology, museum studies, physical anthropology, social-cultural anthropology	Department of Anthropology
	Ph.D.	Archaeology, physical anthropology, social-cultural anthropology	Department of Anthropology
Asian Languages and Civilizations—Chinese/Japanese	M.A.	—	Department of Languages and Literatures
Biology ²	M.S., Ph.D.	Ecology	Department of Biology
Chemistry	M.S., Ph.D.	Analytical chemistry, biochemistry, geochemistry, inorganic chemistry, organic chemistry, physical chemistry, solid-state chemistry	Department of Chemistry and Biochemistry
Communication Disorders	M.S.	—	Department of Speech and Hearing Science
Creative Writing	M.F.A. ³	—	Creative Writing Committee
English	M.A.	Comparative literature, English linguistics, literature and language, rhetoric and composition	Department of English
	Ph.D.	Literature, rhetoric/composition and linguistics	Department of English
Exercise Science	Ph.D. ³	Biomechanics, motor behavior/sport psychology, physiology of exercise	Committee on Exercise Science
Exercise Science/ Physical Education	M.S.	—	Department of Exercise Science and Physical Education
Family and Human Development	M.S.	Family studies	Department of Family and Human Development
Family Science ²	Ph.D.	Marriage and family therapy	Department of Family and Human Development
French	M.A.	Comparative literature, linguistics, literature	Department of Languages and Literatures
Geography	M.A., Ph.D.	—	Department of Geography
Geological Sciences	M.S., Ph.D.	—	Department of Geological Sciences
German	M.A.	Comparative literature, language and culture, literature	Department of Languages and Literatures
History	M.A.	Asian history, British history, European history, Latin American history, public history, U.S. history, U.S. Western history	Department of History
	Ph.D.	Asian history, British history, European history, Latin American history, U.S. history	Department of History
Humanities	M.A.	—	Graduate Committee on Humanities
Materials Science ³	M.S.	—	Committee on Science and Engineering of Materials
Mathematics	M.A., Ph.D.	—	Department of Mathematics
Microbiology	M.S., Ph.D.	—	Department of Microbiology
Molecular and Cellular Biology	M.S., Ph.D.	—	Interdisciplinary Committee on Molecular and Cellular Biology

¹ Graduate students in the School of Justice Studies and the Department of Anthropology are able to receive a concurrent M.S. degree in Justice Studies and M.A. degree in Anthropology.

² This major has formalized concentration(s); other areas of study are available.

³ This program is administered by the Graduate College.

College of Liberal Arts and Sciences Graduate Degrees and Majors (continued)

Major	Degree	Concentration	Administered By
Natural Science	M.N.S.	Biology Chemistry Geological sciences Mathematics Microbiology Physics Plant biology	Department of Biology Department of Chemistry and Biochemistry Department of Geological Sciences Department of Mathematics Department of Microbiology Department of Physics and Astronomy Department of Plant Biology
Philosophy	M.A., Ph.D.	—	Department of Philosophy
Physical Education	M.P.E.	—	Department of Exercise Science and Physical Education
Physics	M.S., Ph.D.	—	Department of Physics and Astronomy
Plant Biology ²	M.S., Ph.D.	Ecology, photosynthesis	Department of Plant Biology
Political Science	M.A., Ph.D.	American politics, comparative politics, international relations, political theory	Department of Political Science
Psychology	Ph.D.	Behavioral neuroscience, clinical psychology, cognitive/behavioral systems, developmental psychology, environmental psychology, quantitative research methods, social psychology	Department of Psychology
Religious Studies	M.A.	—	Department of Religious Studies
Science and Engineering of Materials	Ph.D. ³	High-resolution nanostructure analysis, solid-state device materials design	Committee on Science and Engineering of Materials
Sociology	M.A., Ph.D.	—	Department of Sociology
Spanish	M.A. Ph.D.	Comparative literature, language and culture, linguistics, literature Cultural studies, literature	Department of Languages and Literatures Department of Languages and Literatures
Speech and Hearing Science	Ph.D. ³	Developmental neurolinguistic disorders, neuroauditory processes, neurogeron- tologic communication disorders	Committee on Speech and Hearing Science
Statistics	M.S. ³	—	Committee on Statistics
Teaching English as a Second Language	M.TESL	—	Department of English

¹ Graduate students in the School of Justice Studies and the Department of Anthropology are able to receive a concurrent M.S. degree in Justice Studies and M.A. degree in Anthropology.

² This major has formalized concentration(s); other areas of study are available.

³ This program is administered by the Graduate College.

College of Nursing

Barbara A. Durand, Ed.D., Dean

www.asu.edu/nursing



Graduate nursing student Shannon Begay volunteered to give health screenings at an elementary school as part of a Blue Cross/Blue Shield medical team.

Tim Trumble photo

PURPOSE

The faculty in the College of Nursing acknowledge their responsibility to health care consumers for the preparation of individuals who provide nursing care of professional quality through teaching, research practices, and service. The purpose of the College of Nursing is to provide educational programs that prepare professional nurses to meet the health care needs of individuals, groups, and communities. To achieve this purpose, the college offers undergraduate, graduate, and continuing and extended education programs. Within the context of a liberal education, the degree programs prepare professional nurses who

1. provide the highest-quality health care to individuals, groups, and communities and who critically

examine and effectively respond to the changing health care needs of society;

2. conduct research and creative activity that strengthens the knowledge base of the discipline, improve theory-based nursing practice, and benefit the health of individuals, groups, and communities; and
3. provide service to the community through a range of nursing activities with diverse populations in a variety of settings.

The continuing and extended education program facilitates lifelong learning by providing opportunities for registered nurses (RNs) to enhance and expand their nursing practice to meet the health care needs of various populations and to further their own professional development.

ORGANIZATION

The College of Nursing recognizes the three major missions of the university, i.e., teaching, research, and service. The responsibility of the associate dean for graduate programs and research is twofold: to oversee the master's program, including the progression of students through the program; and to work with faculty and students to facilitate research activities, such as research development. The associate dean for undergraduate programs and extended education is responsible for undergraduate degree programs, progression of students through the program, and extended and continuing education.

The faculty are grouped under two major clinical divisions within nursing: adult health/parent-child nursing and community health/psychosocial nursing systems. Each division has a chair, and each faculty member belongs to a division.

NURSING—M.S.

The graduate curriculum leads to the M.S. degree in Nursing. The graduate program provides an academic environment that fosters scholarship, critical thinking, and creativity, while preparing nurses for leadership as nurse specialists and beginning researchers. The program offers advanced-level courses that can be used as a base for doctoral study and for functional role development in teaching, management, or practice as a nurse practitioner.

Students may select one area of concentration as shown in the "College of Nursing Graduate Degrees and Majors" table, page 85.

Options within the parent-child nursing concentration include childbearing family and nursing of children.

The curriculum also provides elective study in teaching, management, and practitioner roles, including adult, child, family, psychiatric, and women's health nurse practitioner roles.

PUBLIC HEALTH—M.P.H.

The School of Health Administration and Policy and the College of Nursing, at ASU, in conjunction with the University of Arizona and Northern Arizona University, offer courses leading to the Master of Public Health degree. Two concentrations are offered at ASU: (1) Community health practice is coordinated by the College of Nursing, and (2) health administration and policy is coordinated by the School of Health Administration and Policy. For more information, see “Public Health,” page 302.

The curriculum also provides elective study in teaching, management, and practitioner roles, including adult, child, family, psychiatric, and women’s health nurse practitioner roles.

CERTIFICATE

A post-master’s Nurse Practitioner Certificate is available. The certificate program is offered periodically based on community need and college resources.

SPECIAL PROGRAMS AND SERVICES

Continuing Education Program. This program presents a variety of noncredit offerings on the main campus, west campus, and off-campus locations. These offerings are designed to assist practicing professional nurses in maintaining and enhancing their competencies, broadening their scientific knowledge base, and further developing their skills in the changing health care environment. Workshops, conferences, institutes, short evening courses, and special programs are offered at times convenient to the working professional. Some offerings are multidisciplinary and are also open to individuals in professions outside of nursing.

Student Services. The Student Services Office in the College of Nursing provides academic advising, general advising, and referral to university resources. Prospective students with academic questions relating to the College of Nursing should contact the College of Nursing Student Services Office.

Scholarships and Financial Assistance. Information about scholarships and loan funds for nursing students may be obtained from the Student Financial Assistance Office, College of Nursing Office of Student Services, or the associate dean for graduate programs and research.

College Council of Nursing Students. The council is a member of ASASU (Associated Students of Arizona State University) and serves as the governing body of all student activities in the college. The College Council of Nursing Students provides for communication, cooperation, and

understanding among undergraduate students, graduate students, and faculty, and represents the college in university and nonuniversity affairs.

Graduate Nurse Organization. The Graduate Nurse Organization (GNO) is the coordinating body for nursing students in the graduate program. It provides programs, information, and orientation services for graduate students and complements their academic experiences.

Sigma Theta Tau. Beta Upsilon Chapter of Sigma Theta Tau was chartered at the ASU College of Nursing in 1976. Membership in Sigma Theta Tau is an honor conferred on students in baccalaureate and graduate programs who have demonstrated outstanding academic and professional achievement.

COLLEGE FACILITIES

Learning experiences with patients and their families are provided under the supervision of qualified faculty with the cooperation of a variety of federal, state, county, and private health agencies. The College of Nursing has contracts with more than 240 agencies in the Phoenix metropolitan area. The college also operates a unique nurse-managed clinic in a community setting, as well as several other community or school-based outreach programs.

Computer Facilities. Computers are available for student use in the Learning Resource Center of the college. Also refer to “Computing Facilities and Services,” page 30.

ADVISING

Students are advised by the Student Services Office before admission to the graduate program. Upon admission, each student is assigned a faculty advisor within the area of concentration. Questions may also be directed to the associate dean for graduate programs and research.

ACCREDITATION

The baccalaureate and master’s programs of the College of Nursing are accredited by the Arizona State Board of Nursing and the National League for Nursing. The continuing education program is accredited by the Western Regional Accrediting Committee of the American Nurses’ Association as a provider of Continuing Education for Nursing. The college is a member of the Council of Member Agencies for the Baccalaureate and Higher Degree Programs of the National League for Nursing, the Western Institute of Nursing, and the American Association of Colleges of Nurses.

College of Nursing Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Nursing	M.S.	Adult health nursing, community health nursing, community mental health/psychiatric nursing, family health nursing, parent-child nursing, women’s health	College of Nursing
Public Health*	M.P.H.	Community health practice	School of Health Administration and Policy and the College of Nursing

* This collaborative program is offered by the three state universities.

College of Public Programs

Anne L. Schneider, Ph.D., Dean

www.asu.edu/copp



The Stauffer Communication Arts Building

Tim Trumble photo

PURPOSE

The College of Public Programs offers a wide range of course work, in both on-campus and off-campus settings, to full-time and part-time students. Through the Graduate College, faculty offer various programs leading to graduate degrees. Each academic unit of the College of Public Programs not only assumes responsibility in preparing its own majors, but also provides a variety of service courses for the rest of the university. The college is committed to excellence in teaching, research, and public service. College units work closely with numerous public and private agencies at the national, state, and local levels.

ORGANIZATION

The College of Public Programs consists of American Indian Studies, Asian Pacific American Studies, the Department of Recreation Management and Tourism, the Hugh Downs School of Human Communication, the School of Justice Studies, the School of Public Affairs, the School of Social Work, and the Walter Cronkite School of Journalism and Telecommunication. Each academic unit is administered by a chair or director.

Hugh Downs School of Human Communication. The faculty in the Hugh Downs School of Human Communication advance the understanding of message-related human behavior in part through the M.A. degree in Communication. The focus of the M.A. degree program is research in one of five areas: intercultural communication, interpersonal communication, organizational communication, performance studies, and rhetoric/public address.

Faculty in the Hugh Downs School of Human Communication participate in offering the interdisciplinary Ph.D. degree in Communication. The program is designed to prepare scholars for research-oriented careers in universities and in the public and private sectors and offers areas of study in critical/cultural studies, information technology, intercultural communication, interpersonal communication, organizational communication, performance studies, relational communication, and rhetoric.

Walter Cronkite School of Journalism and Telecommunication. The faculty in the Walter Cronkite School of Journalism and Telecommunication offer the Master of Mass Communication degree (M.M.C.). The M.M.C. is designed to accommodate students who wish to study in the fields of journalism, broadcasting, or public relations. The program provides broader training for professionals employed in the media and for those who wish to enter media fields.

Department of Recreation Management and Tourism. The faculty in the Department of Recreation Management and Tourism offer a graduate program leading to the M.S. degree in Recreation. The program focuses both on building professional knowledge and developing the ability to criti-

cally analyze topics and issues related to the recreation and tourism fields. Students choose between pursuing a more academic, focused thesis option or the more professionally applied nonthesis option. Each student takes graduate core courses in the department and then can pursue individual interests with related course work and a research project.

School of Public Affairs. The faculty in the School of Public Affairs offer a professional graduate program leading to the Master of Public Administration degree. Courses are offered in the evenings to fit the scheduling needs of working students. The diversity of the school's program offerings accommodates both preservice students and midcareer public administrators. State and local government internships are available to those with no previous public sector experience. Students work with faculty on the school's active research and publications program, including public policy reports and other community service projects for state and local governments in Arizona.

The school also administers the interdisciplinary Ph.D. in Public Administration program. Faculty of the School of Public Affairs participate in offering this degree program.

School of Justice Studies. The School of Justice Studies provides an interdisciplinary social science perspective for studying law and justice, crime and delinquency, dispute resolution, gender justice, racial and ethnic minorities and the law, and social and economic justice. Its faculty have academic backgrounds in anthropology, criminology, his-

tory, law, philosophy, political science, psychology, and sociology.

Faculty in the School of Justice Studies also participate in offering the Ph.D. degree in Public Administration. The school administers the interdisciplinary Ph.D. program in Justice Studies under the auspices of the Graduate College.

School of Social Work. The School of Social Work offers the full complement of social work academic programs (B.S.W., M.S.W., and Ph.D.). The mission and the goals of the school are consistent with the university's mission and overall objectives, as can be seen in the school's focus on excellence in professional instruction; the advancement of social work research; the understanding of social issues; and public/community service. Central to the mission of the school is the emphasis on the understanding of and respect for the unique cultural diversity of the Southwest and the promotion of social and economic justice.

GRADUATE PROGRAMS

Graduate degree programs as shown in the "College of Public Programs Graduate Degrees and Majors" table, page 88, are offered by the faculty within the college.

One of the unique features of an interdisciplinary program is that it uses faculty research and teaching interests from a large number of academic units. Students may tailor a course of study to fit individual needs and goals.



One of the many fountains on campus

ADMISSION REQUIREMENTS

Admission requirements of all advanced degree programs within the college are connected with those required by the Graduate College. In addition, individual units may require further supporting materials such as letters of recommendation, scores on the Graduate Record Examination, statements of educational and career goals, and writing samples. Applicants should refer to requirements specified by the academic unit under each degree program in this catalog.

SPECIAL PROGRAMS

Concurrent M.A. in Anthropology and M.S. in Justice Studies. Graduate students in the School of Justice Studies and the Department of Anthropology may pursue a concurrent M.S. degree in Justice Studies and M.A. degree in Anthropology with a concentration in social-cultural anthropology. The purpose of the program is to provide individuals with combined, complementary knowledge and skills for basic and applied research; as well as administrative and educational activities related to both disciplines. Students must be admitted separately to each program, following the guidelines established by the Graduate College, Department of Anthropology, and School of Justice Studies. Additional information on concurrent degrees may be obtained from the respective academic units.

Concurrent Ph.D. in Justice Studies/J.D. The purpose of the Ph.D. in Justice Studies/J.D. is to provide a rigorous educational program for highly qualified students interested in pursuing academic careers in law, law and the social sciences, or law and philosophy.

COLLEGE FACILITIES

Microcomputer training and remote site terminal access are available to students in all programs within the College of Public Programs. Academic units provide facilities, equipment, and support for student research, including laboratory space, computer terminals connected to the mainframe computer, and personal computers for individual student use. See "Computing Facilities and Services," page 30.

Broadcast laboratories within the School of Journalism and Telecommunication have the latest in-studio and ENG-EFP equipment, and provide facilities for performance, writing, and the other necessary broadcasting skills.

ADVISING

Advising of graduate students is usually handled by graduate faculty or a committee. Once admitted, students are typically assigned a temporary faculty advisor in the potential areas of specialization who will assist in planning a course of study. For those degree programs requiring the completion of a thesis, a chair and thesis supervisory committee are selected by the director of graduate studies, in consultation with the student, and appointed by the dean of the Graduate College.

ACCREDITATION

The Walter Cronkite School of Journalism and Telecommunication is accredited by the Accrediting Council on Education in Journalism and Mass Communication (ACEJMC). The Master of Public Administration program is accredited by the National Association of Schools of Public Affairs and Administration. The School of Social Work is fully accredited by the council on Social Work Education.

College of Public Programs Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Communication	M.A.	—	Hugh Downs School of Human Communication
	Ph.D.	Communicative development, intercultural communication, organizational communication	Hugh Downs School of Human Communication
Justice Studies	M.S.	—	School of Justice Studies
	Ph.D.*	Criminal and juvenile justice; dispute resolution; law, justice, and minority populations; law, policy, and evaluation; women, law, and justice	Committee on Law and Social Sciences
Mass Communication	M.M.C.	—	Walter Cronkite School of Journalism and Telecommunication
Public Administration	M.P.A.	Public information management, public management, public policy analysis and evaluation, urban management and planning	School of Public Affairs
	Ph.D.	—	School of Public Affairs
Recreation	M.S.	—	Department of Recreation Management and Tourism
Social Work	M.S.W.	Advanced direct practice; planning, administration, and community practice	School of Social Work
	Ph.D.	—	School of Social Work

* This program is administered by the Graduate College.

College of Technology and Applied Sciences

Albert L. McHenry, Dean

www.east.asu.edu/ctas



The wafer manufacturing laboratory at ASU East

Tim Trumble photo

PURPOSE

The College of Technology and Applied Sciences (CTAS) offers professional degree programs leading to the Master of Science in Technology (M.S.Tech.) degree. These degree programs are intended as preparation for a career in a selected branch of technology or as the foundation for further study. Graduates of these programs are provided with technical and professional skills for use in leadership positions in industry and education.

ORGANIZATION

The M.S.Tech. degree is offered through the Graduate College by the faculty in four CTAS departments: The Departments of Aeronautical Management Technology, Electronics and Computer Engineering Technology, Infor-

mation and Management Technology, and Manufacturing and Aeronautical Engineering Technology. Faculty members administering the programs have been selected because of their relevant backgrounds in industry and business along with their academic training and teaching experience.

GRADUATE PROGRAMS

Graduate programs as shown in the "College of Technology and Applied Sciences Graduate Degrees and Majors" table, page 90, are offered by the faculty within the college.

ADMISSION REQUIREMENTS

Admission to the degree program requires the completion of all general admission requirements and procedures set forth by the Graduate College. CTAS also requires an appropriate baccalaureate degree from an accredited college or university, with a minimum of 30 semester hours in technology or its equivalent and 16 semester hours of physical science and mathematics appropriate to the program pursued. The specific requirements vary within each department.

Graduate work presupposes an adequate technical preparation in a selected technology at the undergraduate level. Deficiencies for admission to the graduate program, if any, are specified at the time of admission. The applicant's past work and professional experience are also evaluated and taken into consideration when determining admission classification. To be considered for regular admission, a 3.00 GPA is required.

ADVISING AND PROGRAM OF STUDY

The program of study is planned in consultation with an appointed supervisory committee. It is designed for flexibility, permitting the student to select a combination of courses in a technological area and a supporting area to meet individual career goals.

A minimum of 33 semester hours is required for the degree program. Of these, a minimum of 15 semester hours must be 500-level courses and part of the approved program. A maximum of 12 hours of course work may be taken from offerings outside CTAS with approval of the appropriate academic program or department. Programs of study for the M.S.Tech., with an interdisciplinary area of concentration, may have up to but not more than 15 hours of course work drawn from areas outside CTAS at the discretion of the program or department in which the concentration is administered. A maximum of nine semester hours of appropriate course work completed before admission may be included in the program of study. Specific credit requirements are as follows:

College of Technology and Applied Sciences Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Technology	M.S.Tech.	Global technology and development	College of Technology and Applied Sciences
		Aviation human factors, aviation management technology	Department of Aeronautical Management Technology
		Computer systems engineering technology, electronic systems engineering technology, instrumentation and measurement technology, microelectronics engineering technology	Department of Electronics and Computer Engineering Technology
		Environmental technology management, fire service administration, information technology, management of technology	Department of Information and Management Technology
		Aeronautical engineering technology, manufacturing engineering technology, mechanical engineering technology, security engineering technology	Department of Manufacturing and Aeronautical Engineering Technology

Thesis Option

Technical area of emphasis	15–18
Supporting area	6–9
Research course	3
Research	6
Total	33

Applied Project Option

Technical area of emphasis	15–18
Supporting area	9–12
Research course	3
Research	6
Minimum total	33

A master's degree candidate forms a supervisory committee, the chair of which is from one of four CTAS departments. The chair and the committee members assist the student in selecting and approving appropriate courses to meet the degree requirements and student's goals.

The Department of Aeronautical Management Technology offers concentrations in aeronautical management technology and aviation human factors.

The Department of Electronics and Computer Engineering Technology offers concentrations in computer systems engineering technology, electronics systems engineering technology, instrumentation and measurement technology, and microelectronics engineering technology.

The Department of Information and Management Technology provides students the opportunity to study environmental technology management, fire service administration, information technology, and management of technology.

The Department of Manufacturing and Aeronautical Engineering Technology offers concentrations in aeronautical engineering technology, manufacturing engineering technology, mechanical engineering technology, and security engineering technology.

SPECIAL PROGRAMS

Concentration in Global Technology and Development (GTD)

The global technology and development (GTD) concentration is an interdisciplinary program offered by the CTAS faculty. This concentration gives students a comprehensive understanding of systems of technology, how they interface, and their role in global economic, political, and social development and change. The GTD concentration integrates the study of economic, social, and political development with technology course work to explore issues critical to 21st-century globalization and the role and impact of technological innovations on societies around the world. Students completing the GTD concentration gain the knowledge and skills to become "technology interpreters" for careers in technology-related public policy, government service, international development, and international management.

The GTD concentration consists of two seminars in global technology and development, and technology and the international political system, and one core course (chosen from several that are offered) in each of the four GTD technology content areas: telecommunications, transportation, commerce, and sustainable development. Students are able to select elective courses from a wide range of topics in social science and/or technology to create their own individualized specialization. An emphasis is placed on the acquisition of solid research skills with a required sequence in applied research methodologies and tools. A minimum of 33 semester hours is required (24 of which must be at the 500 level or above), including an applied project or thesis. The exact program of study—including elective courses leading to an area of specialization, and the final project or thesis—is planned in consultation with a faculty advisor from the GTD faculty committee.

Graduate Studies at ASU Main and ASU East

GRADUATE DEGREES AND MAJORS

The Graduate College at ASU provides students with opportunities to study beyond the bachelor's degree. The college enrolls students in programs leading to both professional and research-oriented advanced degrees. The M.A., M.S., and Ph.D. degrees are awarded to students completing programs that culminate in research and creative endeavors. The Ph.D. degree is the highest university award, conferred on candidates who have proven their ability as scholars and original researchers.

Professional graduate programs emphasize training that leads to professional practice. In these degree programs, students develop a mastery of a comprehensive body of knowledge and the ability to organize and carry out significant investigations in their professional field. Professional degrees usually are named Master of (Professional Field) and Doctor of (Professional Field), although some Master of Arts and Master of Science degree programs have professional tracks. The professional doctoral degree is the highest university award to candidates completing academic preparation for professional practice. The following professional degrees are offered through the Graduate College:

- Master of Accountancy and Information Systems (M.A.I.S.)
- Master of Architecture (M.Arch.)
- Master of Arts (M.A.)
- Master of Business Administration (M.B.A.)
- Master of Computer Science (M.C.S.)
- Master of Counseling (M.C.)
- Master of Education (M.Ed.)
- Master of Engineering (M.E.)
- Master of Environmental Planning (M.E.P.)
- Master of Fine Arts (M.F.A.)
- Master of Health Services Administration (M.H.S.A.)
- Master of Mass Communication (M.M.C.)
- Master of Music (M.M.)
- Master of Natural Science (M.N.S.)
- Master of Physical Education (M.P.E.)
- Master of Public Administration (M.P.A.)
- Master of Public Health (M.P.H.)
- Master of Science (M.S.)
- Master of Science in Design (M.S.D.)
- Master of Science in Engineering (M.S.E.)
- Master of Science in Technology (M.S.Tech.)
- Master of Social Work (M.S.W.)
- Master of Taxation (M.Tax.)
- Master of Teaching English as a Second Language (M.TESL)
- Doctor of Education (Ed.D.)
- Doctor of Musical Arts (D.M.A.)
- Doctor of Philosophy (Ph.D.)

Faculty members offering a specific graduate degree program may be members of a single academic unit (such as a department, school, or college), or they may form an inter-

disciplinary committee consisting of faculty from various academic units. The Graduate College awards degrees upon the recommendation of the faculty offering the graduate degree programs.

Interdisciplinary Study

Although most graduate programs are administered by academic units, a diverse group of interdisciplinary programs falls directly under the supervision of the Graduate College. Many majors are in fields that are still emerging as recognized academic disciplines and, therefore, do not customarily form the academic basis for departments. Other fields of study are inherently interdisciplinary and do not fit well with conventional disciplines around which departments are formed. Curricula must reflect intrinsically broad disciplinary affinities, and faculty must be drawn from more than one department.

The Graduate College oversees nine interdisciplinary programs and has joint responsibility with the College of Education for another; several others are planned. Existing interdisciplinary programs are as follows:

- Creative Writing (M.F.A.)
- Curriculum and Instruction (Ph.D.) (jointly administered with the College of Education)
- Exercise Science (Ph.D.)
- Gerontology Program (Certificate in Gerontology)
- Justice Studies (Ph.D.)
- Science and Engineering of Materials (Ph.D.)
- Speech and Hearing Science (Ph.D.)
- Statistics (M.S.)
- Transportation Systems (Certificate in Transportation Systems)

Other interdisciplinary programs include Communication (Ph.D.), administered by the College of Public Programs; History and Theory of Art (Ph.D.), jointly offered with the University of Arizona, administered by the School of Art; Humanities (M.A.), administered by the College of Liberal Arts and Sciences; and Molecular and Cellular Biology (M.S., Ph.D.), administered by the College of Liberal Arts and Sciences.

Each of these programs uses resources and faculty from several disciplines. The programs promote cooperative research and instruction among faculty who share common interests but are housed in different academic units. Interdisciplinary programs allow students to pursue degrees that are intellectually coherent while bringing together diverse strengths of the university.

Certificate Programs

A number of certificate programs are offered by various academic units or programs on campus. For more information, see "ASU Graduate Certificates," page 17.

ADMISSION TO THE GRADUATE COLLEGE

Eligibility

Anyone who holds a bachelor's (or the equivalent) or graduate degree from a college or university of recognized standing is eligible to apply for admission to the Graduate College. Remedies for undergraduate deficiencies may be assigned if the undergraduate degree is based on credits not accepted by ASU, such as life experience or noncredit workshops and seminars.

Graduate College Requirements

Generally, an applicant must have a GPA of 3.00 (scale is 4.00 = A), or the equivalent, in the last two years of work leading to the bachelor's degree. A student who enters a graduate degree program is expected to have undergraduate educational experiences, including general education studies, that are similar to those required for the baccalaureate degree at ASU.

Requirements of the Academic Unit

Academic units, departments, or colleges, may have admission requirements in addition to those of the Graduate College. Many graduate programs require scores from a national admissions test such as the Graduate Record Examination, Graduate Management Admission Test, or the Miller Analogies Test. Some programs require a portfolio, letters of recommendation, or a statement of goals. Applicants should contact the academic unit regarding specific requirements.

Submission of an Application

For admission information and procedures, access the Web site at www.asu.edu/graduate/admission, or refer to the *Application for Graduate Admission* booklet. Students may apply via the Web, by mail, or by fax.

Application Fee

Each application for entry to ASU graduate programs must be accompanied by a nonrefundable application processing fee. The fee is \$45 to apply for admission to a degree program and \$15 to apply for nondegree studies. For admission information and procedures, access the Web site at www.asu.edu/graduate/admission, or refer to the *Application for Graduate Admission* booklet.

International Applicants

Applicants who will attend the university while holding F-1 or J-1 visas must meet the regulations of the Immigration and Naturalization Service in addition to the requirements of the Graduate College and the academic units to which they apply.

International applicants must meet the requirements of the Graduate College as well as those of the degree programs to which they apply. Applicants from outside the United States are also required to submit additional materials and should follow the procedures described in the *Application for Graduate Admission* booklet or on the Web at www.asu.edu/graduate/admission. International applicants should read this information carefully to become familiar with all requirements, consulting it often for instructions regarding materials. The *Graduate Catalog* provides essential information about ASU and its graduate programs, but applicants can also consult the ASU listings in *Peterson's Graduate Education Directory* and in the *Directory of*

Graduate Programs (published by the Educational Testing Service).

TOEFL Requirement. Among the additional materials required of international students are scores from English language examinations. All applicants whose native language is not English must submit a score from the Test of English as a Foreign Language (TOEFL). The TOEFL can be waived for students who have graduated from a college or university in a country whose native language is English, or for a student who has had immigrant status (permanent residency) in the United States for at least 18 months. For a complete list of TOEFL requirements, see page 7 of the *Graduate Admissions* booklet, or refer to the Web site at www.asu.edu/graduate/international.html.

All international applicants who do not speak English as a primary language and who wish to apply for teaching assistantships must pass an examination that certifies their skill in speaking English—either the Test of Spoken English (TSE), which may be taken in the student's home country, or the Speaking Proficiency English Assessment Kit (SPEAK) test, which is administered at ASU. Some degree programs also require TSE or SPEAK scores of applicants whose native language is not English. For specific information about TSE requirements, contact the head of the academic unit.

As required by the U.S. Immigration and Naturalization Service, international applicants must also verify that they have the financial resources to cover their expenses during graduate study at ASU. The Financial Guarantee form is available in the *Application for Graduate Admission* booklet. It can also be accessed through the Graduate College Web site at www.asu.edu/graduate/admission. The I-20 or the IAP66 (documents needed to obtain a student visa) are issued only after the completed, properly verified Financial Guarantee form and support document have arrived. International students may enroll at ASU only if they have been admitted to a degree program, a certificate program, or the postbaccalaureate teacher education program. They must meet all appropriate immigration standards and requirements.

Applications are processed when they are received. However, international applicants should submit all materials in December or January in order to begin study the following fall semester and in August or September in order to begin study the following spring semester. An application fee of \$45 (in U.S. funds) must accompany each formal degree program application.

All F-1 or J-1 visa students must have insurance coverage against illness and accident before being permitted to register. Insurance must be maintained throughout the student's enrollment in the university and may be obtained at the time of registration.

Upon arrival on campus, students must report to an advisor in the International Student Office.

Additional Information

The Graduate College does not have deadlines. Applications are processed as they are received. However, many academic units have specific and early deadlines; many units review applications once a year, usually in January or February for fall admission. Applicants are urged to contact the academic units regarding deadlines.

Academic units, which must indicate their willingness to admit applicants, frequently set higher standards than those established by the Graduate College. Many qualified applicants are denied because of limits on the number of students admitted each year.

Notice of Admission Decisions

Only the dean of the Graduate College can make formal offers of admission. The Graduate College notifies all applicants in writing of the admission decision.

All academic credentials and supporting materials received by the university in connection with an application for admission become the property of ASU. If the applicant does not enroll in the university within one year, the admission documents may be destroyed.

The date (month/day/year) on the Graduate College dean's letter of admission is the actual date of admission. If the student is enrolled in courses on the admission date, those courses—if applicable—may be considered part of a program of study. Courses taken the semester before this date are considered nondegree hours.

Admission Classifications

Regular Admission. Applicants who fulfill all requirements for admission and are academically acceptable to both the academic unit and the Graduate College are granted regular admission.

Regular Admission with Deficiencies. A student whose grades and test scores are at an acceptable level but who does not have the undergraduate background expected by the academic unit and the university may be required to complete courses to remedy deficiencies. In such cases, the letter of admission specifies the deficiencies that must be completed before the student is awarded a graduate degree. Deficiency courses may not be applied toward the minimum hours required for the degree program.

Provisional Admission. A student who does not meet minimum academic standards but has counterbalancing evidence to suggest the potential for success may be admitted on a provisional basis. Provisional admission provides an academic unit with more evidence on which to base its decision. Normally the academic unit reviews the student's status following completion of 12 semester hours of approved graduate study. At that time, the academic unit recommends to the Graduate College a change in status to either regular admission or withdrawal from the program. When students have completed their provisional requirements, they should check with their advisors to make sure that the change of status has been recommended. A provisional student may also be assigned deficiencies.

Nondegree Admission. A student not interested in earning a degree or not ready to apply to a particular degree program may enroll as a nondegree student. The application process is streamlined and does not require submission of transcripts or test scores. For nondegree admission information and procedures, access the Web site at www.asu.edu/graduate/admission or refer to the *Application for Graduate Admission* booklet. Students may apply electronically. A maximum of nine hours taken at ASU while in this category may be applied toward a master's degree if appropriate for the student's program of study.

The six-year maximum time limit applies to nondegree semester hours appearing on a master's program of study. In addition, because of limited class size and resources, certain academic units may limit the enrollment of nondegree students.

Recognition of a Degree

Recognition of a degree is acknowledgment that the program leading to the degree is equivalent to a program offered by ASU or is an acceptable program for the proposed graduate major at ASU. A student who enters a graduate degree program at ASU is expected to have undergraduate educational experiences, including general education studies, that are appropriate for the program.

Definition of a Unit of Credit

The Arizona Board of Regents has defined (May 26, 1979) a unit of credit for the institutions under its jurisdiction. A minimum of 45 hours of work by each student is required for each unit of credit. An hour of work is the equivalent of 50 minutes of class time (often called a "contact hour") or 60 minutes of independent study work. For lecture-discussion courses, this requirement equates to at least 15 contact hours and a minimum of 30 hours of work outside of the classroom for each unit of credit. Even though the values of 15 and 30 may vary for different modes of instruction, the minimum total of 45 hours of work for each unit of credit is a constant. Since the unit of credit as defined by the Arizona Board of Regents is the cornerstone of academic degree programs at ASU, degrees granted by other institutions that are recognized by ASU should be based on a similar unit of credit.

GRADUATE COLLEGE PROCEDURES

Change in Graduate Degree Program

A change from one graduate degree program to another requires a new application to the Graduate College. The usual admission procedures are followed. For details on matters relating to the application fee, see "Admission Application," page 41.

Readmission to the Graduate College

Any graduate student who has not been in attendance at the university for one or more semesters must submit an application for readmission to the Graduate College. The application should be submitted at least one month before the beginning of the semester in which the student plans to reenter. For details on readmission and other matters relating to the application fee, access the Web site at www.asu.edu/graduate/admission, or refer to the *Application for Graduate Admission* booklet.

Determination of Catalog Requirements

The *Graduate Catalog* is published annually. Requirements for an academic unit or college, campus, or the university as a whole, may change and are often upgraded.

A student graduates under the curriculum, course requirements, and regulations for graduation in effect at the time of admission to a graduate degree program at ASU. A student may also choose to graduate under any subsequent catalog issued. *In determining graduation requirements, a student may use only one catalog.*

Some changes in policies and procedures affect all students regardless of the catalog used by the student. These

policies and procedures may appear in the catalog or in other university publications.

Registration

Graduate students, like all university students, register during the intervals indicated in the *Schedule of Classes* issued by the Office of the Registrar. Details regarding registration and course drop-add procedures are also provided in the *Schedule of Classes*. Day and evening graduate classes, offered on or off campus, during the two regular semesters and the summer sessions, are considered part of the regular program.

InTouch, the ASU touch-tone telephone system for registration and fee payment, and the online registration system, accessed at any registrar site, ease the enrollment process.

Audit Enrollment

Graduate students may register as auditors in one or more courses with the approval of the supervisory committee chair and the consent of the instructor involved. The student must be registered properly and pay the fees for the course. An audited course is counted in the student's maximum course load. It does not count for students who must take a minimum number of credits, e.g., teaching assistants or students receiving financial assistance. The mark of "X" is recorded for completion of an audited course, unless the instructor determines that the student's participation or attendance has been inadequate, in which case a "W" may be recorded.

Withdrawal Policies and Procedures

Students who find it necessary to withdraw from the university should obtain and complete an official withdrawal form from any registrar site. Until officially withdrawn, the student is registered in all courses and, at the end of the semester, receives grades appropriate for the performance in each course. A student who officially withdraws from the university during the first four weeks of a semester receives the mark of "W" in all courses registered. A student who officially withdraws from the university later than the fourth week receives a mark of "W" or "E," depending upon the quality of work at the time of official withdrawal. No student is permitted to withdraw during or after the last two weeks of the semester (the last week of classes and final examination week).

Failure to withdraw officially from a course results in a grade of "E," which is used in the computation of the GPA. The *Schedule of Classes* lists the procedures for withdrawal.

An instructor may withdraw a student from a class with a mark of "W" or a grade of "E" only if the student's continued presence in the course is disruptive to the instructor's ability to teach the course. A student may appeal an instructor-initiated withdrawal within 10 days of being withdrawn to the standards committee of the college in which the course is offered. The decision of the committee is final.

A graduate student who does not enroll for three calendar years is considered withdrawn and must submit a new application for admission to a degree program.

Unrestricted Withdrawal. During the first four weeks of a semester or the first six days of a summer session, a student may withdraw from any course with a mark of "W." See the *Schedule of Classes* or the *Summer Sessions Bulletin* for the dates of the unrestricted withdrawal period.

Restricted Withdrawal. From the fifth week to the end of the 10th week of a semester and from the seventh day to the end of the third week of a summer session, students may withdraw with a mark of "W" from courses only in which the instructor certifies that they are passing at the time of the withdrawal. See the *Schedule of Classes* or the *Summer Sessions Bulletin* for dates of the restricted withdrawal period.

Medical Withdrawal. Normally, a medical withdrawal request is made in cases where serious illness or injury prevents a student from completing course work or finishing incompletes or when other arrangements with the instructor are not possible. Consideration is usually given for complete withdrawal. An application for less than a complete withdrawal must be well documented to justify the selective nature of the medical withdrawal request. This policy applies both to cases involving physical health problems and those involving mental or emotional difficulties.

To receive permission for a medical withdrawal from courses, a student must present a Request for Documented Medical Withdrawal form and proper documentation (usually a letter from a physician) of the medical condition to the medical withdrawal designee of the college of the student's major. For complete procedural information, contact the appropriate medical withdrawal designee.

Course Load

The course load is determined by the supervisory committee but is not to exceed 15 semester hours of credit during each of the two semesters. Refer to the latest *Summer Sessions Bulletin* for course load limits for five-week and eight-week sessions. An audited course is counted in the student's maximum load.

All teaching and research assistants and associates must enroll for a minimum of six semester hours during each semester (fall and spring) of their appointment. The six hours cannot include audit enrollment. Enrollment in continuing registration (595, 695, or 795) does not fulfill the six-hour requirement. A half-time (50 percent) teaching and research assistant or associate working 20 clock hours per week may not register for more than 12 hours of course work each semester; a third-time (33 percent) assistant or associate for more than 13 hours; and a quarter-time (25 percent) assistant or associate for more than 15 hours.

All graduate students doing research, working on theses or dissertations, taking comprehensive or final examinations, or using university facilities or faculty time must be registered for a minimum of one semester hour of credit, not audit, that appears on the program of study or is an appropriate graduate-level course, such as 595, 695, or 795 Continuing Registration.

Doctoral students fulfilling residence requirements for the Doctor of Philosophy and Doctor of Musical Arts degrees must be enrolled full time (nine semester hours minimum or six semester hours for research assistants or teaching assistants) during the specified period. See "Residency Classification Procedures and Policies," page 44, and specific degree requirements for fulfilling residence requirements for other doctoral degree programs.

Summer Course Loads. Refer to the latest *Summer Sessions Bulletin* for course load limits for five-week and eight-week sessions.

Enrollment Verification Guidelines for Graduate Students

	Full Time	Half Time	Less Than Half Time
Regular semester			
Graduate	9 or more hours	5–8 hours	4 or fewer hours
Graduate assistant*	6 or more hours	—	—
Five-week summer session			
Graduate	3 or more hours	2 hours	1 hour
Graduate assistant*	2 or more hours	1 hour	—
Eight-week summer session			
Graduate	5 or more hours	3–4 hours	2 or fewer hours

* For enrollment verification purposes, “graduate assistant” is a generic term that includes graduate assistants, teaching assistants, research assistants, graduate associates, teaching associates, and research associates.

Enrollment Verification Guidelines. The registrar is responsible for verifying enrollment according to the general guidelines in the “Enrollment Verification Guidelines for Graduate Students” table, on this page.

GRADUATE COLLEGE DEGREE REQUIREMENTS**Graduate Advising**

Advising is much more than technical support; it is an integral part of graduate education. Students’ programs of study are generally tailored to meet individual needs, and students should seek advice from faculty or advisors as they plan their course work, examinations, and other degree requirements.

Grading

The “Grades” table, on this page, defines grades and gives their values.

A grade of “P” (pass) in a 400-level course may not appear on a program of study. Grades on transfer work or ASU law credit are not included in computing GPAs.

There are two graduate GPA calculations, the cumulative GPA of graduate-level (i.e., 500-level and above) course work on the transcript, and the GPA calculation on the program of study. A student receiving a grade of “D” or “E” must repeat the course in a regularly scheduled (not an individualized instruction) class, and obtain a grade of “C” or higher, *if the student chooses to include it on the program of study*. When a course is repeated and the new grade is listed on the program of study, both the new grade and the initial “D” or “E” are averaged in computing the cumulative GPA of graduate-level course work on the transcript. If a student chooses not to repeat the course after receiving a “D” or “E,” the “D” or “E” is still reflected in the cumulative GPA calculation of graduate-level course work on the transcript. To graduate, all graduate students must have a minimum 3.0 GPA calculation both on the program of study, and in the cumulative GPA of graduate-level course work listed on the transcript.

Graduate course work (500-, 600-, and 700-level courses) reported as an “I” (incomplete) must be completed within one calendar year. At the time the “I” grade is given, the student must complete a “Request for Grade of Incomplete” form. The form first serves as a record of the “I” grade and the work required to complete it. When the student has completed the work, the form then serves as a change-of-grade authorization.

If the work specified on the form is not completed within one calendar year, the “I” grade (500-, 600-, and 700-level

Grades

Grade	Definition	Value
A	Excellent	4.00
B	Good	3.00
C	Passing	2.00
D	No graduate credit	1.00
E	Failure	0.00
I	Incomplete	—
W	Withdrawal ¹	—
X	Audit	—
Y	Satisfactory	—
Z	Course in progress ²	—

¹ This grade is given whenever a student officially withdraws.

² This grade is usually given pending completion of courses.

courses) becomes part of the student’s permanent transcript. The student is not allowed to complete the course work as specified on the “Incomplete” form. The student may, however, repeat the course after the “I” has become permanent, by reregistering, paying fees, and fulfilling all course requirements. The grade for the repeated course appears on the transcript but does not replace the permanent “I.”

Repeating ASU Courses. Graduate students (degree or nondegree) may retake any courses at any level at ASU, but all grades remain on the student transcript as well as on the cumulative GPA calculation of the transcript.

University Policy for Student Appeal Procedures on Grades

Informal. The steps outlined below, beginning with step A, must be followed by any student seeking to appeal a grade. Student grade appeals must be processed in the regular semester immediately following the issuance of the grade in dispute (by commencement for fall or spring), regardless of whether the student is enrolled at the university. It is university policy that students filing grievances and those who are witnesses will be protected from retaliation. Before beginning an appeal, students should speak to the appropriate, designated administrator in the academic dean’s office of the college in which the course is offered.

- A. The aggrieved student must first undergo the informal procedure of conferring with the instructor, stating the evidence (if any) and reasons for questioning that the grade received was not given in good faith. The instructor is obliged to review the matter, explain the grading procedure utilized, and show how the grade in question was determined. If the instructor is a graduate assistant and this interview does not resolve the difficulty, the student may then go to the faculty member in charge of the course (regular faculty member or director of the course sequence) with the problem.
- B. If the grading dispute is not resolved in step A, the student may appeal to the department chair or other appropriate chair of the area within the department (if any). The department chair may confer with the instructor to handle the problem. Step B applies only in departmentalized colleges.
- C. If these discussions are not adequate to settle the matter to the complainant's satisfaction, the student may then confer with the dean of the college concerned (or the dean-designate), who will review the case. If unresolved, the dean or designate may refer the case to the college academic grievance hearing committee to review the case formally. In most instances, however, the grievance procedure does not go beyond this level.

Formal. The following procedure takes place after steps A, B, and C (or A and C) have been completed.

- D. Each college has on file in the office of the dean (and in each department of the college) the procedures and composition of the undergraduate or graduate academic grievance hearing committee for student grievances. Each college committee shall operate under grievance procedures as stated, which satisfy due process requirements. The committee shall always meet with the student and the instructor in an attempt to resolve the differences. At the conclusion of the hearing, the committee shall send its recommendations to the dean.
- E. Final action in each case is taken by the dean after full consideration of the committee's recommendation. Grade changes, if any are recommended, may be made by the dean. The dean shall inform the student, instructor, department chair (if any), the registrar, and the grievance committee of any action taken.

Scholarship

To be eligible for a degree in the Graduate College, a student must achieve two GPAs of "B" (3.00) or higher. The first GPA is based on all courses numbered 500 or higher that appear on the transcript. (Courses noted as deficiencies in the original letter of admission are not included.) The second GPA is based on all courses that appear on the program of study.

Graduate students (degree or nondegree) may retake any courses at any level at ASU, but all grades remain on the student transcript as well as on the cumulative GPA calculation of the transcript.

Academic excellence is expected of students doing graduate work. Upon recommendation from the head of the academic unit, the dean of the Graduate College can withdraw a student who is not progressing satisfactorily.

The designation of honors (*summa cum laude*, *magna cum laude*, and *cum laude*) is reserved for undergraduates.

The Graduate College does not use these academic distinctions.

Graduate Credit Courses

Courses at the 500, 600, and 700 levels are graduate credit courses. Courses at the 400 level apply to graduate degree requirements when appearing on an approved program of study. However, 400-level courses are not graduate courses by definition and cannot be certified as such for purposes of employment or transferring to other institutions.

Reserving of Course Credit by Undergraduates. Seniors at ASU within 12 semester hours of graduation may enroll in a 400-level or graduate course and reserve the credit for possible use in a future graduate program. The course cannot be used to meet a baccalaureate graduation requirement. Before registration in the class, the student must submit a Graduate College Petition form requesting credit reservation; the form must be signed by the student's advisor, the head of the academic unit offering the class, and the dean of the Graduate College.

Permission to reserve a course does not guarantee admission to a graduate degree program or that the course may be used toward graduate degree requirements. A maximum of nine hours of credit may be reserved, and only courses with an "A" or "B" grade are applicable. Reserved credit earned before admission to a graduate degree program is classified as nondegree credit. The maximum course load for a student enrolled in a reserved course is 15 semester hours during a regular semester and six hours during a summer session.

Transfer Credit. Transfer of credit is the acceptance of credit from another institution for inclusion in a program of study leading to a degree awarded by ASU. The number of hours transferred from other institutions may not exceed 20 percent of the total minimum semester hours required for a master's degree unless stated otherwise for a specific degree program.

Transfer credit taken before admission to a graduate degree program at ASU Main or East is nondegree credit. Nondegree credit taken at ASU Main or East combined with nondegree credit taken at another institution may not exceed nine hours on the master's program of study. The nine-hour limit does not apply to doctoral programs.

The date (month/day/year) on the Graduate College dean's letter of admission is the actual date of admission. If the student is enrolled in courses on the admission date, those courses—if applicable—may be considered part of a program of study. Courses taken the semester before this date are nondegree hours. Courses taken at ASU West are considered transferred credit.

Transfer credits must be acceptable toward graduate degrees at the institution where the courses were completed. Certain types of graduate credits cannot be transferred to ASU, including the following:

1. credits awarded by postsecondary institutions in the United States that lack candidate status or accreditation by a regional accrediting association;
2. credits awarded by postsecondary institutions for life experience;
3. credits awarded by postsecondary institutions for courses taken at noncollegiate institutions (e.g., government agencies, corporations, and industrial firms);

4. credits awarded by postsecondary institutions for noncredit courses, workshops, and seminars offered by other postsecondary institutions as part of continuing education programs; and
5. credits given for extension courses.

Acceptable academic credits earned at other institutions that are based on a different unit of credit than the ones prescribed by the Arizona Board of Regents are subject to conversion before being transferred to ASU.

Only resident graduate courses with an “A” or “B” grade may be transferred. A course with the grade of pass, credit, or satisfactory may not be transferred.

Official transcripts of any transfer credit to be used on a program of study must be sent directly to the Graduate Admissions Office from the Office of the Registrar at the institution where the credit was earned.

Graduate Supervisory Committees

When the program of study is filed, upon the recommendation of the head of the academic unit, the dean of the Graduate College appoints a graduate student’s supervisory committee, consisting of a chair and other resident faculty members. The number of members serving on this committee depends on the degree program.

Academic professionals (e.g., research scientists, research engineers), nontenure-track faculty (e.g., adjunct professors, research professors), and individuals granted affiliated faculty status through established university procedures may serve as cochairs, members, or extra members of thesis and dissertation committees upon approval by the Graduate College. Individuals who are recommended by an academic unit as eligible to serve as a cochair must meet the criteria established by the academic unit and be approved by the Graduate College.

Upon the recommendation of the committee chair and head of the academic unit, ASU West tenured (or tenure-track) faculty may serve on master’s and doctoral committees at ASU Main. ASU West tenured (or tenure-track) faculty may serve as cochairs for theses and dissertations at ASU Main upon the recommendation of the head of the academic unit and approval of the dean of the Graduate College. Cochairs must meet the academic unit’s criteria for chairing theses and dissertations.

Qualified individuals outside the university, upon the recommendation of the head of the academic unit and approval of the Graduate College, may serve as members of thesis and dissertation committees; however, such individuals may not serve as chairs or cochairs (unless they have affiliated faculty status). With the approval of the academic unit and the dean of the Graduate College, former ASU faculty with students completing their degrees may continue to serve as cochairs. At least 50 percent of the committee must be faculty from ASU Main.

Once a student has an approved program of study on file and the committee is in place, it is the student’s responsibility to file a Graduate Supervisory Committee Appointment form in the event of a committee change. The Graduate Supervisory Committee Appointment form for committee changes is accessible from the Graduate College in Wilson Hall or the Web site at www.asu.edu/graduate/forms.

Foreign Language Requirements

A graduate degree program may require proficiency in a foreign language. If a foreign language is required, students must demonstrate at least a reading knowledge in the area of study required by the supervisory committee and consistent with the requirements for the graduate degree program.

Normally, the language is selected from French, German, Russian, or Spanish, although other languages may be recommended when there is adequate justification.

Students who are required to demonstrate proficiency in a foreign language must pass a foreign language examination specific to their particular graduate program. The examinations are administered three times each year by the Department of Languages and Literatures, which certifies language competency. Students planning to take the examination must register in the Graduate College at least one month in advance of the examination date. The chair of the student’s supervisory committee is responsible for providing the Department of Languages and Literatures with materials from which the examination is then prepared. The chair should submit or recommend relevant books or journals of approximately 200 pages in length in the desired foreign language.

A student may petition the Graduate College for a reexamination but must pass the examination in no more than three attempts.

Theses and Dissertations

The master’s thesis or equivalent is an introduction to research writing. All doctoral degree candidates must submit a dissertation, with the exception of the Doctor of Musical Arts degree in Music (concentrations in choral conducting and solo performance), which requires three recitals and a research paper. The Ph.D. dissertation should be a valuable educational experience that demonstrates the candidate’s mastery of research methods, theory, and tools of the discipline. It should demonstrate the candidate’s ability to address a major intellectual problem and to propose meaningful questions and hypotheses. The dissertation should be a contribution to knowledge that is worthy of publication by an established press as a book or monograph or as one or more articles in a reputable journal.

For format, the Graduate College must review the final copy of the master’s thesis, doctoral dissertation, and other final documents that are required to be placed in the library. Copies of the *Format Manual* are available on the Web at www.asu.edu/graduate/formatmanual and in the Graduate College. The student is required to submit appropriate signed forms and a complete copy of the thesis or dissertation for format review at least 10 working days (two weeks if there are no holidays during the time period) before the oral defense. Doctoral students must also submit a completed Survey of Earned Doctorates Awarded in the United States, conducted by the National Research Council.

Graduate students and their supervisory committee chairs jointly select a style guide or journal format representative of the field of study. The Graduate College allows certain flexibility in the format of the manuscript, but Graduate College and library guidelines must be followed.

The student must submit two final copies of a thesis or dissertation to the ASU Bookstore for binding. The student is responsible for the binding fees. Bound copies are placed in the Hayden Library and Archives. Doctoral students must submit one copy of the title page, approval page, and

abstract (which must not exceed 350 words); the original signature of the doctoral student must appear on the University Microfilms International (UMI) Dissertation Agreement Form. The student is responsible for the UMI microfilming fee, which covers the expense of having the document sent to UMI, where it is microfilmed and catalogued. Information on the dissertation will appear in *Dissertation Abstracts International*.

Application for Graduation

Students should apply for graduation no later than the date specified in the “Graduate College Calendar,” page 18. All fees are payable at that time. Students applying for graduation after the deadline listed in the “Graduate College Calendar” are required to pay a late fee. At the end of the semester in which they apply for graduation, students are officially notified of any requirements for their degree that they have not yet completed.

Students are requested to complete a questionnaire that serves as a graduate student exit survey.

Students who do not complete all degree requirements by their anticipated graduation date are required to pay a refiling fee.

Summer Sessions

Work taken during the summer sessions carries the same scholastic recognition as that taken during the regular semester. A complete schedule of offerings is available in the *Summer Sessions Bulletin*, which may be obtained from the Office of Summer Sessions.

Dates and Deadlines

The “Graduate College Calendar,” page 18, lists deadlines for the submission of theses and dissertations to the Graduate College, the last day to apply for graduation, the last day to hold an oral defense of a thesis or dissertation, and the last day to submit theses and dissertations to the ASU Bookstore for binding.

Student Responsibility

It is the responsibility of the graduate student to know and observe all procedures and requirements of the Graduate College as defined in the *Graduate Catalog*, the *Schedule of Classes*, and the *Format Manual*. Each student should also be informed about the requirements concerning the student’s degree program and any special requirements within the academic unit.

ACADEMIC INTEGRITY

The highest standards of academic integrity are expected of all students. The failure of any student to meet these standards may result in suspension or expulsion from the university and/or other sanctions as specified in the academic integrity policies of the individual colleges.

Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, plagiarism, or facilitating such activities.

The university academic integrity policy is available at the Office of the Senior Vice President and Provost and in the *Student Affairs Policies and Procedures Manual* STA 104-01, on the Web at www.asu.edu/aad/manuals/sta/sta104-01.html.

MISCONDUCT IN SCHOLARLY RESEARCH AND CREATIVE ACTIVITIES

Students are expected to maintain the highest standards of integrity and truthfulness in scholarly research and creative activities. Misconduct in scholarly research and creative activities includes, but is not limited to, fabrication, falsification or misrepresentation of data, and plagiarism. Misconduct by any student may result in suspension or expulsion from the university and other sanctions as specified by the individual colleges. Policies on misconduct are available in the Office of the Vice Provost for Research and on the Web at www.asu.edu/aad/manuals/rsp/rsp111.html.

ASSISTANTSHIPS AND ASSOCIATESHIPS

Application Procedure. Since it is necessary for all applicants to be admitted to degree programs before awards are made, students should apply for admission through the Graduate Admissions Office at the same time they apply for financial assistance.

Teaching and Research Assistantships and Associateships. Appointments as teaching or research assistants and associates are available in most academic units offering graduate work to students admitted with regular status. Students who have completed a master’s degree or the equivalent may be considered for graduate associateships when available.

Note: All teaching and research assistants and associates must enroll for a minimum of six semester hours during each semester of their appointment. The six hours cannot include audit enrollment. A half-time (50 percent) teaching and research assistant or associate working 20 clock hours per week may not register for more than 12 hours of course work each semester; a third-time (33 percent) assistant or associate for more than 13 hours; and a quarter-time (25 percent) assistant or associate for more than 15 hours.

During the summer sessions, teaching or research assistants and associates employed 25 percent time may enroll for a maximum of six semester hours during a five-week session or nine hours during the eight-week session; those employed 50 percent time may enroll for a maximum of five hours during a five-week session or seven hours during the eight-week session; and those employed 100 percent time may enroll for a maximum of three hours during a five-week session or four hours during the eight-week session.

Teaching and research assistantships and associateships allow nonresident graduate students to pay tuition at the resident tuition rate. Eligibility applies to teaching and research assistants and associates working 25 percent or more time if their first working day occurs before the end of the first five days of instruction during the semester in question. Only under exceptional circumstances are exceptions granted by the Dean’s Office.

A number of academic units administer assistantships and associateships under research programs sponsored and supported by government, industry, and foundations. Inquiries concerning requirements and deadlines as well as applications should be sent to the head of the appropriate academic unit.

Assistantships, Associateships, and Commercial Services. All graduate students who are hired for class/course support or who hold assistantships or associateships *for a*

specific course—including teaching assistants and research assistants—may not take or provide notes for *that* course to commercial notetaking services or students. An exception may be made by the course instructor(s) on a case-by-case basis as an authorized support service for a disabled student. This policy covers all commercial activities (e.g., notetaking and paid review sessions) that might be associated with a course for which the assistant or associate has assigned responsibilities.

STUDENT RECORDS

Family Educational Rights and Privacy Act of 1974

This act, known as the Buckley Amendment, sets forth the requirements governing the protection of the privacy of the educational records of students who are or have been in attendance at ASU.

Definitions

Eligible Student. For the purpose of this act, an *eligible student* is defined as any individual formally admitted to and enrolled at ASU or the parents of a *dependent* eligible student. Dependency is defined by Section 152 of the Internal Revenue Code of 1954.

Record. Any information or data recorded in any medium, including, but not limited to, handwriting, print, tapes, film, microfilm, microfiche, and electronic means.

Types of Information

Educational Record. The educational record refers to those records that are directly related to a student and are maintained by an educational institution. Two types of educational records are subject to the provisions of this act, (1) *directory information* and (2) *personally identifiable information*. The term does not include those records specifically excluded by Section 99.3 of the Privacy Act.

Directory Information. *Directory information* includes the following student information: name, local and permanent address, local telephone number, date and place of birth, citizenship, residency status, academic level, major field of study, college of enrollment, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and the most recent previous educational agency or institution attended by the student.

Personally Identifiable Information. *Personally identifiable information* includes the name of a student, the student's parent or other family member(s), a personal identifier such as the student's Social Security number, a list of personal characteristics, or other information that would make the student's identity easily traceable and any information, including directory information, that the student has indicated not to be released.

Access to Records

Eligible students, or parents of a dependent eligible student, may inspect and review their educational records. Some form of photo identification must be displayed before access to educational records is allowed.

Directory information may be released to anyone without consent of the student, unless the student indicates otherwise. Students may request that this information not be

released by completing a form in the Office of the Registrar. Request to withhold this information will exclude the student from being listed in the annual *Directory*.

All other educational records that contain *personally identifiable information* may not be released without the written consent of the student. Parents of a dependent student may challenge denial of such access by producing the most current copy of Internal Revenue Form 1040. If that form lists the student in question as a dependent, the parents will be required to sign an affidavit that affirms that the student is their dependent. The affidavit will be retained by the Office of the Registrar. Upon receipt of the affidavit, the university will make student records available to parents for the rest of that calendar year as specified under the Privacy Act.

Students may grant access to parents or agencies by completing a form in the Office of the Registrar.

Location of Policy and Records

The Custodian of Educational Records at ASU is the Office of the Registrar. Copies of this policy are available in the following offices: the Reserve Section of Hayden Library and the Noble Science and Engineering Library, the Office of the Registrar, the Offices of Undergraduate and Graduate Admissions, and the Student Life Office. The Office of the Registrar also maintains a directory that lists all education records maintained on students by ASU.

POLICIES AND PROCEDURES OF THE GRADUATE COUNCIL APPEALS BOARD

The Graduate Council Appeals Board (GCAB) acts as the appeals body for graduate students seeking redress on academic decisions regarding their graduate program. Before filing an appeal, the graduate student should discuss the situation with the associate dean of the Graduate College to explore resolution of the matter at the unit or college level.

GCAB. The purpose of the board is to review written appeals of graduate students. (On occasion a faculty member may be appealing the decision about a graduate student made by a program, an academic unit, the Graduate College, or another college.) Such appeals concern

1. retention in graduate programs;
2. other academic issues (except grade appeals, which are handled in academic colleges); and
3. procedural matters in graduate student programs (e.g., programs of study, thesis/dissertation, exams).

The GCAB consists of three or more members of the Graduate Council appointed by the dean of the Graduate College at the beginning of each academic year. In specific cases the GCAB may ask for additional members from the faculty or one or more graduate students to be appointed by the dean of the Graduate College. The GCAB is chaired by one of the members as designated by the dean or associate dean. The GCAB is assisted by the assistant dean, who oversees the hearing but does not serve as a member of the GCAB. Membership is on an annual basis, but members of the Graduate Council may serve for a maximum of three consecutive years. To the extent possible, GCAB membership does not change during a student appeal. A member continues to serve on the GCAB into the next academic year if an appeal is continued during that time.

Meetings. The board meets when notified by the assistant dean that an appeal is pending. The GCAB requires two-thirds of the committee present for a quorum. A GCAB member must disqualify herself or himself if a case involves a student in her or his academic unit or the member has some direct tie to the student who is appealing. The dean of the Graduate College replaces the individual with a current or past Graduate Council member. A recording secretary is selected before each appeal. This person keeps notes of the hearing. Secretarial support for typing notes is provided by the assistant dean. A tape is made of the hearing.

Jurisdiction. The GCAB has the authority to receive written appeals from graduate students on the review of any action or decision by any university faculty member, staff member, or administrator. However, any appeal must first be reviewed at the level of the academic unit from which the graduate student is making an appeal.

The GCAB has the right to decide not to hear an appeal. In this case, the decision of the academic unit is final. The GCAB may hear appeals on program dismissal, other academic issues, or procedural issues. In addition, the GCAB hears any appeal referred to it by the dean of the Graduate College.

The GCAB does not review

1. appeals of course grades, including omnibus courses such as independent research, thesis, or dissertation, which are handled through the academic colleges;
2. appeals concerning academic dishonesty, which are handled by the academic unit with appeals to the University Hearing Board;
3. appeals concerning scientific misconduct, which are handled by the academic unit with appeals to the Council of Research and Creative Activity through the Office of the Vice Provost for Research;
4. appeals for which the graduate student has not fully used all other appeal and review processes (e.g., the academic unit);
5. appeals filed more than 30 calendar days after receiving notification of the action taken at an appeal by the academic unit (or, if appropriate, another university committee);
6. allegations of discrimination; and
7. other appeals or grievances under the jurisdiction of other university boards and committees.

Appeals are not heard during the summer. The calendar stops on the last day of exams for the spring semester and begins on the first day of classes for the fall semester.

Mediation. Mediation between the graduate student and any university official is always a preferred option to a hearing. If mediation appears beneficial when the initial appeal is filed with the GCAB, the GCAB may recommend that mediation occur and select a mediator. If mediation is successful and both parties agree to the decision, a written record of the outcome is filed by the mediator with the GCAB, all parties involved, and the dean of the Graduate College. If mediation is not successful, the graduate student has 30 days from the end of the mediation process to request in writing a formal appeal hearing.

Authority. The GCAB may affirm or reverse the original decision being appealed and make such recommendations for further actions as appropriate. In the course of any hearing, the GCAB is authorized to request additional evidence or testimony by any student, faculty or staff member, administrator, other university employee, or other individual as a witness. The GCAB has final authority in procedural matters. The decision of the GCAB is final. The chair of the GCAB notifies all parties of the decision.

Filing an Appeal. Before an appeal comes to the GCAB, the normal channels for resolving disputes must have been consulted. The appellant should consult with the major professor to resolve the issue at that level. If the issue cannot be resolved with the major professor, the appellant should seek out the department chair or designated individual for resolution. In some cases, if the major professor and department chair have not been able to resolve the issue or the outcome still needs to be pursued, it may be appropriate to pursue the issue with the academic college dean. If the issue has not been resolved at one of these levels, an appeal to the GCAB may be pursued.

Before initiating an appeal, the graduate student should speak to the associate dean of the Graduate College to see if the issue can be resolved informally. Should negotiation, through the associate dean of the Graduate College, not succeed, the graduate student may submit a written appeal.

All appeals must be submitted in writing to the associate or assistant dean of the Graduate College. Witnesses and any other pertinent evidence must be listed in the appeal. The written appeal must specify the grounds for the appeal as listed in the document "Guidelines for Appeals," available in the Graduate College. Only documents that follow the guidelines are considered, although university regulations pertinent to the case may be used as supporting grounds. It is incumbent upon the student to demonstrate to the GCAB that grounds for the appeal exist. The written appeal may not exceed 10 pages.

The associate or assistant dean notifies the appellee and requests, in writing, information from the appellee related to the case. The initial written response by the appellee is submitted within 15 days of receiving notice of the appeal.

Master's Degrees

Faculty at ASU offer programs leading to the Master of Arts (M.A.) degree, the Master of Science (M.S.) degree, and various professional master's degrees. The M.A. and M.S. programs serve primarily as an introduction to research; the professional master's programs are intended primarily as a preparation for a career in professional practice.

For more information, refer to the appropriate section within "Graduate Programs and Courses," page 105.

Admission to all Master's Degree Programs. Students wishing to enroll in a master's program at ASU are admitted according to the procedure described under "Admission to the Graduate College," page 92. Since graduate work presupposes adequate preparation in a selected field at the undergraduate level, deficiencies are specified at the time of admission by the academic unit involved.

Credit Requirements. A minimum of 30 semester hours of graduate work approved by a student's supervisory commit-

tee and the Graduate College is required. More than 30 semester hours are required in certain programs.

Supervisory Committee. The supervisory committee is responsible for the guidance and direction of the student's graduate program. The committee is composed of a minimum of three members, including a chair, for students writing a thesis or equivalent.

Program of Study. After regular status has been granted, it is in the student's best interest to have an official program of study filed with the Graduate College at the earliest possible date. When the program of study is filed, a supervisory committee is appointed by the dean of the Graduate College upon the recommendation of the head of the academic unit (verified by the signature on the program of study). Changes in the planned program may be made by the student's supervisory committee, with the approval of the head of the academic unit and the dean of the Graduate College. Forms for the submission of the program of study are available in the Graduate College, in the Graduation section of the Office of the Registrar (located in the Student Services Building), or on the Web at www.asu.edu/registrar/forms/pos.html. A student is not eligible to apply for the comprehensive or final examination until a program of study has been approved and any foreign language requirement completed.

Credit Completed Before Admission. With the approval of the student's supervisory committee, the head of the academic unit, and the dean of the Graduate College, a maximum of nine semester hours of ASU (Main and East) graduate course work completed before admission to a graduate degree program may be included in the program of study for a master's degree. The date (month/day/year) on the Graduate College dean's letter of admission is the actual date of admission. If the student is enrolled in courses on the admission date, those courses—if applicable—may be considered part of a program of study. Courses taken the semester before this date are nondegree hours. Individual academic units may have a policy of accepting fewer than nine semester hours attained before admission. For details, refer to the specific degree program.

Graduate credit earned at another institution before admission to a graduate degree program at ASU is nondegree credit. Nondegree credit earned at ASU Main and East combined with nondegree credit earned at another institution may not exceed nine semester hours in the program of study. For example, if six semester hours earned before admission to ASU are transferred from another institution, only three nondegree semester hours may be from ASU Main or East for a master's degree program. (See "Transfer Credit," page 96.)

The six-year maximum time limit applies to nondegree/transferred semester hours appearing on a program of study. (See "Maximum Time Limit," page 102.) Certain degree programs may have different maximum time limits. The student should refer to the specific degree program.

College of Law Credit. The Graduate College accepts a numerical grade of 70 or above for courses taken in the College of Law at ASU as part of an approved program of study for a master's degree program. These grades are not used in the two GPAs calculated for graduation: the courses on the program of study and all courses numbered 500 and above.

A maximum of six semester hours taken in the College of Law may be included in a 30-hour program of study for a master's degree. For a 36- to 45-hour program, the number of hours is limited to a maximum of nine semester hours of course work in the College of Law.

Foreign Language Requirements. A graduate degree program may have a foreign language requirement. This requirement must be fulfilled before the student is eligible to apply for the final written comprehensive examination or the defense of the thesis or equivalent. For certification of proficiency, see "Foreign Language Requirements," page 97.

Comprehensive Examinations. A comprehensive examination, written, oral, or both, administered by the academic unit, is required in all professional master's programs that do not have a thesis or equivalent requirement. A comprehensive examination is optional in other programs. Students are not eligible to apply for the comprehensives or for the oral defense of the thesis or equivalent until they have been regularly admitted, have filed an approved program of study, removed any deficiencies, and fulfilled any foreign language requirements. Students are required to register for at least one semester hour of credit that appears on the program of study or one hour of appropriate graduate-level credit (such as 595, 695, and 795 Continuing Registration) during the semester or summer session in which they take their comprehensive examinations. Failure in the comprehensive examination is considered final unless the supervisory committee and the head of the academic unit recommend, and the dean of the Graduate College approves, a reexamination. Only one reexamination is permitted. A reexamination may be administered no sooner than three months and no later than one year from the date of the original examination.

Thesis or Equivalent Requirements. To satisfy the research requirement for most M.A. or M.S. degrees, a student is expected to present a thesis or equivalent, which is defended in an oral examination. Some professional master's programs may also require a thesis, research project, performance, or exhibition. The requirement varies with each major. Each student writing a thesis or equivalent must register for a minimum of six semester hours of thesis or for a combination of research and thesis totaling six hours, which are directed toward a common research problem.

Credit taken to fulfill the thesis or equivalent enrollment requirement must appear on the program of study.

A student writing a thesis must include on the program of study six hours of 592 Research and 599 Thesis, at least three of which must be 599 Thesis. Although additional 592 Research hours may be included on a program of study, a maximum of six hours of 599 Thesis may be used.

A thesis or equivalent should be of high quality, giving evidence that the program provided an introduction to research. Format evaluation of the thesis or equivalent, described under "Theses and Dissertations," page 97, must be obtained before its submission to the Graduate College for the oral defense. The final approved copy is bound and placed in Hayden Library. Copies of the *Format Manual* are available in the Graduate College or on the Web site at www.asu.edu/graduate/formatmanual.

The final copy of the thesis or equivalent must be reviewed by the student's supervisory committee and

submitted to the Graduate College for format evaluation at least 10 working days before the defense date. The final oral examination in defense of the thesis or equivalent must be conducted at least one week before the degree conferral date. The examination is conducted by the supervisory committee. Applications for the examination are available at the Graduate College.

Each student must be enrolled for at least one semester hour of credit that appears on the program of study or one hour of appropriate graduate-level credit (such as 595, 695, or 795 Continuing Registration) during the semester or summer session in which the student defends the thesis or equivalent.

Open Thesis Defenses. Master's thesis defenses are open to all members of the university community. The oral defense engages the supervisory committee and the candidate in a critical, analytical discussion of the research and findings of the study as well as a review of the relation of the thesis to the major field. The presentation of a thesis defense in an open forum fosters a broader awareness of the state of graduate research at the university, promotes a wider scholarly dialogue among disciplines, and recognizes publicly the scholarly contributions of thesis candidates. Announcements are posted in prominent places in the student's department. Members of the university community are invited to thesis defenses through announcements published in *ASU Insight*, the university's weekly news bulletin. The supervisory committee may conduct the final part of its questioning in closed session. Committee deliberations and final vote are conducted in closed session.

Graduation. The student is eligible for graduation when all course work is successfully completed, the Graduate College scholarship requirements have been met, any required comprehensive examinations have been passed, and the thesis or equivalent, if applicable, has been approved by the supervisory committee and accepted by the head of the academic unit and the dean of the Graduate College. See "Application for Graduation," page 98.

Maximum Time Limit. Unless stated otherwise for a specific degree program, all work offered toward a master's degree must be completed within six consecutive years. The six years begin with the first course included on a student's approved program of study. For example, if the first course listed was taken fall semester 1999, the student must complete all requirements by August 2005. The six-year maximum time limit applies to nondegree transferred semester hours appearing on a program of study. (See "Credit Completed Before Admission," page 101.)

Withdrawal Policy. See "Withdrawal Policies and Procedures," page 94.

Programs Leading to Two Master's Degrees. A student may pursue concurrent master's degrees provided that a maximum of one-sixth of the minimum total semester hours required for the completion of both degrees is common to the two programs of study. The total number of hours common to both degree programs may vary from this maximum value only when the Graduate Council has formally approved coordinated degree programs.

In all cases, these guidelines must be followed:

1. course work common to both programs must constitute a well-planned and meaningful part of each of the programs;
2. the course work common to both programs may not include 599 Thesis or 592 Research credits leading to the thesis or equivalent in either degree;
3. graduate credit transferred from another institution may be applied toward only one degree program;
4. when the two degree programs are pursued at the same time, they must have the approval of the heads of both academic units involved; and
5. concurrent enrollment in a doctoral and master's degree may not have common hours appear on both programs of study.

Doctoral Degrees

Faculty at ASU offer programs leading to the Doctor of Philosophy (Ph.D.) degree and various professional doctoral degrees. For more information, refer to the appropriate section within "Graduate Programs and Courses," page 105.

DOCTORAL DISSERTATIONS

The doctoral dissertation is based on a substantial and sustained research project and constitutes a significant contribution to knowledge in the student's discipline. Accordingly, it is presumed that the results should be published in scholarly journals, books, or other appropriate forms, either before or following completion of the doctoral degree. The research on which the dissertation is based should have been conducted during the time of the student's doctoral studies at ASU, under guidance of ASU faculty, and in accord with Graduate College policies and procedures.

The pedagogical function of the dissertation is twofold. On the one hand, students learn to conduct a major, independent research project and to present the results, all under the guidance of an experienced doctoral mentor. On the other hand, the dissertation is a demonstration of the student's ability to conduct a major research project at the highest level of professional competence. The research experience culminates in a final oral exam, commonly known as the "dissertation defense." At ASU, defenses are public; students and faculty from the candidate's unit especially are encouraged to attend. In the successful dissertation defense, doctoral study culminates in a public affirmation of the student's scholarly competence and of his or her new status in the community of scholars.

The doctoral student must submit two final copies of the dissertation or research paper (research papers are for certain D.M.A. concentrations only) to the ASU Bookstore for binding. The student is responsible for the binding fees. Bound copies are placed in Hayden Library and Archives. See "Theses and Dissertations," page 97, for more information.

Open Dissertation Defenses

Doctoral dissertation defenses are open to all members of the university community. The oral defense engages the supervisory committee and the candidate in a critical, analytical discussion of the research and findings of the study as well as a review of the relation of the dissertation to the specialized field in which it lies. The presentation of dissertation defenses in an open forum fosters a broader aware-

ness of the state of graduate research at the university, promotes a wider scholarly dialogue among disciplines, and recognizes publicly the scholarly contributions of doctoral candidates. Announcements are posted in prominent places in the student's department. Members of the university community are invited to dissertation defenses through announcements published in *ASU Insight*, the university's weekly news bulletin. If circumstances warrant, the supervisory committee may conduct the final part of its questioning in closed session. Committee deliberations and the final vote are conducted in closed session.

Coauthored Work in Doctoral Dissertations

The Graduate Council recognizes the necessity of collaborative research by graduate students with their mentors and with other graduate students. These efforts often result in coauthored works such as journal articles and presentations at meetings. When data or information contained in coauthored works or the actual coauthored works themselves appear in a doctoral dissertation, the graduate author should obtain necessary permission from involved parties (such as written consent from coauthors and the journal that holds the copyright), credit the sources and inspiration of the research, and properly acknowledge the coauthors. For more information, see the *Research and Sponsored Projects Policies and Procedures Manual*—RSP 106 at www.asu.edu/aad/manuals/rsp/rsp106.html.

Course Work After Admission to Doctoral Program

A student with an appropriate master's degree must complete at ASU a minimum of 54 to 60 semester hours of approved graduate work, including 24 hours of dissertation and research (or recital for Music majors), after admission to the doctoral degree program. A student without an appropriate master's degree usually must complete 84 to 90 semester hours of work at ASU.

Research and Dissertation Credits on Programs of Study

The doctoral program of study generally consists of appropriate graduate course work and 24 hours of 792 Research and 799 Dissertation. No more than 24 hours of 799 Dissertation may be included on the doctoral program of study.

Thesis Credit on Doctoral Programs of Study

A maximum of six hours of thesis credit may be included in a doctoral program of study. The thesis credit must be recorded, the thesis successfully defended, and the degree conferred.

College of Law Credit

The Graduate College accepts a numerical grade of 70 or above for courses taken in the College of Law at ASU as part of an approved program of study for a doctoral degree program, if the ASU law courses are deemed appropriate. These grades are not used in the two GPAs calculated for graduation, i.e., the courses on the program of study and all courses numbered 500 and above.

Withdrawal Policy

See "Withdrawal Policies and Procedures," page 94.

DOCTOR OF PHILOSOPHY

The Doctor of Philosophy degree is granted upon evidence of excellence in research and the demonstration of independent, creative scholarship culminating in a dissertation.

Admission. See "Admission to the Graduate College," page 92, for general requirements. Graduate students may apply for admission to the Ph.D. program by filing a written application with the Graduate Admissions Office.

Program Committee. Upon the recommendation of the head of the academic unit, the dean of the Graduate College appoints the program committee, consisting of a chair and at least two other members. The program committee advises the student in planning the program of study. The recommendation for the program committee is reviewed simultaneously with the program of study.

Comprehensive Examination Committee. Ph.D. comprehensive examinations are administered by a committee consisting of three to five members, depending on the requirements of the academic unit.

Dissertation Committee. Upon the recommendation of the head of the academic unit, the dean of the Graduate College appoints the student's dissertation committee, consisting of a chair and at least two other members. This committee must approve the subject and title of the dissertation. The members of the dissertation committee have the necessary knowledge and skills to advise the student during the formulation of the research topic and during the completion of the research and the dissertation. The chair of the program committee may serve as the chair of the dissertation committee. In some cases, the same members serve on both committees. However, the two different committees may have memberships with overlapping functions.

If the head of the academic unit recommends changes in membership for either committee after the committee has been appointed, the student must submit a change of committee form to the Graduate College and receive the approval of the dean of the Graduate College.

Program of Study. The program of study should be submitted as early as possible and must have the approval of the student's supervisory committee, head of the academic unit, and the dean of the Graduate College. The program of study is reviewed simultaneously with the recommendation for the program committee. In general, Ph.D. degree students should expect to devote to the program of study the equivalent of at least three academic years (84 semester hours) beyond the bachelor's degree. A minimum of 84 semester hours is required; 24 of these hours must be a combination of 792 Research and 799 Dissertation. Of the 84 semester hours, at least 30 hours (which may include research credit) of the approved Ph.D. program and 24 research and dissertation hours must be completed *after admission* to a Ph.D. program at ASU. A maximum of 24 dissertation hours is permitted on the program of study. In addition, on the Ph.D. program of study, a student may use up to six hours (maximum) of thesis credit from the completed master's degree. The master's thesis must have been defended and the hours must have been used as part of a completed master's program.

Continuous Enrollment. Once admitted to a Ph.D. degree program, the student is expected to be enrolled continuously, excluding summer sessions, until all requirements for the degree have been fulfilled. Continuous enrollment promotes steady progress toward the completion of the degree and an ongoing relationship between the student and faculty offering the program. If additional credit is not required toward the Ph.D. degree, the student may enroll for 595, 695, or 795 Continuing Registration. Continuing Registration does not carry credit; no grade is given. If a program of study must be interrupted for one or more semesters, the student may apply for leave status, not to exceed one calendar year. A student on leave is not required to pay fees, but is not permitted to place any demands on university faculty or use any university facilities. A student who interrupts a program without obtaining leave status may be removed automatically by the Graduate College, under the assumption that the student has decided to discontinue the program. A student removed by the Graduate College for this reason may reapply for admission; the application is considered along with all other new applications to the degree program.

An application for leave status, endorsed by the members of the student's supervisory committee and the head of the academic unit, must be approved by the dean of the Graduate College. This request must be filed and approved no later than the last day of registration in the semester of anticipated absence.

Residency. In general, Ph.D. degree students should expect to devote to their program of study the equivalent of at least three academic years (84 semester hours) beyond the bachelor's degree. At least two consecutive semesters subsequent to admission to the Ph.D. program must be spent in full-time residence at ASU. At least 30 hours of the approved Ph.D. program in which they are enrolled, in addition to the 24 semester hours of research and dissertation credit, must be completed after admission to the Ph.D. program at ASU. These courses must appear on an approved program of study.

It is expected that, during the period spent in residence, full time (nine semester hours minimum or six semester hours for research assistants or teaching assistants) is devoted to graduate studies. This period is designed to provide an opportunity for students to avail themselves of university resources and to interact fully with faculty and fellow graduate students. This time represents total involvement in the academic major of the program in which they are enrolled.

Foreign Language Requirements. Language requirements are determined by the academic unit concerned. For information concerning certification of proficiency, see "Foreign Language Requirements," page 97.

Comprehensive Examinations. When students have essentially completed the course work in an approved program of study, they should request permission to take the comprehensive examinations. Some academic units may require that the foreign language requirements be fulfilled before

taking the comprehensive examinations. These written and oral examinations are designed to test the student's mastery of the field of specialization. Ph.D. comprehensive examinations are administered by a committee consisting of three to five members, depending on the requirements of the academic unit. Failure in the comprehensive examinations is considered final unless the supervisory committee and the head of the academic unit recommend, and the dean of the Graduate College approves, a reexamination. A reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Only one reexamination is permitted.

Candidacy. Ph.D. students will achieve candidacy status in a letter from the Graduate College dean upon:

1. passing the foreign language examination, if applicable;
2. passing the comprehensive examinations; and
3. successfully defending the dissertation prospectus.

Students must enroll for a minimum of 12 semester hours of 792 Research and 799 Dissertation credit (combined) in subsequent semesters, following the semester in which they are advanced to candidacy. *Note:* The 12 semester hours come *after* advancing to candidacy.

Research and Dissertation Requirements. Each candidate must register for a combined total of 24 semester hours of credit for 792 Research and 799 Dissertation. No more than 24 hours of 799 Dissertation may be included on the 84-hour program of study. Courses or semester hours taken beyond the listed requirements should not be included on the program of study. The final copy of the dissertation must be reviewed by the supervisory committee and the Graduate College at least three weeks before the degree conferral date. Copies of the *Format Manual* are available in the Graduate College and on the Web at www.asu.edu/graduate/formatmanual.

Final Examinations. The final oral examination in defense of the dissertation is mandatory and must be held on the main campus. The oral defense is scheduled by the supervisory committee with the approval of the dean of the Graduate College.

Graduation. The student is eligible for graduation when the Graduate College scholarship requirements have been met, the final oral examination has been passed, and the dissertation has been approved by the supervisory committee and accepted by the head of the academic unit and the dean of the Graduate College.

Maximum Time Limit. The candidate must take the final oral examination in defense of the dissertation within five years after passing the comprehensive examinations. Any exception must be approved by the supervisory committee and the dean of the Graduate College and ordinarily involves repetition of the comprehensive examinations.

Graduate Programs and Courses

All graduate degree programs and certificate programs are organized alphabetically by the name of the major or certificate with only a few exceptions. For example, French, German, and Spanish are found under "Languages and Literatures," page 247.

Accountancy

Certificate Program

ASU West offers a postbaccalaureate certificate in Accountancy. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Accountancy and Information Systems

Master's Program

Philip M.J. Reckers
Director
(BA 223) 480/965-3631
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PROFESSORS

J.R. BOATSMAN, BOYD, GOUL, JOHNSON, KAPLAN,
PANY, PEI, PHILIPPAKIS, RECKERS, ROY, SCHULTZ,
SMITH, STEINBART, VINZE, WYNDELTS

ASSOCIATE PROFESSORS

CHRISTIAN, GOLEN, GUPTA, HWANG, KEIM, KULKARNI,
MOECKEL, O'DELL, O'LEARY, REGIER,
ST. LOUIS, WHITECOTTON

ASSISTANT PROFESSORS

BHATTACHERJEE, CHEN, CHENOWETH, COMPRIX,
DAVID, DOWLING, IYER, O'DONNELL, ROBINSON,
SANTANAM, SHAO, WEISS

SENIOR LECTURERS

MacCRACKEN, SHREDNICK

LECTURERS

BALOGH, J.L. BOATSMAN, GEIGER, HAYES, TAYLOR

The faculty in the School of Accountancy and Information Management, College of Business, offer specialized professional programs leading to the Master of Accountancy and Information Systems (M.A.I.S.), Master of Science in Information Management (see "Information Management," page 182), and Master of Taxation (see "Taxation," page 322) degrees.

The faculty participate in offering the program leading to the Master of Business Administration (see "Master of Business Administration," page 137) and Ph.D. in Business Administration (see "Doctor of Philosophy," page 137) degrees.

MASTER OF ACCOUNTANCY AND INFORMATION SYSTEMS

The M.A.I.S. degree provides specialized preparation for careers in professional accounting in accounting and computer information systems/management, corporate accounting/finance, and management consulting.

Admission. Applicants must submit scores from the Graduate Management Admissions Test (GMAT) exam. All applicants are also required to submit the supplemental application materials required from the school. International applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL) and Test of Spoken English (TSE) exams. Preference in admission is given to those with degrees in accounting and business, although other exceptional candidates are considered. A complete advising guide and application packet may be obtained from the school's Web site.

Prerequisites. Applicants must complete the program prerequisites. Refer to the School of Accountancy and Information Management Web site for a current listing of required course prerequisites for the program.

Program of Study. The program of study consists of a minimum of 30 semester hours and is continually updated. A representative program might include the following courses:

ACC 533	Application Solutions in the Connected Economy	3
ACC 541	Strategic Innovations in Information and Cost Management.....	3
ACC 582	Information Security of Interorganizational Systems	3
ACC 585	Performance Measurement of Emerging Business Models.....	3
ACC 586	Shareholder Value Creation and Financial Statement Analysis	3
ACC 587	Business Process Integrity Controls.....	3
ACC 591	Seminar: Electronic Commerce	3
CIS 505	Object-Oriented Modeling and Programming	3
CIS 506	Business Database Systems	3
CIS 512	Intelligent Decision Systems and Knowledge Management	3

Visit the school's Web site for a current program of study.

Course Load. Students are limited to 12 hours per trimester.

Foreign Language Requirements. None.

Thesis Requirements. None.

Final Examinations. A final comprehensive, written examination is required of all candidates.

RESEARCH ACTIVITY

For current information about research activity, access the School of Accountancy and Information Systems Web site at www.cob.asu.edu/acct and see “Publications and Working Papers.”

ACCOUNTANCY (ACC)

ACC 502 Financial Accounting. (3)

once a year

Financial accounting concepts and procedures for external reporting. Prerequisite: M.B.A. degree program student.

ACC 503 Managerial Accounting. (3)

once a year

Managerial accounting concepts and procedures for internal reporting. Prerequisite: M.B.A. degree program student.

ACC 511 Taxes and Business Strategy. (3)

once a year

Economic implications of selected management decisions involving application of federal income tax laws. Recognition of tax hazards and tax savings. Prerequisite: ACC 502 (or its equivalent).

ACC 515 Professional Practice Seminar. (3)

once a year

History, structure, environment, regulation, and emerging issues of the accounting profession.

ACC 521 Tax Research. (3)

once a year

Tax research source materials and techniques. Application to business and investment decisions. Prerequisite: ACC 430.

ACC 533 Application Solutions in the Connected Economy. (3)

not regularly offered

Analysis of software solutions and evaluation methods. Emphasis on current topics such as enterprise modeling, ERP software, and inter-organizational solutions. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

ACC 541 Strategic Innovations in Information and Cost Management. (3)

once a year

Strategic cost management emphasizing contemporary topics, including activity-based costing and strategic uses of information technology systems. Cooperative learning, lecture. Prerequisite: ACC 503 or M.S. in Information Management degree program student or M.A.I.S. degree program student.

ACC 567 Financial Models in Accounting Systems. (3)

once a year

Development and application of financial models by accountants. Analysis of decision support systems as financial modeling environments. Prerequisite: ACC 330.

ACC 571 Taxation of Corporations and Shareholders. (3)

once a year

Tax aspects of the formation, operation, reorganization, and liquidation of corporations and the impact on shareholders. Pre- or corequisite: ACC 521.

ACC 573 Taxation of Pass-Through Entities. (3)

once a year

Tax aspects of the definition, formation, operation, liquidation, and termination of a partnership. Tax planning is emphasized. Pre- or corequisite: ACC 521.

ACC 575 Family Tax Planning and Wealth Transfer Taxation. (3)

once a year

Tax treatment of wealth transfers at death and during life time, with emphasis on tax planning. Pre- or corequisite: ACC 521.

ACC 577 Taxation of Real Estate Transactions. (3)

once a year

Income tax aspects of acquisition, operation, and disposal of real estate; syndications; installment sales; exchanges; dealer-investor issues; alternative financing; and planning. Prerequisite: ACC 521 or instructor approval.

ACC 582 Information Security of Interorganizational Systems. (3)

not regularly offered

Function and responsibility of the information security officer. Advanced topics in security methods and technology. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

ACC 585 Performance Measurement of Emerging Business Models. (3)

once a year

Application of quantitative techniques to accounting problems. Prerequisite: ACC 503 or M.S. in Information Management degree program student or M.A.I.S. degree program student.

ACC 586 Shareholder Value Creation and Financial Statement Analysis. (3)

not regularly offered

Develop skills necessary to exploit financial reporting information in a business environment and appreciation of reporting issues faced by management.

ACC 587 Business Process Integrity Controls. (3)

once a year

Design and evaluation of computer-based accounting information system. Development of computer-based business models for planning and control. Prerequisite: M.A.I.S. degree program student.

ACC 591 Seminar on Selected ACC Topics. (1–12)

once a year

Possible topics:

- (a) Computer Security. (3)
- (b) Data Warehouse and Data Mining. (3)
- (c) Electronic Commerce. (3)
- (d) Enterprise Modeling. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

COMPUTER INFORMATION SYSTEMS (CIS)

CIS 502 Management Information and Decision Support Systems. (3)

once a year

Fundamentals of computer-based management information and decision support systems. Prerequisite: M.B.A. degree program student.

CIS 505 Object-Oriented Modeling and Programming. (3)

once a year

Object-oriented modeling of business information systems, abstract data types and object-oriented programming using a visual language. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 506 Business Database Systems. (3)

once a year

Hierarchical, network, relational, and other recent data models for database systems. Processing issues such as concurrency control, query optimization, and distributed processing. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 512 Intelligent Decision Systems and Knowledge Management. (3)

once a year

Definition, description, construction, and evaluation of computer-based decision systems. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 515 Management Information Systems. (3)

not regularly offered

Systems theory concepts applied to the collection, retention, and dissemination of information for management decision making. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 520 Systems Design and Evaluation. (3)

not regularly offered

Methodologies of systems analysis and design. Issues include project management, interface, organizational requirements, constraints, documentation, implementation, control, and performance evaluation. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 530 Information Systems Development. (3)

once a year

Object-oriented and interprocess communication and control concepts for information systems; applications based on languages such as C++ and platforms such as networked UNIX. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 535 Distributed Information Systems. (3)*once a year*

Distributed systems and their impact on information systems in business. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 591 Seminar on Selected CIS Topics. (1-12)*once a year*

Possible topics:

- (a) Computer Security
- (b) Computing Architectures
- (c) Data Warehouse and Data Mining
- (d) Electronic Commerce
- (e) Enterprise Modeling

Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 593 Applied Project. (1-12)*not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Aerospace Engineering

Master's and Doctoral Programs

Don L. Boyer

Chair

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PROFESSORS

BOYER, CHATTOPADHYAY, LAANANEN, LIU, MIGNOLET,
REED, SARIC, WIE

ASSOCIATE PROFESSORS

KOURIS, LEE, RANKIN, WELLS

The faculty in the Department of Mechanical and Aerospace Engineering offer graduate programs leading to the M.S., Master of Science in Engineering, and Ph.D. degrees in Aerospace Engineering. A number of areas of study may be pursued, including aerodynamics, design, dynamics and control, propulsion, and structures. The faculty also offer graduate degree programs in Mechanical Engineering. All of the department's graduate programs stress a sound foundation leading to a specialized area of study.

The application deadline for admission in the fall semester is April 15. Applications received after that date and before November 15 are considered for admission in the spring semester.

Graduate Record Examination. All applicants are required to take the Graduate Record Examination; the subject test in Engineering is highly recommended but not required.

MASTER OF SCIENCE

See "Master's Degrees," page 100, for general requirements.

MASTER OF SCIENCE IN ENGINEERING

See "Master of Science in Engineering," page 200, for information on the Master of Science in Engineering degree.

DOCTOR OF PHILOSOPHY

The Ph.D. degree is conferred upon evidence of excellence in research leading to a scholarly dissertation that is an original contribution to knowledge in the field of aerospace engineering. See "Doctor of Philosophy," page 103, for general requirements.

Program of Study. The program of study must be established no later than the first semester after successfully completing the qualifying examination.

Qualifying Examinations. The purposes of the qualifying criteria are to assess if the student is prepared to continue in the doctoral program and to detect deficiencies in the student's background that can be corrected by appropriate course work and individual study. Within the first year of graduate studies at ASU, a graduate student pursuing a Ph.D. program of study in Aerospace Engineering must complete three 500-level core courses, preferably in the major area of interest, and one 500-level mathematics course, both with an average GPA of 3.25 or higher.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral comprehensive examinations are required. The examinations are administered by the program committee.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

Computer Resources and Facilities

Aerospace Engineering graduate education and research is supported by an extensive array of college- and university-supported computer hardware and software, in addition to laboratory minicomputers and microcomputers.

ASU operates an IBM ES9000-732, an IBM 3090-300E, a VAX 6000-634, a MASPAR-MP-2, and a cluster of four IBM RISC-6000 substations, which are available to support graduate research. The College of Engineering and Applied Sciences supports a Convex C220, one Motorola 8640, one DEC VAX, a SPARC 2000, and many minicomputers and microcomputers. These machines are available for use by engineering faculty and students for classroom and research work.

The ASU Computing Commons is equipped with three IBM RS/6000-590s, one MASPAR, several DEC VAX 5000s, numerous Sun Sparc servers, and many other platforms. Access to these computers is via the ASU Advanced Communications Support System (ACSS) broadband network as well as via dial-in lines. The university also operates microcomputer sites with more than 400 IBM and Apple Macintosh systems.

COURSES

For courses, see "Mechanical and Aerospace Engineering (MAE)," page 265.

Agribusiness

Master's Program

Ray Marquardt

Dean

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PROFESSORS

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MARQUARDT, SEPERICH, SHULTZ, THOR

ASSOCIATE PROFESSORS

GREEN, MILLER, RACCACH, RICHARDS, WHYSONG

ASSISTANT PROFESSORS

BURKINK, MANFREDO, PATTERSON,
SCHMITZ, STANTON

MASTER OF SCIENCE

The Morrison School of Agribusiness and Resource Management (MSABR), at ASU East, offers the M.S. degree in Agribusiness with a choice of two concentrations: (1) agribusiness management and marketing and (2) food quality assurance. In general, this degree is designed to prepare students from a variety of backgrounds with a set of critical and analytical business skills while recognizing the unique demands of the agribusiness and resource management sectors. Graduates are well prepared for successful administrative or managerial careers with either government or private-sector organizations in either field. Students are able to select either a research-oriented program, which leads to the completion of a supervised thesis, or a program consisting of course work only (nonthesis option). The nonthesis option allows students to develop an area of specialization and apply these skills to a real-world agribusiness problem through an integrative, capstone course experience. Both the thesis and nonthesis options require the completion of a common set of core courses and successful completion of an MSABR standard comprehensive exam following the first year of course work.

Admission. Applicants to the program are expected to meet the minimum requirements for admission to the Graduate College. In addition, scores from the Graduate Record Examination, Miller Analogies Test, or Graduate Management Admission Test are required. Applications must include a vita and statement of purpose; letters of recommendation are suggested. The statement of purpose must offer evidence of the applicant's basic skills in economics, accounting, statistics, and computer use, as well as some experience or knowledge in an area related to agribusiness. Applicants not meeting this last requirement may be considered for admission with deficiencies. The application deadline for admission in the fall semester is April 15. Applications received after that date and before November 15 are considered for admission in the spring semester. Applicants are strongly encouraged to apply by mid-February to increase their chances for official university funding.

Thesis Option. Students interested in pursuing a research-related career, or an in-depth study of a particular agribusiness issue to improve employment prospects, may choose the thesis option. These students are advised to begin discussions with faculty members early in their studies so that course work and potential employment can be geared toward supporting thesis research. Six of the 36 semester hours in the program are dedicated to the research time required to complete a thesis.

Nonthesis Option. The nonthesis M.S. degree in Agribusiness option provides an opportunity for students who wish to pursue a professional career that is not specifically research-oriented to obtain a rigorous and comprehensive graduate degree. The nonthesis option allows for the selection of six semester hours of electives to be taken in a specific area of emphasis. In lieu of a thesis, a nonthesis option student completes a case-oriented capstone course, which allows the student an opportunity to pursue a course-based project that integrates all of the core business skills acquired during the course work sequence.

Program of Study. All M.S. candidates must complete a minimum of 36 hours of approved graduate-level course work, excluding courses taken to address deficiencies. Of these 36 hours, 21 must be taken to satisfy core requirements in basic business, statistics, and computer proficiency. For students selecting the nonthesis option, fulfilling the requirements for an area of emphasis consists of the successful completion of six hours of elective courses from within that area chosen from graduate agribusiness courses. The specific courses are determined by the student and his or her academic advisor. Thesis students are required to complete three semester hours of research and three hours of writing in addition to six hours of general 500-level agribusiness electives.

It is suggested that students take a coherent sequence of courses such as those indicated below, but considerable flexibility is possible based on individual backgrounds and interests.

Thesis and Nonthesis M.S. in Agribusiness

Semester I

AGB 560	Advanced Agribusiness Management Systems.....	3
AGB 570	Managerial Economics for Agribusiness	3
		-
Total		6

Semester II

AGB 528	Advanced Agribusiness Marketing	3
AGB 532	Advanced Agribusiness Finance	3
AGB 561	Agribusiness Research Methods	3
		-
Total		9

Semester III

Nonthesis Option		
500-level AGB	emphasis electives.....	9
		-
Total		9

Thesis Option

AGB 511	Advanced Agribusiness Management.....	3
500-level AGB	electives.....	6
		-
Total		9

Semester IV

Nonthesis Option

AGB 511 Advanced Agribusiness Management	3
500-level AGB emphasis or other electives	6
Total	9

Thesis Option

AGB 592 Research	6
AGB 599 Thesis	3
Total	9

Total hours in program.....36

Cooperative Degree Program. The Morrison School of Agribusiness and Resource Management and the American Graduate School of International Management (Thunderbird) have a cooperative agreement for students interested in both agribusiness and international management. Thunderbird is an internationally recognized private graduate school, located in the Phoenix metropolitan area, offering course work in international studies, modern languages, and world business. This agreement enables students of ASU to take up to nine semester hours of course work at Thunderbird. To participate, the ASU student must be enrolled full-time (nine semester hours) and may only take three semester hours per semester at Thunderbird. The goal of this agreement is to enhance the educational opportunities available to qualified students of both institutions while making optimal use of the resources and facilities of both institutions.

Foreign Language Requirements. None.

Peace Corps' Master's International Program. MSABR has an agreement with the United States Peace Corps that makes combining graduate studies with Peace Corps service even more appealing. Participants can receive up to six hours of credit for their independent field work while in Peace Corps service. Graduate course work precedes departure to foreign countries. Interested individuals make separate application to ASU and the Peace Corps, and prepare plans of study with their faculty committees regarding studies in the field.

RESEARCH ACTIVITY

The faculty of agribusiness are engaged in a number of research projects of global, national, regional or state, importance. Scholarship in service to community is the hallmark of a state supported university and continues to be in the Morrison School of Agribusiness and Resource Management.

A few examples of this scholarship are "The National Food and Agriculture Policy Project;" a project involved with "Retail Contracting and Growers' Prices in Fresh Fruit;" investigations in "Emerging Markets of the Balkans and Black Sea Region;" as well as "Curriculum for a Bachelor of Science Degree in Food Management."

AGRIBUSINESS (AGB)

AGB 410 Agribusiness Management II. (3)

spring
Principles of human resource management in agribusiness firms. Prerequisite: AGB 310.

AGB 411 Agricultural Cooperatives. (3)

spring
Organization, operation, and management of agricultural cooperatives.

AGB 414 Agribusiness Analysis. (3)

fall and spring
Analysis of agribusiness firm decisions in the ecological, economic, social, and political environments. Special emphasis on ethical issues surrounding food production and consumption.
General Studies: L

AGB 420 Food Marketing. (3)

spring
Food processing, packaging, distribution, market research, new food research and development, and social implications. Prerequisite: AGB 320.

AGB 422 Consumer Behavior. (3)

fall
Application of behavioral concepts in analyzing consumer food purchases and their implications for marketing strategies. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 424 Sales and Merchandising in Agribusiness. (3)

summer
Principles and techniques of selling and merchandising in the agricultural and food industries.

AGB 425 Agricultural Marketing Channels. (3)

fall
Operational stages of agricultural commodities in normal distribution systems and implementation of marketing strategies. Prerequisite: AGB 320.

AGB 429 Marketing Research. (3)

fall
Examines the marketing research process and its role in facilitating agribusiness decisions. Emphasizes problem identification, survey design, and data analysis. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 431 Intermediate Agribusiness Financial Management. (3)

spring
Comprehensive treatment of topics in financial management of agribusiness: capital structure, dividend policy, asset valuation, mergers and acquisitions, risk management. Prerequisites: AGB 332, 333.

AGB 433 Intermediate Agribusiness Financial Markets. (3)

spring
Role and function of agribusiness in U.S. financial system. Topics include rural banking, farm credit system, monetary policy, and federal reserve. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 434 Agricultural Risk Management and Insurance. (3)

fall
Strategies to manage agricultural price and business risk: derivatives, insurance, self-insurance, and public policy. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 436 Entrepreneurship and Financial Management of E-Commerce. (3)

fall
Uses lectures, case studies, and business plans to highlight challenges of starting and running a small business. Lecture, seminar, case studies, computer labs.

AGB 440 Food Safety. (3)

spring
Control, prevention, and prediction of microbial and chemical food-borne diseases. Prerequisite: AGB 442 or instructor approval.

AGB 441 Food Chemistry. (3)

spring
Biochemical and chemical interactions that occur in raw and processed foods. Prerequisites: CHM 115, 231.

AGB 442 Food and Industrial Microbiology. (4)

not regularly offered
Food- and industrial-related microorganisms; deterioration and preservation of industrial commodities. Lecture, lab. Prerequisite: microbiology course with lecture and lab.

AGB 443 Food and Industrial Fermentations. (3)

spring
Management, manipulation, and metabolic activities of industrial microbial cultures and their processes. Prerequisite: AGB 442 or instructor approval.

AGB 445 Food Retailing. (3)*fall*

Food retail management. Discusses trends, problems, and functions of food retail managers within various retail institutions. Lecture, case studies.

AGB 450 International Agricultural Development. (3)*fall*

Transition of developing countries from subsistence to modern agriculture. Emphasis placed on implications for U.S. agribusiness working abroad.

General Studies: G

AGB 452 International Agricultural Policy. (3)*fall*

Use of international trade theory to analyze the effects of government policies, trade agreements, and exchange rates on agribusiness. Prerequisite: ECN 112.

AGB 454 International Trade. (3)*spring*

International practices in trading of agribusiness, technology, and resource products and services.

AGB 455 Resource Management. (3)*spring*

Explores differences between societal and individual valuations of natural resources and considers public policy versus market-based solutions to environmental concerns. Prerequisite: ECN 112.

General Studies: SB

AGB 456 World Agricultural Resources. (3)*fall*

World production and consumption of agricultural products, international relationships, and agencies concerned with world agricultural development problems.

General Studies: G

AGB 457 Resource Policy and Sustainability. (3)*fall*

Considers the evolution of policy design, focusing on how resource and environmental concerns have affected agricultural development and trade policies. Prerequisite: ECN 112.

AGB 458 Bioremediation. (3)*spring*

Technical-regulatory and policy issues emanating from minetailing and animal waste. Lecture, case studies.

AGB 460 Agribusiness Management Systems. (4)*spring*

Development and use of decision support systems for agribusiness management and marketing. Lecture, lab.

AGB 463 Electronic Commerce Applications. (3)*fall*

Overview of electronic commerce technology with introduction to basics of design, control, operation, organization, and emerging issues. Pre- or corequisite: AGB 460 (or its equivalent).

AGB 466 Integrated Pest Control. (2)*fall and spring*

Management of pests affecting golf turf and landscape plants. Structural Pest Control Board sprayer certification preparation offered during the semester. Lecture, lab.

AGB 470 Comparative Nutrition. (3)*not regularly offered*

Effects of nutrition on animal systems and metabolic functions. Prerequisite: CHM 231.

AGB 471 Diseases of Domestic Animals. (3)*spring*

Discussion of animal welfare, mechanisms of disease development, causes and classification of diseases, disease resistance, and common zoonoses. Prerequisite: BIO 181.

AGB 473 Animal Physiology I. (3)*not regularly offered*

Control and function of the nervous, muscular, cardiovascular, respiratory, and renal systems of domestic animals. Prerequisites: BIO 181; CHM 113.

AGB 479 Veterinary Practices. (3)*fall and spring*

Observation of and participation in veterinary medicine and surgery supervised by local veterinarians. Prerequisite: advanced preveterinary student.

AGB 480 Agribusiness Policy and Government Regulations. (3)*spring*

Development and implementation of government food, drug, pesticide, and farm policies and regulations that affect the management of agribusiness.

AGB 484 Internship. (1–12)*fall and spring***AGB 490 Recent Advances in Agribusiness. (1)***fall and spring*

Reports and discussions of current topics and problems associated with agribusiness. May be repeated for credit.

AGB 500 Research Methods. (1–12)*not regularly offered***AGB 501 Master's Thesis Preparation. (1)***fall and spring*

Step-by-step guidelines to major elements of a master's thesis along with practical guidelines for conducting research.

AGB 511 Advanced Agribusiness Management. (3)*spring*

Analysis of organization behavior, change, and resource requirements within agribusiness systems.

AGB 512 Food Industry Management. (3)*spring*

Operations and management of food-processing factories, food distribution centers, and retail food-handling firms.

AGB 513 Advanced Cooperatives. (3)*fall*

Advanced study of cooperatives and other nongovernmental organizations (NGO) focusing on management and proposal preparation for international agencies.

AGB 514 Advanced Agribusiness Analysis I. (3)*spring*

Vertical integration and differentiation in food and agricultural industries. Prerequisite: AGB 528.

AGB 515 Agribusiness Coordination. (3)*spring*

Organizational alternatives for agribusiness with emphasis on cooperatives and trading companies. Prerequisite: AGB 528.

AGB 528 Advanced Agribusiness Marketing. (3)*fall*

Theory and analysis of marketing farm commodities, risks, and the effect of future trading on cash prices.

AGB 529 Advanced Agribusiness Marketing Channels. (3)*spring*

Analysis of agribusiness market channel systems. Formulation of marketing strategies.

AGB 532 Advanced Agribusiness Finance. (3)*fall*

Financial management of agribusiness firms; agribusiness financial analysis, investment analysis, agricultural risk management, and introduction to agricultural financial intermediaries. Prerequisites: both computer literacy and a finance course or only instructor approval.

AGB 535 Commodity Analysis. (3)*fall*

Analysis of commodity markets.

AGB 536 Small Business Finance, Entrepreneurship, and E-Commerce. (3)*fall*

Uses lectures, case studies, and business plans to highlight challenges of starting and running a small business. Lecture, seminar, case studies, computer labs.

AGB 540 Advanced Food Science. (3)*not regularly offered*

Chemical and physical nature of processed foods. Emphasis on food product development.

AGB 550 International Agricultural Development. (3)*fall*

Transition of developing countries from subsistence to modern agriculture. Emphasis placed on implications for U.S. agribusiness working abroad.

AGB 551 Agribusiness in Developing Countries. (3)*spring*

Factors influencing successful development of agribusiness enterprises in developing countries, including poverty, access to capital and technology, and trade opportunities.

AGB 552 International Agricultural Policy. (3)*fall*

Use of international trade theory to analyze the effects of government policies, trade agreements, and exchange rates on agribusiness.

AGB 554 Advanced International Trade. (3)*fall*

Advanced international practices in trading of agribusiness, technology, and resource products and services.

AGB 557 Resource Policy and Sustainability. (3)*fall*

Considers the evolution of policy design, focusing on how resource and environmental concerns have affected agricultural development and trade policies.

AGB 558 Advanced Bioremediation. (3)*spring*

Management and policy issues related to bioremediation of minetailing and animal waste and replacement of chemical control with biological methods. Lecture, case studies.

AGB 560 Advanced Agribusiness Management Systems. (3)*not regularly offered*

Development and use of decision support systems for agribusiness management decision making.

AGB 561 Agribusiness Research Methods. (3)*fall*

Use of model building, hypothesis testing, and empirical analysis in solving agribusiness problems.

AGB 570 Managerial Economics for Agribusiness. (3)*fall*

Concepts in micro- and macroeconomics applied to agribusiness management environments: price formation, market structure, information economics, fiscal and monetary policy. Prerequisites: introductory micro- and macroeconomics.

AGB 580 Practicum. (1-12)*not regularly offered***AGB 581 Advanced Agribusiness Policy. (3)***fall*

Policy-making history, structure, and process.

AGB 583 Field Work. (1-12)*not regularly offered***AGB 584 Internship. (1-12)***not regularly offered***AGB 587 Resource Policy and Sustainability. (3)***fall*

Considers the evolution of policy design, focusing on how resource and environmental concerns have affected agricultural development and trade policies.

AGB 590 Reading and Conference. (1-12)*not regularly offered***AGB 591 Seminar. (1-12)***not regularly offered***AGB 592 Research. (1-12)***not regularly offered***AGB 593 Applied Project. (1-12)***not regularly offered***AGB 594 Conference and Workshop. (1-12)***not regularly offered***AGB 595 Continuing Registration. (1)***not regularly offered***AGB 598 Special Topics. (1-4)***not regularly offered***AGB 599 Thesis. (1-12)***not regularly offered***AGB 600 Research Methods. (1-12)***not regularly offered***AGB 690 Reading and Conference. (1-12)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Anthropology

Master's and Doctoral Programs

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ASSOCIATE PROFESSORS

BARTON, FALCONER, HEGMON, KIMBEL, RICE, WELSH

ASSISTANT PROFESSORS

BAKER, HAENN, JONSSON, REED, STEADMAN

SENIOR LECTURER

WINKELMAN

The faculty in the Department of Anthropology offer graduate programs leading to the M.A. and Ph.D. degrees in Anthropology.

Admission. In addition to the general requirements for admission to the Graduate College, the Department of Anthropology requires applicants to provide a statement of their interests and professional goals and three letters of recommendation. Applicants who received their B.A. during the past ten years must also submit scores on the Graduate Record Examination. Undergraduate course work in anthropology is not a prerequisite for admission to the M.A. program. Admission to the Ph.D. program normally presumes an M.A. in Anthropology; students may be admitted without such a background on the condition that they acquire a knowledge of general anthropology in a manner to be specified at the time of admission.

Program of Study. Special training programs designed to terminate with a master's degree are possible at the discretion of the student and faculty advisors. For example, the concentrations in linguistics, museum studies, medical anthropology, and bioarchaeology are at the master's level. The primary purpose and scope of the graduate program in anthropology, however, is intended to lead to the Ph.D. degree.

The doctoral program is divided into three phases. The first consists of 24 semester hours of course work and readings, usually within a subdiscipline and closely allied areas, followed by six semester hours for the M.A. thesis (or publishable paper). The faculty may require additional hours of course work or other preparation for entering students who are unfamiliar with the concepts of general anthropology at a level equivalent to that of the Arizona State undergraduate anthropology core. Mastery of the phase I course material is

demonstrated by successful completion of a written qualifying examination in social-cultural anthropology or, in physical anthropology, bioarchaeology, and archaeology, by successful completion of a sequence of core courses.

Admission to phase II of the doctoral program is granted to students on the basis of performance in phase I, the quality of M.A. research, prior course work, faculty recommendations, and other relevant information. The second phase consists of 30 semester hours of course work, reading in anthropology and related fields, and directed research designed to prepare the student for the dissertation project. Proficiency in one foreign language or quantitative methods may be required by the supervisory committee. The second phase is completed when the following have been met: (1) passing a written comprehensive examination, and (2) passing the oral defense of the dissertation proposal. The successful student is then advanced to candidacy.

The final phase consists of 24 semester hours of research and dissertation.

Certificate in Museum Studies. The certificate is awarded to nondegree or graduate students who are accepted into the certificate program and who complete 12 hours of required course work and a six-semester hour internship at an approved museum. The certificate may be taken independently or in conjunction with the M.A. degree in Anthropology with a concentration in museum studies.

MASTER OF ARTS

Concentrations are available at the master's level in archaeology, bioarchaeology, linguistics, medical anthropology, museum studies, physical anthropology, and social-cultural anthropology.

The new medical anthropology concentration emphasizes biocultural perspectives on the study of health and illness behavior. The faculty has a range of teaching and research activities that span biological, physical, ecological, socio-cultural, and applied areas of medical anthropology. The program combines theoretical approaches with an applied problem-solving focus to prepare students for careers both in academia and in health care delivery and public health.

See "Master's Degrees," page 100, for general requirements. A concurrent M.A. degree in Anthropology and M.S. degree in Justice Studies is also available. See "Concurrent M.A. Anthropology/M.S. Justice Studies.," page 244.

DOCTOR OF PHILOSOPHY

Concentrations are available at the doctoral level in archaeology, physical anthropology, and social-cultural anthropology.

For more information on the Ph.D. degree, see "Doctor of Philosophy," page 103.



Old Main, renovated in 2000, houses the Alumni Association. •Tim Trumble photo

ANTHROPOLOGY (ASB)**ASB 400 Cultural Factors in International Business. (3)***spring*

Anthropological perspectives on international business relations; applied principles of cross-cultural communication and management; regional approaches to culture and business.

*General Studies: G***ASB 411 Kinship and Social Organization. (3)***spring*

Meanings and uses of concepts referring to kinship, consanguinity, affinity, descent, alliance, and residence in the context of a survey of the varieties of social groups, marriage, rules, and kinship terminological systems. Prerequisite: 6 hours in anthropology or instructor approval.

ASB 412 History of Anthropology. (3)*fall*

Historical treatment of the development of the culture concept and its expression in the chief theoretical trends in anthropology between 1860 and 1950. Prerequisite: ASB 102 or instructor approval.

*General Studies: L/SB***ASB 416 Economic Anthropology. (3)***fall*

Economic behavior and the economy in preindustrial societies; description and classification of exchange systems; relations between production, exchange systems, and other societal subsystems. Prerequisite: ASB 102 or instructor approval.

*General Studies: L/SB***ASB 417 Political Anthropology. (3)***once a year*

Comparative examination of the forms and processes of political organization and activity in primitive, peasant, and complex societies. Prerequisite: ASB 102 or instructor approval.

ASB 462 Medical Anthropology: Culture and Health. (3)*fall*

Role of culture in health, illness, and curing; health status, provider relations, and indigenous healing practices in United States ethnic groups. Lecture, discussion.

*General Studies: C***ASB 466 Peoples and Cultures of Africa. (3)***fall and spring*

Survey of African peoples and their cultures, external contact, and changes. Meets non-Western requirement. Lecture, discussion. Cross-listed as AFS 466. Credit is allowed for only AFS 466 or ASB 466.

*General Studies: SB, G, H***ASB 471 Introduction to Museums. (3)***fall*

History, philosophy, and current status of museums. Exploration of collecting, preservation, exhibition, education, and research activities in different types of museums. Prerequisites: both ASB 102 and ASM 101 or only instructor approval.

*General Studies: L***ASB 480 Introduction to Linguistics. (3)***fall*

Descriptive and historical linguistics. Survey of theories of human language, emphasizing synchronic linguistics.

*General Studies: SB***ASB 481 Language and Culture. (3)***spring*

Application of linguistic theories and findings to nonlinguistic aspects of culture; language change; psycholinguistics. Prerequisite: ASB 102 or instructor approval.

*General Studies: SB***ASB 483 Sociolinguistics and the Ethnography of Communication. (3)***not regularly offered*

Relationships between linguistic and social categories; functional analysis of language use, maintenance, and diversity; interaction between verbal and nonverbal communication. Prerequisites: both ASB 480 and ENG 213 (or FLA 400) or only instructor approval.

*General Studies: SB***ASB 485 U.S.-Mexico Border in Comparative Perspective. (3)***spring in odd years*

Explores the multicultural and social dimensions of communities along the U.S.-Mexico border, emphasizing social organization, migration, culture, and frontier ideology. Prerequisite: 6 hours in anthropology or instructor approval.

ASB 501 Applied Medical Anthropology. (3)*fall*

Overview of anthropology's applications in medicine and its adaptations to U.S. ethnic populations. Requires research project in medical setting. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 502 Health of Ethnic Minorities. (3)*spring*

Prevalence of illness, risk factors, health ecology, and medical and indigenous treatments. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 503 Advanced Medical Anthropology. (3)*fall*

Theory in medical anthropology and cross-cultural studies that illustrate particular theories. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 504 Ethnic Relations. (3)*fall*

Structural processes of intergroup relations, methods for investigating psychocultural dimensions of ethnicity with focus upon U.S. ethnic groups. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 505 Culture and Psychiatry. (3)*fall*

Psychiatry as a cultural phenomenon and indigenous definitions and treatments of mental disorders across cultures. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 506 Gender, Emotions, and Culture. (3)*spring*

Relationships among gender and emotion across cultures. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 529 Culture and Political Economy. (3)*not regularly offered*

Origin and spread of Western capitalism and its impact on non-Western societies. Utilizes ethnographic and historical case studies. Prerequisite: graduate standing.

ASB 530 Ecological Anthropology. (3)*once a year*

Relations among the population dynamics, social organization, culture, and environment of human populations, with special emphasis on hunter-gatherers and extensive agriculturalists.

ASB 532 Graduate Field Anthropology. (2-8)*spring*

Independent research on a specific anthropological problem to be selected by the student in consultation with the staff. May be repeated for credit. Prerequisites: ASM 338 (or its equivalent); instructor approval.

ASB 536 Ethnohistory of Mesoamerica. (3)*not regularly offered*

Indigenous societies of southern Mexico and Guatemala at Spanish contact and their postconquest transformation. Emphasis on the Aztec Empire. Prerequisite: graduate standing.

ASB 537 Topics in Mesoamerican Archaeology. (3)*not regularly offered*

Changing organization of pre-Columbian civilizations in Mesoamerica is explored through interpretive issues, such as regional analysis, chiefdoms, urbanism, and exchange. Prerequisite: instructor approval.

ASB 540 Method and Theory of Sociocultural Anthropology and Archaeology. (3)*fall*

Basic issues concerning concepts of social and ethnic groups, cultural and sociological theory, and the nature of anthropological research. Prerequisite: instructor approval.

ASB 541 Method and Theory of Social and Cultural Anthropology. (3)*spring*

Continuation of ASB 540. Prerequisite: ASB 540 or instructor approval.

ASB 542 Method and Theory of Archaeology I. (3)*spring*

Models of human evolution, culture change, and interpretation of hunter-gatherer and tribal societies, ceramic, lithic, and faunal materials. Prerequisite: instructor approval.

ASB 543 Method and Theory of Archaeology II. (3)*fall*

Covers concepts of social complexity along with economy, demography, and social dynamics, followed by archaeological research design. Prerequisite: instructor approval.

ASB 544 Settlement Patterns. (3)*not regularly offered*

Spatial arrangement of residences, activity sites, and communities over landscape. Emphasis on natural and cultural factors influencing settlement patterns. Prerequisite: instructor approval.

ASB 546 Pleistocene Prehistory. (3)*fall*

Development of society and culture in the Old World during the Pleistocene epoch, emphasizing technological change through time and the relationship of people to their environment. Prerequisite: ASB 361 (or its equivalent).

ASB 547 Issues in Old World Domestication Economies. (3)*spring*

Archaeological evidence for transitions in Old World subsistence economies from hunting and gathering to dependence on domesticated plants and animals. Prerequisite: ASB 362 (or its equivalent).

ASB 550 Economic Archaeology. (3)*not regularly offered*

Prehistoric economies in hunter-gatherer, tribal, and complex societies. Covers subsistence strategies, craft production and specialization, and exchange. Prerequisite: instructor approval.

ASB 551 Prehistoric Diet. (3)*not regularly offered*

Critical review of techniques for recovering dietary information and theoretical models concerned with explaining diet and nutrition. Prerequisite: instructor approval.

ASB 555 Complex Societies. (3)*spring*

Examines structural variations in hierarchically organized societies, along with origins, dynamics, and collapse. Seminar.

ASB 559 Archaeology and the Ideational Realm. (3)*not regularly offered*

"Postprocessual" and other views concerning relevance of mental phenomena for understanding sociocultural change. Various approaches to inferring prehistoric meanings.

ASB 563 Hunter-Gatherer Adaptations. (3)*not regularly offered*

Evolution of prehistoric hunter-gatherer societies in the Old and New Worlds from the most ancient times through protohistoric chiefdoms. Prerequisite: instructor approval.

ASB 567 Southwestern Archaeology. (3)*spring*

Broad coverage of Southwestern cultural developments focusing on current debates and rigorous use of archaeological data in making cultural inferences.

ASB 568 Intrasite Research Strategies. (3)*fall*

Research issues within a single site context. Topics include quantitative spatial analysis, site definition, sampling, distributional analysis, and substantive interpretation.

ASB 571 Museum Principles. (3)*fall*

History, philosophy, and current status of museums. Exploration of collecting, preservation, exhibition, education, and research activities in different types of museums. Prerequisites: both ASB 102 and ASM 101 or only instructor approval.

ASB 572 Museum Collection Management. (3)*spring*

Principles and practices of acquisition, documentation, care, and use of museum collections; registration, cataloging, and preservation methods; legal and ethical issues. Prerequisite: ASB 571 or instructor approval.

ASB 573 Museum Administration. (3)*spring*

Formal organization and management of museums, governance, personnel matters, fund raising and grantsmanship, legal and ethical issues. Prerequisite: ASB 571 or instructor approval.

ASB 574 Exhibition Planning and Design. (3)*spring*

Exhibition philosophies and development; processes of planning, designing, staging, installing, evaluating, and disassembling temporary and long-term exhibits. Prerequisites: both ASB 571 and 572 or only instructor approval.

ASB 575 Computers and Museums. (3)*fall*

Basics of museum computer application; hardware and software; fundamentals of database management; issues of research, collections management, and administration.

ASB 576 Museum Interpretation. (3)*fall*

Processes of planning, implementing, documenting, and evaluating educational programs in museums for varied audiences—children, adults, and special interest groups. Lecture, discussion. Prerequisite: ASB 571.

ASB 577 Principles of Conservation. (3)*spring*

Preservation of museum objects: nature of materials, environmental controls, and causes of degradation; recognizing problems, damage, and solutions; proper care of objects. Prerequisites: both ASB 571 and 572 or only instructor approval.

ASB 579 Critical Issues in Museum Studies. (3)*fall*

Current debates of museum practice from an anthropological perspective. Addresses issues of collection, presentation, authenticity, and authority. Seminar. Prerequisite: ASB 571 or instructor approval.

ASB 591 Seminar. (1–12)*not regularly offered*

Selected topics in archaeology, linguistics, and social-cultural anthropology. Possible topics:

- (a) Archaeological Ceramics. (3)
- (b) Archaeology of North America. (3)
- (c) Cultural Anthropology. (3)
- (d) Culture and Personality. (3)
- (e) Evolution and Culture. (3)
- (f) Historical Archaeology. (3)
- (g) Interdepartmental Seminar. (3)
- (h) Language and Culture. (3)
- (i) Linguistics. (3)
- (j) Museum Studies. (3)
- (k) Problems in Southwestern Archaeology. (3)
- (l) Problems in Southwestern Ethnology. (3)
- (m) Social Anthropology. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

ANTHROPOLOGY (ASM)**ASM 435 Archaeological Pollen Analysis. (3)***fall*

Theory, methodology, and practice of pollen analytic techniques. Compares uses in botany, geology, and archaeology. 2 hours lecture, 3 hours lab, possible field trips. Prerequisite: instructor approval.

ASM 452 Dental Anthropology. (4)*fall*

Human and primate dental morphology, growth, evolution, and genetics. Within- and between-group variation. Dental pathology and behavioral-cultural-dietary factors. 3 hours lecture, 3 hours lab. Prerequisite: instructor approval.

*General Studies: SG***ASM 454 Comparative Primate Anatomy. (4)***spring*

Functional anatomy of the cranial, dental, and locomotor apparatus of primates, including humans, emphasizing the relation of morphology to behavior and environment. 3 hours lecture, 3 hours lab, dissections, demonstrations. Prerequisite: instructor approval.

ASM 455 Primate Behavior Laboratory. (3)*not regularly offered*

Instruction and practice in methods of observation and analysis of primate behavior. Discussion of the relationship between class work on captive animals and field techniques for studying free-ranging groups. Directed readings, 6 hours lab. Prerequisites: ASM 343; instructor approval.

*General Studies: L***ASM 465 Quantification and Analysis for Anthropologists. (3)***spring*

Statistical, quantitative, and geometric strategies for envisioning and exploring archaeological, physical anthropological, bioarchaeological, and sociocultural data. Univariate and multivariate methods. Prerequisites: introductory statistical course; instructor approval.

ASM 507 Anthropological Study of Disease. (3)*once a year*

In-depth introduction to the study of disease processes from an anthropological perspective. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASM 548 Geoarchaeology. (3)*fall*

Geologic context relevant to archaeological research. Topics include sediments, deposition environments, soils, anthropogenic and biogenic deposits, and quaternary chronology. Prerequisite: instructor approval.

ASM 555 Advanced Human Osteology. (3)*not regularly offered*

Laboratory and field techniques in dealing with the human skeleton. Emphasis on preparation, identification, radiography, sectioning, microscopy, and data processing. 1 hour lecture, 6 hours lab. Prerequisite: ASM 341 or instructor approval.

ASM 565 Quantitative Archaeology. (3)*spring*

Formal methods of structuring, codifying, and analyzing data for archaeological problems. Designing research to yield data amenable to productive analysis.

ASM 566 Advanced Topics in Quantitative Archaeology. (3)*fall*

Archaeological issues associated with quantitative analysis, e.g., Bayesian and Monte Carlo approaches, simulation, diversity. May be repeated for credit. Prerequisite: ASM 565 or instructor approval.

ASM 573 Lithic Analysis. (3)*not regularly offered*

Analysis and interpretation of chipped stone artifacts. Focus on both techniques and underlying concepts and their application to real collections. Prerequisite: instructor approval.

ASM 591 Seminar. (1–12)*not regularly offered*

Selected topics in archaeology and physical anthropology. Possible topics:

- (a) Bioarchaeology. (3)
- (b) Evolution and Culture. (3)
- (c) Interdepartmental Seminar. (3)
- (d) Physical Anthropology. (3)
- (e) Primates and Behavior. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Architecture

Master's Program**Ron McCoy***Director***(AED 162) 480/965-3536****arch.grad@asu.edu****www.asu.edu/caed/architecture****REGENTS' PROFESSOR**

COOK

PROFESSORS

HOFFMAN, McCOY, MEUNIER, OZEL, ROTONDI,
SCHEATZLE, UNDERHILL, UNDERWOOD

ASSOCIATE PROFESSORS

BRYAN, ELLIN, HARTMAN, KROLOFF, KUPPER, LOOPE,
VAN DUZER, ZYGAS

ASSISTANT PROFESSORS

CAICCO, HAHN, HEJDUK, LERUM, MURFF, PETRUCCI,
SOROKA, SPELLMAN

The faculty in the School of Architecture offer a professional program leading to the Master of Architecture degree and a research-based postprofessional graduate program leading to the M.S. degree in Building Design. See "Master of Science in Building Design," page 118, for information on this degree program.

The faculty in the school also participate in offering a Ph.D. in Environmental Design and Planning. See "Environmental Design and Planning," page 207, for information on this degree program.

MASTER OF ARCHITECTURE

The Master of Architecture is the accredited professional degree program at ASU. There are two typical programs of study available: (1) a two-year program for applicants who have completed the four-year Bachelor of Science in Design (with a major in Architectural Studies) at ASU or an equivalent degree from another school that offers an accredited professional degree in architecture, and (2) a three-plus-year program for applicants with an undergraduate degree in a discipline or field other than architecture. Both programs promote broad areas of knowledge, professional skill, and a social awareness that the architect must command if architecture is to enhance contemporary life and remain an enduring and valid expression of society.

The program represents an attempt to develop the knowledge and skills necessary for graduates to achieve future leadership roles in the professional practice of architecture and related environmental design fields.

It is the intention of the faculty that the programs also

1. ensure a basic level of educational experience sufficient to enter the practice of architecture after successfully completing state licensing requirements and examination,

2. encourage the student to develop proficiencies in specific areas compatible with individual interests and university instructional capabilities,
3. provide a breadth of understanding that will encourage and motivate the student to continue learning throughout a professional career, and
4. develop opportunities that combine instruction and research directed toward adding value to the built environment.

Elective foci currently offered in the program include energy-conscious design, computer applications, urban design, architectural history and theory, and architectural administration and management.

In the first year of the two-year program, graduate design studio projects focus on advanced comprehensive problems that require integration of the full range of knowledge and skills from students' undergraduate education. In the second year, students select design studios and undertake final design projects that complement their areas of interest. Courses in technology, history and theory, and architectural management are structured alongside the studio sequence.

The three-plus-year program begins with an intensive 10-week summer session introducing architecture and design fundamentals and continues with a preparatory year of architectural history, technology, and design. The final two years are similar to the two-year program described above. Students with no work experience in architecture must also complete a summer internship between the first and second years.

Application Requirements. An applicant to the M.Arch. program must hold a baccalaureate or graduate degree from a college or university recognized by ASU and must meet the minimum GPA requirements as established by the Graduate College.

In addition, all applicants are required to submit for review a design portfolio, GRE scores (except for international students), a statement of intent, and letters of reference. Applicants are accepted on a space-available basis only. Students may be admitted to the two-year program *with deficiencies* if their previous course work is not equivalent to the ASU undergraduate requirements and standards.

Students intending to apply for admission to the professional program in architecture at the *graduate level* should write to the graduate program coordinator well in advance of the application deadline.

International applicants whose native language is not English must submit a TOEFL score of 550 or above. International students should write the Graduate Admissions Office at least one year before the date they plan to begin study.

Application Procedures. Applicants must submit separate application materials to the Graduate College and the School of Architecture.

School of Architecture. In addition to the Graduate College admission requirements, applicants must file all of the following admission materials with

MASTER OF ARCHITECTURE ADMISSIONS
COMMITTEE
SCHOOL OF ARCHITECTURE
ARIZONA STATE UNIVERSITY
PO BOX 871605
TEMPE AZ 85287-1605

1. *Statement of Intent.* A personal narrative (maximum 600 words or two pages typed) indicating the applicant's interest, previous academic and practical background, and personal and professional educational objectives must be submitted.
2. *Letters of Recommendation.* A minimum of three letters of recommendation in support of the applicant must be mailed directly to the Graduate Admissions Committee, School of Architecture. The references should be from professionals or educators familiar with the applicant's experience and capability for graduate work.
3. *Portfolio.* Candidates applying for the two-year Master of Architecture program are required to submit a portfolio. The portfolio must be no larger than 8.5" x 11" (image size). The admissions committee is interested in the quality of work submitted in the portfolio, and applicants are advised not to lavish expense on special or unusual packaging. Slides, original drawings, and loose (unbound) materials should not be submitted. The portfolio should include at least five projects with a range of complexity and with concise, explanatory statements for each project. Include the dates of execution; course, professor, or firm; objective or program summary; and most importantly, a brief self-analysis of the results. When any work is not completely original, the relevant sources must be given. When work is of a team nature, the applicant's role and contribution to the project should be clearly indicated. Applicants who have professional experience and wish to submit examples of professional work may do so. Of particular interest are projects in which the applicant has played a principal role in design. The portfolio is returned after final admission procedures, provided the applicant encloses a self-addressed return mailer with sufficient prepaid postage or if the applicant appears in person to claim the materials within one year of submission. Unclaimed portfolios are retained for one year only. The School of Architecture assumes no liability for materials lost or damaged during shipment or handling.
4. *Creative Work.* Candidates applying for the three-plus-year Master of Architecture program must also provide a portfolio of work as described in paragraph three above. It is recognized that candidates to this program may not have work related to architecture. Therefore, the portfolio should include other forms of creative work such as drawings, designs, paintings, photography, writing, craft, and construction. The work presented may be from vocational, avocational, or academic sources.

Because of space limitations, not all qualified applicants can be accommodated and the admission process is necessarily selective.

Students should indicate for which program of study they are applying. Those with a four-year degree equivalent to the B.S.D. in Architectural Studies should apply for the two-year program. Those with an undergraduate degree not in architecture should apply for the three-plus-year program. Students who are uncertain about which program suits them should write to the graduate program coordinator for determination of appropriate application. Applicants are required to write their names in a clear and consistent manner on all materials submitted, preferably in the “family name, first name” format (e.g. Smith, John).

Students with a previous professional degree in architecture (five or six years) who wish to pursue advanced study in climate responsive architecture, building energy performance, computer-aided design, energy simulation and analysis, and facilities development and management should apply to the Master of Science in Building Design program. See “Master of Science in Building Design,” page 118.

Application Deadline. Priority consideration is given to completed applications received on or before January 15. Students are not admitted to the two-year Master of Architecture program at any time other than the beginning of the fall semester. Students are not admitted to the three-plus-year Master of Architecture program at any time other than the beginning of the first summer session.

Personal Interview. A personal interview is not required. However, a candidate wishing to visit the school is welcome and should make arrangements by contacting the Graduate Programs Coordinator in the School of Architecture.

Requirements for the Two-Year Program. The two-year graduate program requires a minimum of 56 semester hours of approved courses and electives and a comprehensive examination. For most students, this program involves an average of 14 semester hours per semester. An internship may be offered as an elective to be taken in the summer before the final year of study. The internship is an honors program individually arranged and approved by the Master of Architecture Committee.

Students who can adequately demonstrate competence through experience or previous academic course work for any of the specific requirements outlined below are encouraged to petition the graduate advisor for a course substitution.

Typical Program of Study

First Year

Fall	
ADE 521 Advanced Architectural Studio I.....	5
APH 505 Foundation Theory Seminar.....	3
ATE 553 Building Systems III.....	3
ATE 563 Building Structures III.....	3
Total	14
Spring	
ADE 522 Advanced Architectural Studio II.....	5
APH 515 Current Issues and Topics.....	3
ATE 556 Building Development.....	3
Professional elective*.....	3
Total	14

Second Year

Fall	
AAD 551 Architectural Management I.....	3

ADE 621 Advanced Architectural Studio III.....	5
ANP 681 Project Development.....	3
Professional elective*.....	3
Total	14

Spring

AAD 552 Architectural Management II.....	3
ADE 622 Advanced Architectural Studio IV.....	5
Approved elective.....	3
Professional elective*.....	3
Total	14
Master of Architecture total	56

* At least one professional elective must be a CAD course or be taken in the area of computers, if the student can demonstrate CAD skills.

Requirements for the Three-Plus-Year Program. The three-plus-year graduate program requires a minimum of 99 semester hours of approved courses and electives and a comprehensive examination. For most students, this program involves 12 semester hours in the first summer and 14–15 semester hours in each of the subsequent six semesters. A summer internship is required after the first full year of study. A second internship may be offered as an elective to be taken in the summer before the final year of study. The second internship is an honors program individually arranged and approved by the Master of Architecture Committee.

Students who can adequately demonstrate competence through experience or previous academic course work for any of the specific requirements outlined below are encouraged to petition the graduate advisor for a course substitution.

Typical Program of Study

First Year

Summer	
ADE 510 Foundation Architectural Studio.....	6
APH 200 Introduction to Architecture <i>HU, G</i>	3
APH 509 Foundation Seminar.....	3
Total	12
Fall	
ADE 511 Core Architectural Studio I.....	6
APH 313 History of Western Architecture <i>IL, HU</i>	3
ATE 353 Architectural Construction.....	3
ATE 451 Building Systems I.....	3
Total	15

Spring

ADE 512 Core Architectural Studio II.....	6
APH 314 History of Western Architecture <i>IL, HU</i>	3
ATE 361 Building Structures I.....	3
ATE 452 Building Systems II.....	3
Total	15

Summer

ARP 584 Clinical Internship.....	1
Total	1

Second Year

Fall	
ADE 521 Advanced Architectural Studio I.....	5
APH 505 Foundation Theory Seminar.....	3
ATE 462 Building Structures II.....	3

ATE 553 Building Systems III	3
Total	14

Spring

ADE 522 Advanced Architectural Studio II	5
APH 515 Current Issues and Topics	3
ATE 556 Building Development	3
Professional elective*	3
Total	14

Third Year**Fall**

AAD 551 Architectural Management I	3
ADE 621 Advanced Architectural Studio III	5
ANP 681 Project Development	3
ATE 563 Building Structures III	3
Total	14

Spring

AAD 552 Architectural Management II	3
ADE 622 Advanced Architectural Studio IV	5
Approved elective	3
Professional elective*	3
Total	14

Total hours in program	99
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* At least one professional elective must be a CAD course or be taken in the area of computers, if the student can demonstrate CAD skills.

Comprehensive Examinations. The faculty require that all students pass an oral comprehensive examination based, in part, on a defense of their final design project in ADE 622. Each student is required to undertake an independent design project in ADE 622, based on an approved proposal completed the previous semester in ANP 681. Examiners typically include members of the Architecture faculty and may include distinguished practitioners not on the faculty.

M.Arch./M.B.A. Concurrent Degree Program. A Master of Architecture/Master of Business Administration concurrent degree program is offered through cooperative arrangement between the faculty of the College of Business and the College of Architecture and Environmental Design. Students may obtain both degrees in approximately three years of study by concurrently meeting the requirements for each degree program. Separate applications are required by the respective units.

This program requires a minimum of 88 semester hours for those in the two-year M. Arch program. Once admitted, in consultation with their respective advisors, students develop programs of study that meet degree requirements of both programs and their particular interests. Students interested in this offering should request further information from the School of Architecture graduate advisor.

MASTER OF SCIENCE IN BUILDING DESIGN

The faculty in the School of Architecture offer a graduate program leading to the M.S. degree in Building Design. Concentrations are available in computer-aided design, energy performance and climate-responsive architecture, and facilities development and management. The program provides advanced study at the postprofessional level for architects, and at the specialist level for nonarchitects who have a degree in a related area such as engineering, busi-

ness, computer science, and the physical and environmental sciences. The purpose of the program is the development of knowledge useful to the arts and sciences of building design and the integration of that knowledge in the design process. Within this context, the program emphasizes (1) the ecological importance of energy-conscious design and construction, as well as the high social value placed on buildings in which natural forces and systems are utilized rather than suppressed, and (2) the development of research, information systems, and management processes suited to the planning and design of complex buildings in urban settings.

The faculty in the school also participate in offering the Ph.D. in Environmental Design and Planning. See "Environmental Design and Planning," page 207, for information on the Ph.D. degree program.

Applicants considered for admission to the program must hold a baccalaureate or graduate degree from a college or university recognized by ASU and meet the minimum GPA requirements for admission as established by the Graduate College.

It is preferred that applicants have at least one year of professional employment or comparable field/research experience in building design in addition to their academic experiences. Applicants are accepted on a space-availability basis, and must specify an area of research concentration upon application. International applicants whose native language is not English must submit a Test of English as a Foreign Language score of 550 or higher. International students should write the Graduate Admissions Office at least one year prior to the date they plan to begin study.

Application Procedures. Applicants must submit separate application materials to the Graduate College and the School of Architecture.

Application Deadline. Priority consideration is given to completed applications received on or before February 15. All fellowships and scholarship allocations for entering students are normally made from applicants in this group. Applications for admission received after February 15 can be considered only for remaining vacancies and "alternate" placement.

School of Architecture. In addition to the Graduate College admission requirements, applicants must file all of the following admission materials with

ACADEMIC ADVISOR,
MASTER OF SCIENCE IN BUILDING DESIGN
SCHOOL OF ARCHITECTURE
ARIZONA STATE UNIVERSITY
PO BOX 871605
TEMPE, AZ 85287-1605

Applicants are encouraged to ascertain that all materials have been received by contacting an advisor at 480/965-3536.

Statement of Intent. A personal narrative (maximum 600 words or two pages typed) indicating the applicant's interest, previous academic and practical background, and personal and professional educational objectives must be submitted.

Letters of Recommendation. A minimum of three letters of recommendation in support of the applicant must be mailed directly to the Graduate Admissions Committee, School of

Architecture. The references should be from professionals or educators familiar with the applicant's experience and capability for graduate work.

Portfolio. Applicants must submit a folio documenting projects, papers, creative endeavors, and, if appropriate, work experience (maximum size 9" x 12").

The portfolio is returned after final admission procedures, *provided* the applicant encloses a self-addressed return mailer with sufficient prepaid postage, or if the applicant appears in person to claim the materials within one year of submission. Unclaimed portfolios are retained for only one year. The School of Architecture assumes no liability for lost or damaged materials. Students must have their name clearly visible on all parts of application, portfolio, statement of intent, etc.

Research/Teaching Statement. Students wishing to be considered for teaching or research assistantships should include an additional statement outlining areas in which they feel competent to serve as a teaching or research assistant. International students who wish to be considered for a teaching assistantship and whose native language is not English are required to pass the Test of Spoken English administered by the American English and Culture Program at ASU.

Program of Study. The program requires a minimum of 30 semester hours of approved course work at the advanced level, including six hours of thesis credit.

The M.S. degree in Building Design is based on concepts of research and decision-making emphasized by the College of Architecture and Environmental Design.

Students admitted to the program are required to take a research methods core, certain courses in their area of concentration, additional elective course work as approved and directed by the supervisory committee, and write and defend a thesis. While the minimum requirement is 30 semester hours, most students require at least four semesters of course work and work on their thesis to successfully complete this degree program.

The concentrations include the following: design knowledge and computing, energy performance and climate-responsive architecture, and facilities development and management.

Computer-Aided Design Concentration

Research/thesis.....	12
Area of concentration requirements.....	12
Approved electives.....	6
Minimum total	30

The *design knowledge and computing* concentration focuses on investigations of computer-aided design methods and techniques and their application to problem-solving issues in the built environment. The goal of the program is to provide a fundamental understanding of computer-aided design methods and to explore critically the application and potential of these techniques in practice. Topics studied include computer graphics, geometric modeling, design databases, interactive graphic environments for design, comprehensive computer-aided design systems, databases for facilities planning, and computer applications in urban design and building construction. The computer-aided design requirements (12 semester hours) consist of ANP 530 Computer Graphics in Architecture, ANP 561 Architectural Information Processing Systems, ANP 563 Methods in

Architectural Design Computation, and ANP 590 RC: Computer Programming and Architecture.

Energy Performance and Climate-Responsive Architecture Concentration

Research/thesis.....	10
Area of concentration requirements.....	15
Approved electives.....	5
Minimum total	30

The energy performance and climate-responsive architecture concentration is concerned with the relationships among climate and site, thermal and visual comfort, and energy demand and consumption. Courses in this concentration establish a basic core of knowledge on the principles of the natural energies available at the building boundary due to climate and site; thermal and optical behavior of building materials and components; passive and low-energy architectural systems for heating, cooling, and lighting; and appropriate integration with mechanical systems. Additional courses are available to support advanced study and research in a variety of related specialties.

Examples of the areas of advanced study that are available are climate-responsive architecture and analysis of building energy performance. In climate-responsive architecture, a student applies the principles of "bioclimatic" building design in a studio setting to maximize the use of renewable energy resources in particular locations and building programs. In analysis of building energy performance, a student applies physical and economic analysis, computer simulation, and/or measurement as tools in determining component or whole-building performance relative to energy, climate, and cost-efficiency. The student is concerned with climate responsive, low-energy building design through resource-efficient building concepts, materials, components, and systems such as daylighting, passive solar heating, passive cooling, and earth sheltering.

Most students address these problems with an emphasis on either a design-oriented approach in a studio setting or with an emphasis on an analysis-oriented approach through the application of the most current building energy simulation and analysis tools. Some students want to combine these approaches in their thesis problem. The energy performance and climate responsive architecture requirements include APH 511 Energy Environment Theory, ATE 521 Building Environmental Science, ATE 550 Passive Cooling and Heating I, ATE 551 Passive Cooling and Heating II, and ATE 582 Environmental Control Systems.

Facilities, Development, and Management Concentration

Research/thesis.....	12
Area of concentration requirements.....	6
Approved electives.....	12
Minimum total	30

The *facilities development and management* concentration is concerned with the decision-making processes in building development and design firm management. The goal of the program is the advancement of knowledge about the interactions between design and managerial processes. This concentration addresses the following topics: spatial decision models, building development processes and financing, market structure and strategy, pricing and cost control, design automation and group decision-making,

architectural programming and post-occupancy evaluation, and professional ethics. The program benefits from ties to various professional groups and other academic units concerned with business and facilities management. The facilities development and management requirements (six semester hours) consist of AAD 552 Architectural Management II and AAD 555 Architect as Developer.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required. Each candidate devotes research effort of six semester hours of thesis/research credit in preparation of a thesis. The thesis must conform to school policies and meet Graduate College format requirements.

Final Examinations. A final oral examination in defense of the thesis is required.

RESEARCH ACTIVITY

Renata Hejduk, is an architectural historian/theorist who works on the Continental and American post-World War II avant-garde in architecture and urbanism. Her focus is on the 1960s and 70s. Her upcoming book is coedited with Jim Williamson and is entitled *The Structure of Faith: The Continuity of Religious Imagination in Modern and Contemporary Architecture*.

Professor Dan Hoffman's research takes the form of design projects focusing on the tectonic implications of sustainable building strategies. Current projects include the development of a housing prototype for the Navajo using small diameter logs and a camp for children and adults of special needs in the Arizona forests.

David Scheatzle's recent research activity includes a demonstration of residential comfort control using radiant cool ceiling panels. His research paper was published in the transactions of the American Society of Heating, Refrigerating and Air Conditioning Engineers, February, 2000: "Monitoring and evaluating a year round radiant/convective system."

Ellen Soroka is finishing a book on Carlo Scarpa to be published in 2001 and is engaged in research that focuses on the interrelationship of contemporary building and conservation at an urban and architectural level.

Leslie Van Duzer (in collaboration with Kent Kleinman) is completing a building monograph entitled "Notes on Almost Nothing: Mies van der Rohe's Haus Lange and Haus Esters."

Paul Zygas' current research interest is focused on the Baroque architecture in the Grand Duchy of Lithuania from 1600 to 1750.

ARCHITECTURE COURSES

Courses offered by the faculty of the School of Architecture are categorized in the instructional areas described below.

Architectural Administration and Management (AAD).

AAD courses investigate the organization and managerial aspects of contemporary architectural practice. These studies examine the overall processes relative to management coordination, administration procedures, ethics, legal constraints, and the financial controls and measures of contemporary architectural practice.

Architectural Design and Technology Studios (ADE). ADE encourages synthesis of the knowledge and understanding the student has gained from previous and parallel course work, and from other sources, toward the comprehensive design of architectural projects. The laboratories integrate the needs, limitations, and determinants of design problems while applying analytical methods and technical skills in seeking and comparing alternative solutions for assigned problems.

Environmental Analysis and Programming (ANP). ANP develops capabilities to analyze and program environmental and human factors as preconditions for architectural design. These studies are concerned with the existing and emerging methods used by the profession to evaluate and analyze. A variety of courses on computer utilization is included in this area.

Architectural Philosophy and History (APH). APH develops an understanding of architecture as both a determinant and a consequence of humankind's culture, technology, needs, and behavior in the past and present. These studies are concerned with the rationale for the methods and results of design and construction.

Architecture Professional Studies (ARP). ARP provides students with residency and off-campus opportunities and educational experience in group and individual studies relative to specific student interests and faculty expertise.

The program also offers several opportunities to study abroad. In addition, various required and optional field trips are undertaken in course work. (Supplemental fees are assessed for these offerings.)

Architectural Technology (ATE). ATE develops knowledge of the technical determinants, resources, and processes of architecture. These studies are concerned primarily with the science and technology of design and construction, including materials, structural systems, construction systems, environmental control systems, active and passive solar systems, and acoustics and lighting.

ARCHITECTURAL ADMINISTRATION AND MANAGEMENT (AAD)

AAD 551 Architectural Management I. (3)

fall

Design delivery, coordination of construction documents, cost estimating, bidding and negotiations, construction observation, and post construction services. Case studies. Lecture, discussion. Prerequisite: graduate-level standing. Corequisite: ADE 621.

AAD 552 Architectural Management II. (3)

spring

Organizational, human performance, and market influences on architecture firms and projects. Readings, case studies, and analysis of managerial problems and solutions. Lecture, discussion. Prerequisites: AAD 551; ADE 621.

AAD 555 Architect as Developer. (3)

once a year

Development building, real estate, construction funding, land acquisition, and the sources for capital. Prerequisite: instructor approval.

AAD 599 Thesis. (1-12)

not regularly offered

Fee.

AAD 681 Professional Seminar: Capstone. (3)

spring

Examination of ethical, political, social, economic, ecological, and cultural issues confronting the practice of architecture. Readings and case studies. Seminar. Prerequisite: AAD 552. Corequisite: ADE 622.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

ARCHITECTURAL DESIGN AND TECHNOLOGY STUDIOS (ADE)

ADE 510 Foundation Architectural Studio. (6)

summer

Fundamentals of architectural design, methodology, visualization, and representation. Lecture, studio, field trips. Fee. Prerequisite: admission to Master of Architecture degree program.

ADE 511 Core Architectural Studio I. (6)

fall

Application of design fundamentals in architectural problems, including construction, technology, programmatic and environmental determinants. Lecture, studio, field trips. Fee. Prerequisites: APH 200, 509. Prerequisite with a grade of "C" or higher: ADE 510.

ADE 512 Core Architectural Studio II. (6)

spring

Application of architectural design fundamentals to increasingly complex problems, including specific sites and activities. Lecture, studio, field trips. Fee. Prerequisite with a grade of "C" or higher: ADE 511.

ADE 521 Advanced Architectural Studio I. (5)

fall

Design problems emphasizing theory, aesthetics, and tectonics as influences on architectural form. Lecture, studio, field trips. Fee. Prerequisite: admission to Master of Architecture degree program.

ADE 522 Advanced Architectural Studio II. (5)

spring

Design problems emphasizing the comprehensive integration of building systems and technologies as influences on architectural form. Lecture, studio, field trips. Fee. Prerequisite with a grade of "C" or higher: ADE 521.

ADE 621 Advanced Architectural Studio III. (5)

fall

Design problems emphasizing the urban context, planning issues, and urban design theory as influences on architectural form. Lecture, studio, field trips. Fee. Prerequisite: instructor approval. Prerequisite with a grade of "C" or higher: ADE 522. Corequisite: AAD 551.

ADE 622 Advanced Architectural Studio IV. (5)

spring

Individual, student-initiated project reflecting a culminating synthesis of architectural ideas. Studio. Fee. Prerequisites with a grade of "C" or higher: ADE 621; ANP 681.

ADE 631 Building Systems Simulation Studio. (5)

fall

Design of energy-efficient medium and large commercial complexes; synthesis to optimize performance using new and advanced algorithms. Lecture, lab, studio. Prerequisites: ATE 521, 550, 551, 582.

ADE 661 Bioclimatic Design Studio. (6)

once a year

Sustainable architectural and site synthesis at a variety of scales emphasizing bioclimatic criteria and the use of passive and low-energy systems. Prerequisite: professional degree or instructor approval. Corequisite: ATE 558.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

ENVIRONMENTAL ANALYSIS AND PROGRAMMING (ANP)

ANP 500 Research Methods. (1–12)

not regularly offered
Fee.

ANP 530 Computer Graphics in Architecture. (3)

once a year

Fundamentals of computer graphics programming in architecture, including graphics hardware, device-independent packages, 2- and 3-dimensional transformations, and data structures. 2 hours lecture, 3 hours lab. Prerequisite: ANP 475 or instructor approval.

ANP 561 Architectural Information Processing Systems. (3)

once a year

Applications of information processing systems to architectural problems. Analysis of computing tools with respect to assumptions and theories. Lecture, lab. Prerequisites: graduate standing; instructor approval.

ANP 563 Methods in Architectural Design Computation. (3)

spring

Concepts and models for research in computer-aided architectural design with an emphasis on computational methods and a system framework. Discussion, lab. Prerequisite: ANP 500 or instructor approval.

ANP 590 RC: Computer Programming and Architecture. (1–12)

not regularly offered

ANP 598 Special Topics. (1–4)

not regularly offered

Possible topics:

(a) Computer-Aided Design Methods

ANP 599 Thesis. (1–12)

not regularly offered

Fee.

ANP 681 Project Development. (3)

fall

Definition and elaboration of major ideas for implementation in ADE 622 in relation to contemporary theory and practice. Seminar. Prerequisite: ADE 522.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

ARCHITECTURAL PHILOSOPHY AND HISTORY (APH)

APH 505 Foundation Theory Seminar. (3)

fall

Foundation of conceptual architectural inquiry, stressing the reciprocal and interdependent relationship between design and theory. Lecture, seminar. Corequisite: ADE 521.

APH 509 Foundation Seminar. (3)

summer

Historical, technical, theoretical, environmental, and professional issues in architecture. Lecture, seminar, field trips. Prerequisite: ADE 510.

APH 511 Energy Environment Theory. (3)

fall

Solar and other energy sources in designed and natural environments; architectural, urban, and regional implications of strategies using other renewable resources.

APH 515 Current Issues and Topics. (3)

spring

Critical examination of current architectural issues, topics, and discourse. Prerequisite: APH 505.

APH 581 Contemporary Urban Design. (3)

spring

Exploration of the contemporary city and urban design issues related to contemporary cities. Seminar, lecture, discussion. Prerequisite: APH 505.

APH 681 Architectural Theory. (3)

spring

Examination of architectural theory. Emphasis on application of theory to practice. Seminar. Prerequisite: instructor approval.

APH 682 Architectural Criticism. (3)

fall

Examination of architectural criticism, emphasizing specific methods of criticism and their application for aesthetic judgment. Seminar. Prerequisite: instructor approval.

APH 683 Critical Regionalism. (3)

not regularly offered

Critical inquiry in cultural grounding the definition of place in architectural theory and practice. Lecture, field studies. Prerequisite: APH 446 or 447.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

ARCHITECTURE PROFESSIONAL STUDIES (ARP)

ARP 584 Clinical Internship. (1)

summer

Structured practical experience following a contract or plan, supervised by faculty and practitioners.

ARP 684 Professional Internship. (2–6)*spring*

Field experience in an architectural firm specializing in an area directly related to the student's advanced study. Integration of theory and state-of-the-art practices. Credit/no credit. Prerequisite: instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

ARCHITECTURAL TECHNOLOGY (ATE)**ATE 521 Building Environmental Science. (3)***fall*

Scientific principles relating to comfort and environmental control. Heat and moisture transfer. Solar/natural energies for heating, cooling, and lighting. Lecture, lab. Prerequisite: MAT 290 (or its equivalent).

ATE 530 Daylighting Design. (3)*spring*

Daylight analysis, availability, design sky measurements, modeling and simulation. Integration with passive heating, cooling, building design, and energy considerations. Lecture, lab.

ATE 550 Passive Cooling and Heating I. (3)*spring*

Theory, analysis, and application of passive and low-energy systems for thermal comfort in buildings emphasizing heating. Prerequisite: ATE 521.

ATE 551 Passive Cooling and Heating II. (3)*fall*

Theory, analysis, and application of passive and low-energy heating systems for thermal comfort in buildings emphasizing cooling. Prerequisite: ATE 550.

ATE 552 Energy Parameters in Buildings. (3)*not regularly offered*

Advanced modeling. Transient and multidimensional analysis of thermal and daylight performance using variable weather data. Prerequisite: ATE 551 or instructor approval.

ATE 553 Building Systems III. (3)*fall*

Design and integration of building systems, including mechanical, electrical, plumbing, security, communications, fire protection, and transportation. Prerequisite: admission to upper division or instructor approval.

ATE 554 Building Energy Efficiency. (3)*spring*

Impact of building design on energy performance. Climate responsiveness, operations dynamics, and subsystems integration in thermal comfort and efficiency. Prerequisite: ATE 452.

ATE 556 Building Development. (3)*spring*

Comprehensive design development through the understanding and integration of building materials and systems. Lecture, seminar. Prerequisites: ATE 462, 553; CAD proficiency. Corequisite: ADE 522.

ATE 557 Construction Documents. (3)*spring*

Production of architectural working drawings; legal status, organization, layout, site survey plans, sections, elevations, details, schedules, and coordination. Lecture, lab. Prerequisite: admission to upper division.

ATE 558 Bioclimatic Parameters. (3)*spring*

Theory, analysis, and application of energy-related parameters of site, climate, human comfort, and building program for design synthesis.

ATE 560 Building Energy Analysis. (3)*fall*

Computer simulation of building thermal behavior. Software review. Detailed study of selected simulation models using case study projects. Lab. Prerequisites: ANP 475 (or 477); ATE 582.

ATE 561 Energy Analysis Techniques. (3)*fall*

Mathematical models of building envelope and comfort conditioning systems as bases for optimization techniques. Prerequisite: ATE 560.

ATE 562 Experimental Evaluation. (3)*once a year*

Instrumentation, measurement and computational techniques for analysis of building components, and assessment of thermal and luminous performance. Fee. Prerequisite: ATE 521.

ATE 563 Building Structures III. (3)*fall*

Analysis, design, and detailing of steel buildings and frames. Lateral analysis of small rigid and braced frame systems. Lecture, lab. Prerequisite: ATE 462 (or its equivalent).

ATE 564 Advanced Structures: Concrete. (3)*once a year*

Analysis, design, and detailing of concrete systems, considering continuity, multistory frames and shear walls, and lateral analysis. Computer application. Prerequisite: ATE 563 or instructor approval.

ATE 565 Advanced Structures: High Rise. (3)*once a year*

Developments in high-rise construction. Effects of wind and seismic forces. Preliminary analysis, design, and detailing considering code requirements. Lecture, lab. Prerequisite: ATE 563 or instructor approval.

ATE 582 Environmental Control Systems. (3)*once a year*

Heating, ventilation, and air-conditioning systems. Loads, psychrometrics, refrigeration cycle, air/water distribution, controls, energy performance standards, and utility rates. 2 hours lecture, 3 hours lab, field trips. Prerequisite: ATE 451 or 521.

ATE 599 Thesis. (1–12)*not regularly offered*

Fee.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Art**Master's and Doctoral Programs****Julie F. Codell***Director***(ART 102) 480/965-3468****michele.fugiel@asu.edu****herbergercollege.asu.edu/art****REGENTS' PROFESSOR**

WEISER

PROFESSORS

ALQUIST, BATES, BRITTON, CODELL, ECKERT, ERICKSON, FAHLMAN, GASOWSKI, GILLINGWATER, KAIDA, KLETT, MAGENTA, MAXWELL, MEISSINGER, OTIS, PILE, PIMENTEL, RISSEEUW, SCHMIDT, SHARER, STOKROCKI, SWEENEY, WHITE, YOUNG

ASSOCIATE PROFESSORS

COCKE, COLLINS, DUNCAN, GULLY, HAJICEK, JENKINS, MARC, PESSLER, PITTSLEY, SCHLEIF, SCHOEBEL, SCHUTTE, SEGURA, SERWINT, UMBERGER, VERSTEGEN, WOLFTHAL

ASSISTANT PROFESSORS

BROWN, McIVER

The faculty in the School of Art offer a program with a major in Art leading to the M.A. degree with concentrations in art education and art history.

Students admitted to the Master of Education degree program with a major in Secondary Education may also elect art as the subject matter field.

The Ph.D. degree in Curriculum and Instruction is offered with a concentration in art education through the College of

Education and in the History and Theory of Art in collaboration with the University of Arizona.

MASTER OF ARTS

Art Education

Admission. An applicant must have a bachelor's degree from an accredited college or university with a major of not less than 45 semester hours of art, including 12 hours of art history and six hours of art education. Additional hours may be required by the school.

An applicant must have a GPA of at least 3.00 in undergraduate course work during the junior and senior years. Applicants who do not meet these requirements must submit scores from the Miller Analogies Test or the Graduate Record Examination. Applicants should submit a formal art education research paper for review.

Program of Study. The degree program requires a minimum of 30 semester hours of credit in art education, including 18 hours of core courses, six hours of special topics on research related to integrating the teaching of studio art, art history, and criticism or aesthetics, and six hours of research and thesis.

To meet the core requirements, students must take the following core courses:

ARE 510 Art Education Colloquium.....	3
ARE 520 Issues in Teaching Inquiry in Art.....	3
ARE 525 Research on Teaching Art History.....	3
ARE 530 Issues in Teaching Studio Art.....	3
ARE 535 Research on Teaching Studio Art.....	3
ARE 540 Teaching Art in Cultural Contexts.....	3

Before the end of the first semester of course work (six or more semester hours), a program of study must be submitted to the Graduate College. Additional program requirements are indicated in the *M.A. in Art Education Guidelines*.

Qualifying Research Paper. A qualifying research paper must be submitted at the end of the semester in which the student completes the first 15 hours of course work. This paper must be judged satisfactory by the art education faculty before the start of the following semester, or the student is put on probation. During the semester following the qualifying research paper review, the student on probation may not enroll in more than nine semester hours of course work (these may not be thesis hours). To continue in the program, the student must submit a satisfactory research paper before the end of that semester.

Thesis Requirements. A written thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

Art History

Admission. An applicant must have a bachelor's degree with an undergraduate major or minor in art history, or at least four upper-division art history courses, in which an average GPA of 3.00 was maintained. Graduate Record Examination (aptitude test) scores must be submitted in support of the application, along with three letters of recommendation. Applicants should submit one formal research paper for review and a one-page statement of intent indicat-

ing their objectives for graduate study. The application deadline is January 15.

Program of Study. The degree program requires 33 semester hours of credit including a minimum of 21 hours in art history, with at least 12 of these earned in 500-level seminars. At least one course must be taken in each of the four core areas: non-Western, ancient/medieval, renaissance/baroque, and modern. Satisfactory completion of ARS 501 Methodologies and Art History is required during the first semester of residence. The remaining hours include ARS 599 Thesis, approved electives, and other courses specified by the faculty.

For more information, a student should request a copy of the *M.A. in Art History Guidelines* from the School of Art.

Foreign Language Requirements. Demonstration of a reading knowledge of one foreign language (French, German, or with faculty approval, another language appropriate to the field of study) is required. Depending upon the student's chosen area of study, reading knowledge of an additional language may be required.

Qualifying Research Paper. In order for the student to continue graduate study, a qualifying research paper, submitted in the semester in which 15 hours will be completed, must be judged satisfactory by the faculty.

Thesis Requirements. A written thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

MASTER OF FINE ARTS

Art

The Master of Fine Arts degree in Art requires a minimum of 60 semester hours of graduate work beyond the bachelor's degree. The objective of this degree is to provide advanced study in one or more of the following concentrations: ceramics, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, sculpture, or wood.

Admission. A bachelor's degree from a college or university recognized by ASU is required. All students applying for the M.F.A. degree must submit to the chair of the Graduate Studio Committee a portfolio of 20 slides of their work with a return envelope and postage. Three letters of recommendation and a statement of intent pertaining to the student's educational objectives are also required. Because each area of specialization may have unique requirements, students are advised to contact the School of Art for additional information.

Selection Procedures. Faculty review committees appointed by the Graduate Studio Committee make the recommendations for admission. All aspects of the application are evaluated with the purpose of selecting for the available openings those students who have the most reasonable prospect for success in the proposed programs of study. The application deadline is January 15 for the following fall semester. Each student whose application is complete by the deadline date should be advised of admission status within six weeks of the deadline.

Review Sequence

All students are reviewed after completing 15 semester hours of graduate studio work. A progress review may be called at any time during the course of the graduate program. Following the review (after 15 semester hours), the student must form a supervisory committee to direct the program through the completion of the M.F.A. exhibition and final oral examination. For more information, a student should request a copy of the *M.F.A. Guidelines* from the School of Art.

Program of Study. A total of 60 semester hours of graduate credit subject to committee approval is required, including:

1. 27–32 graduate studio hours in the major area(s) of concentration;
2. nine hours of graduate-level art history;
3. nine hours of graduate work outside the area of concentration. These hours may be taken in art auxiliary, art education, art history, or outside the school or college. At least three hours are recommended in a studio discipline; and
4. 10–15 hours of ART 680 Practicum, resulting in an M.F.A. Exhibition.

Credit Before Admission. Subject to the recommendation of the review committee, students with a completed M.A. degree in Studio Art may have up to 24 hours (exclusive of thesis or project) applied to the M.F.A. program. In other cases, a maximum of 12 semester hours of transfer credit may be applied to the degree program. However, only nine hours of nondegree graduate credit taken before admission at ASU or another institution may be used to fill degree requirements (see “Credit Completed Before Admission,” page 101).

Foreign Language Requirements. None.

Final Examination. An oral defense of the M.F.A. exhibition (ART 680) is required.

Time Limit. The total program and all requirements for the degree, including transferred course work, must be completed within seven calendar years.

DOCTOR OF PHILOSOPHY—Ph.D.

Faculty in the School of Art offer programs leading to doctoral degrees in art education and art history. Additional information about graduate programs and forms for graduate study are available online at www.asu.edu/graduate or from graduate admissions.

ART EDUCATION

Ph.D. in Curriculum and Instruction

A Ph.D. degree in Curriculum and Instruction with a concentration in art education is available through the College of Education. For more information, see “Curriculum and Instruction,” page 174.

Admissions. In addition to meeting the Graduate College admission requirements, each applicant must provide the following: a letter of intent including career goals and reasons for seeking the interdisciplinary Ph.D. in Curriculum and Instruction; GRE scores; a sample of scholarly written

work; and three letters of recommendation. One year of full-time K–12 teaching experience is strongly recommended.

Program of Study. The degree requires 90 to 93 semester hours beyond the bachelor’s degree. Course work is divided into four core areas: core requirements, professional focus, cognate study, and dissertation/individual research. A foreign language is not required.

Program Committee. A chair and at least two other members oversee early advising and the preparation of the initial program of study. A five-member committee is required for the administration and evaluation of the comprehensive examination. Three of these members must be from the interdisciplinary committee, two of whom must have expertise in the student’s area of concentration.

Dissertation Committee. After passing the comprehensive examination, a dissertation committee is formed with the approval of the dean of the Graduate College. Members of the program committee may continue to serve as members of the dissertation committee or the members of the committee may change. The dissertation committee chair must be a faculty member designated eligible to serve in this capacity by the interdisciplinary committee and the dean of the Graduate College.

HISTORY AND THEORY OF ART

Ph.D. in History and Theory of Art

The Arizona Ph.D. in the History and Theory of Art is a collaborative program between Arizona State University and the University of Arizona, directed by a Ph.D. steering and academic committee with members from both universities. The emphasis is on interdisciplinary methodologies and electronic technologies to prepare students for museum and teaching careers. See “Doctor of Philosophy,” page 103, for general requirements.

Admissions. Applicants must submit an application form, fee, GRE scores, official transcripts, and other materials to the Graduate College Admissions Office. The following materials must be sent to the graduate advisor, art history: a statement of intent regarding graduate study, a scholarly research paper, requests for assistantships and tuition waivers, and three academic letters of recommendation (to be sent directly by referees). The postmark deadline is January 15 for complete admission applications for enrollment in the following fall semester.

Students with a B.A. fulfilling the requirements for acceptance into the M.A. program may seek admission directly into the Ph.D. program. Other applicants may hold an M.A. in Art History or another discipline approved by the Ph.D. steering committee. Students lacking in sufficient background in art history are required to make up these credits before courses may be counted toward the Ph.D.

Program of Study. The Ph.D. requires 54 semester hours beyond the M.A., including six semester hours of Ph.D. core classes, 12 semester hours in the major area of emphasis, six semester hours in the minor area, six semester hours in interdisciplinary courses outside of art history, and a written dissertation (24 semester hours). Students need to complete the requirements for the M.A. in Art with a concentration in art history before advancing to the Ph.D. program.

Foreign Language. A reading knowledge of at least two foreign languages is required. A third language may be necessary, depending on the field of study.

Ph.D. Committee. A three- to five-member comprehensive examination and dissertation committee directs the student's subsequent work. The committee consists of two art history faculty members in the student's major area and one in the minor area or related discipline. One member must be from the University of Arizona.

Comprehensive Examinations. A written examination is required upon completion of course work. The subsequent oral examination, within six months of passing the written examination, addresses the dissertation proposal.

Admission to Candidacy. A student advances to candidacy upon completion of the written and oral examinations.

ART AUXILIARY (ARA)

ARA 460 Gallery Exhibitions. (3)

fall and spring

Practical experience in all phases of department gallery operations and preparation of gallery publications. May be repeated for credit. Prerequisite: instructor approval.

ARA 488 Understanding Art. (3)

fall and spring

Understanding art as an emergent cultural phenomenon with an emphasis on a critical examination of conceptual issues in art. Writing required. Prerequisites: both ARS 101 and 102 or only instructor approval.

General Studies: L/HU

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

ART EDUCATION (ARE)

ARE 440 Disciplines of Art Education. (3)

once a year

Explorations in art education's disciplines, history, and people's art-making development at diverse age levels and abilities. Lecture, discussion. Prerequisites: a combination of ARS 101 and 102 and ART 113 and 115 or only instructor approval.

ARE 450 Teaching Inquiry in Art. (3)

fall and spring

Designing inquiry-based curriculum units built on developmental levels of art making and art understanding. Lecture, discussion. Prerequisites: ARS 101, 102.

ARE 470 Art Criticism: Aesthetics. (3)

fall

Traditions of aesthetics and art criticism; conceptual issues in contemporary art; education in the visual arts. Prerequisite: ARE 440 or instructor approval.

ARE 482 Teaching Art Processes. (3)

spring

Art traditions of the 20th century as a basis for studio and art history instruction. 2 hours lecture, 2 hours studio. Meets art postbaccalaureate certification requirement. Prerequisite: ARE 450.

ARE 486 Art Education: Strategies and Applications. (3)

fall

Implementation and evaluation of art instruction for K–12 population. Includes teaching of Saturday classes in the Children's Art Workshop. Meets art postbaccalaureate certification requirement. Prerequisite: ARE 482.

ARE 496 Methods and Assessment of Learning in Art. (3)

once a year

Individual or group research on the assessment of art learning incorporating theory and practice. Meets art postbaccalaureate certification requirement. Prerequisites: both ARE 470 and 486 or only instructor approval.

ARE 510 Art Education Colloquium. (3)

not regularly offered

Historical foundations of art education and faculty presentations regarding teaching and research related to the visual arts.

ARE 520 Issues in Teaching Inquiry in Art. (3)

once a year

Issues in teaching and learning through inquiry about artworks using print and electronic reproductions and information. Recommended to be taken before ARE 525.

ARE 525 Research on Teaching Art History. (3)

once a year

Review of empirical and historical research, research methods, learning theory, and assessment of learning in art history. Pilot studies on the effects of instruction upon learning. Recommended to be taken after ARE 520.

ARE 530 Issues in Teaching Studio Art. (3)

once a year

Critical examination of issues concerning teaching multicultural art to different populations of students. Historical and philosophical foundations reviewed. Recommended to be taken before ARE 535. Lecture, discussion.

ARE 535 Research on Teaching Studio Art. (3)

once a year

Review of empirical and historical research methods, learning theory, and assessment of learning in studio art, including developmental studies and their limitations. Pilot studies on the effects of instruction upon learning. Recommended to be taken after ARE 530.

ARE 540 Teaching Art in Cultural Contexts. (3)

once a year

Relationship of multicultural perspectives to teaching/learning art criticism, aesthetics, studio art, and art history.

ARE 610 Issues and Trends in Art Education. (3)

not regularly offered

Doctoral-level investigation of historical and contemporary issues related to teaching and research in art education.

ARE 611 Curriculum Development in Art Education. (3)

not regularly offered

Doctoral-level inquiry into the philosophical, psychological, and sociological foundations of curriculum development.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

ART HISTORY (ARS)

ARS 400 History of Printmaking. (3)

once a year

History of the print as an art form and its relation to other modes and forms of artistic expression. Prerequisites: both ARS 101 and 102 or only instructor approval.

General Studies: HU, H

ARS 410 Early Christian and Byzantine Art. (3)

once a year

Art and architecture of the early church and the Byzantine Empire from the 4th to the 15th century. Prerequisites: both ARS 101 and 102 or only instructor approval.

General Studies: HU

ARS 458 Critical Theories in the Visual Arts. (3)

not regularly offered

Examines current critical theories through their application to all visual arts. May include new historicism, Marxism, deconstruction, post-structuralism, semiotics, Lacanian psychoanalysis, feminism, post-modernism. Lecture, discussion, student presentations. Prerequisites: both ARS 101 and 102 or only instructor approval.

General Studies: HU

ARS 469 Mexican Art. (3)

once a year

Art of Mexico and related Central American cultures from the prehistoric to the contemporary schools. Meets non-Western art history requirement. Prerequisites: both ARS 101 and 102 or only instructor approval.

General Studies: HU, H

ARS 473 Art of Japan. (3)*once a year*

Japanese art from the Joman period to the present. Meets non-Western art history requirement. Prerequisites: both ARS 101 and 102 or only instructor approval.

*General Studies: HU***ARS 485 Women in the Visual Arts. (3)***spring*

Historical study of art by women in various media; related social, political, educational issues; representation of women in art. Lecture, discussion. Prerequisites: both ARS 101 and 102 or only instructor approval.

*General Studies: L***ARS 501 Methodologies and Art History. (3)***fall*

History of the discipline and an exploration of various methodologies, critical theory, and bibliographies used by art historians. Seminar.

ARS 502 Critical Studies in Egyptian Art. (3)*not regularly offered*

Egyptian art from pre-Dynastic to New Kingdom periods. Focus on aesthetic, philosophical, and cultural contexts. Research paper and readings required.

ARS 504 Critical Approaches to Greek Art. (3)*once a year*

Art and architecture of Aegean civilizations (Cycladic, Minoan, Mycenaean) and of Greece to end of Hellenistic period. Research paper and readings required.

ARS 506 Critical Studies in Roman Art. (3)*once a year*

Art and architecture of Etruria, the Roman Republic, and the Roman Empire. Research paper and/or supplemental readings required.

ARS 514 Critical Approaches to Romanesque Art. (3)*not regularly offered*

Sculpture, painting, architecture, and the minor arts in western Europe, ca. 1030–1200, considered within religious, economic, and social contexts. Research paper required.

ARS 516 Critical Approaches to Gothic Art. (3)*not regularly offered*

Architecture, sculpture, painting, and the minor arts in western Europe, ca. 1150–1350, considered within religious, social, and economic contexts. Research paper required.

ARS 517 Critical Approaches to Late Gothic Art. (3)*not regularly offered*

Art of the late-Gothic style, ca. 1350–1525, considered within religious, social, economic, and political contexts. Research or reading project required.

ARS 522 Sixteenth-Century Italian Art. (3)*once a year*

Critical study of painting, sculpture, and architecture in 16th-century Italy in its religious and historical context.

ARS 528 Eighteenth-Century Art in Europe. (3)*once a year*

Critical study of European art from the late Baroque to the early years of Neoclassicism.

ARS 530 Art of Spain and New Spain. (3)*once a year*

Critical study of architecture, painting, and sculpture from 1500 to 1800. Lecture, conference.

ARS 532 Art, Politics, and Patronage, 1770–1850. (3)*fall*

Critical analyses of political events in Europe. Issues of patronage, art as propaganda examined. Impact of war and revolution on visual arts.

ARS 534 Studies in Modern European Art, 1850–1914. (3)*once a year*

Critical study of visual arts using primary source material from mid-19th century to WWI within philosophical, socioeconomic, and economic contexts. Lecture, tutorial. Prerequisite: instructor approval.

ARS 542 Critical Issues in American Painting I. (3)*once a year*

Explores themes and social issues in American art with a critical study of American painting from the 18th century to 1850. Lecture, discussion. Prerequisites: ARS 101, 102.

ARS 543 Critical Issues in American Painting II. (3)*once a year*

Explores themes and social issues in American art with a critical study of American painting from 1850 to 1900. Lecture, lab. Prerequisite: instructor approval.

ARS 544 American Modernism and Realism, 1900–1945. (3)*once a year*

Critical study of the social, political, and artistic changes in American art during the first half of the 20th century. Prerequisites: both ARS 101 and 102 or only ARS 340.

ARS 562 Art of Ancient Mesoamerica. (3)*fall*

Critical study of art and architecture of Mexico and Maya areas before Spanish contact. Lecture, conference.

ARS 565 Native Art of North America. (3)*once a year*

Critical examination of Native American art within culture, prehistory to the present. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 574 Studies in Japanese Art. (3)*once a year*

Critical examination of the nature and history of Japanese art, its rich heritage and its indebtedness to foreign sources. Lecture, discussion. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 575 Approaches to Chinese Painting. (3)*fall*

Critical history of Chinese painting from Eastern Chou to 1911. Emphasis on masters, regional developments, and conceptual underpinnings. Lecture, discussion. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 591 Seminar. (1–12)*once a year*

Graduate seminar. Problems or criticism in possible topics:

- (a) American Art. (3–6)
- (b) American Indian Art. (3–6)
- (c) Ancient Art. (3–6)
- (d) Baroque Art. (3–6)
- (e) Chinese Art. (3–6)
- (f) Critical Theories in the Visual Arts. (3–6)
- (g) Medieval Art. (3–6)
- (h) Modern Art. (3–6)
- (i) Native American Art. (3–6)
- (j) Photographic History. (3–6)
- (k) Pre-Columbian Art. (3–6)
- (l) Renaissance Art. (3–6)

Prerequisite: instructor approval.

ARS 599 Thesis. (1–12)*not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

ART (ART)**CERAMICS****ART 460 Ceramic Clay. (3)***spring*

Research into various clay body formulations, local natural materials, slip glazes, and engobes. Lecture, lab, studio. Fee. Prerequisites: both ART 360 and 364 or only instructor approval.

ART 463 Ceramic Glaze. (3)*fall*

Glaze calculation and formulation using various glaze colors and surfaces. Lecture, lab, studio. Fee. Prerequisite: ART 460 or instructor approval.

ART 466 Special Problems in Ceramics. (3)*fall, spring, summer*

Emphasis on personal expression within structure of seminars, critiques, and studio work. Professional methods of presentation/documentation of work. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 364 or instructor approval.

ART 494 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Ceramics Printmaking
Fee.
- (b) Turning
Fee.
- (c) Vapor Glazes
Fee.

ART 594 Conference and Workshop. (1–12)*not regularly offered*

Possible topics:

- (a) Turning
Fee.

ART 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Ceramic Clay
Fee.
- (b) Ceramic Glaze
Fee.
- (c) Ceramics Printmaking
Fee.
- (d) Experimental Printmaking
Fee.
- (e) Special Problems in Ceramics
Fee.

DRAWING**ART 411 Advanced Drawing. (3)***fall and spring*

Visual and intellectual concepts through problem solving and independent study. Emphasis on the individual creative statement. 6 hours a week. May be repeated for credit. Prerequisites: ART 311; instructor approval.

ART 414 Advanced Life Drawing. (3)*fall and spring*

Various media and techniques on an advanced level. The human figure as an expressive vehicle in various contexts. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 315 or instructor approval.

ART 415 Art Anatomy. (2)*not regularly offered*

Study of human anatomical structures as applied to the practice of figure-oriented art. 3 hours lecture, 5 hours studio a week. Fee. Prerequisite: ART 214.

ART 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Art Anatomy
Fee.
- (b) Life Drawing
Fee.

FIBERS**ART 476 Fibers: Multiple Harness Weaving. (3)***fall and spring*

Advanced loom techniques and computer pattern design. Emphasis on individual design and loom application. Fee. Prerequisite: ART 113 or 115 or 376 or instructor approval.

ART 477 Printed Textiles. (3)*once a year*

Techniques for screen printing on fabric exploring pattern as a compositional element. Various stencil methods including photographic processes. May be repeated for credit. Studio. Fee. Prerequisite: ART 377 or instructor approval.

ART 478 Advanced Surface Design. (3)*spring in odd years*

Emphasis on personal expression with advanced problems in stitch resist, arashi shibori, transfers, indigo, vat and disperse dyes, and pigments. Studio. Prerequisites: both ART 377 and 477 or only instructor approval.

ART 494 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Fibers and Surface
Fee.
- (b) Print Textiles
Fee.

ART 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Fibers and Surface
Fee.
- (b) Print Textiles
Fee.
- (c) Printed Textiles
Fee.

INTERMEDIA**ART 439 Mixed Media. (3)***fall and spring*

Exploring visual effects by combining traditional and nontraditional methods, techniques, and concepts. 6 hours a week. May be repeated for credit. Studio. Prerequisites: a combination of ART 113 and 115 and 6 hours additional studio requirements or only instructor approval.

ART 440 New Media Concepts. (3)*fall and spring*

Continued experiments with new media and interdisciplinary concerns in art. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 443. Corequisite: ART 441.

ART 441 Video Art. (1)*fall and spring*

Utilizing video and audio equipment essential to the production of broadcast quality video art. 2 hours a week. May be repeated for credit. Fee. Corequisite: ART 440.

ART 442 Folk/Outsider Art. (3)*fall*

Exploration of ideas, attitudes, and art of contemporary “self-taught,” “visionary,” and “outsider” artists. Research and studio practice. Lecture, studio. Prerequisites: both ART 113 and 115 or only instructor approval.

ART 443 Intermedia. (3)*fall and spring*

Experimental, conceptual, and interdisciplinary studio art with emphasis on new media and technologies. 6 hours a week. May be repeated once for credit. Prerequisites: both ART 113 and 115 or only instructor approval.

ART 449 Computer Animation and Video. (3)*fall and spring*

Integration of 3D fine arts animation with video and compositing. May be repeated for credit. Studio. Fee. Prerequisite: ART 348 or instructor approval.

ART 450 Computer Animation and Audio. (3)*fall and spring*

Integration of audio with 3D animation for fine arts applications. Includes compositing and effects. May be repeated for credit. Studio. Fee. Prerequisites: ART 449; instructor approval.

ART 530 Two-Dimensional and Three-Dimensional Computer Art. (3)*once a year*

Integration of 2D and 3D computer imaging for art. Emphasis on new directions for computer imaging which accounts for media characteristics. Studio.

ART 540 Advanced Computer Art. (3)*once a year*

Study of motion for 3D models, light sources, and surface effects. Assumes students have a comprehension of complex modeling, mapping, and lighting. Studio. Prerequisite: ART 346 or instructor approval.

ART 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Dimensional Animation
Fee.

METALS**ART 472 Advanced Jewelry. (3)***fall and spring*

Jewelry making with emphasis on developing personal statements and craftsmanship. 6 hours a week. May be repeated for credit. Fee. Prerequisites: ART 372; instructor approval.

ART 473 Advanced Metalworking. (3)*once a year*

Forging and forming techniques in individualized directions. 6 hours a week. May be repeated for credit. Fee. Prerequisites: ART 373; instructor approval.

ART 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Jewelry Metalworking
Fee.

PAINTING**ART 423 Advanced Painting. (3)***fall and spring*

Continuation of ART 324. 6 hours a week. May be repeated for credit. Prerequisite: ART 324.

ART 425 Advanced Figure Painting. (3)*fall and spring*

Continuation of ART 325. 6 hours a week. May be repeated for credit. Fee. Prerequisites: ART 315, 324, 325.

ART 427 Advanced Watermedia. (3)*fall and spring*

Continuation of ART 327. Advanced techniques, concepts, and methods with watercolor and other water-based media on paper. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 327 or instructor approval.

ART 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Figure Painting
Fee.
- (b) Watercolor
Fee.

PHOTOGRAPHY**ART 401 Nonsilver Photography. (3)***fall and spring*

Recognition of the inherent characteristics of nonsilver processes and their use in communicating ideas. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 304 or instructor approval.

ART 403 Senior Photographic Projects. (3)*fall and spring*

Technical and philosophical refinement of personal aesthetic with various photographic media. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 304 or instructor approval.

ART 404 Portraiture Photography. (3)*fall and spring*

Photographing people. Critical discussions and slide lectures on issues in portraiture. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 304 or instructor approval.

ART 405 Advanced Color Photography. (3)*fall and spring*

Intensive use of subtractive color process in photographic printing. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 305 or instructor approval.

ART 406 Photo Techniques. (3)*fall and spring*

Camera and darkroom techniques with emphasis on creative control of the black and white print. 6 hours a week. Prerequisite: ART 301 or instructor approval.

ART 407 View Camera. (3)*fall and spring*

View camera and darkroom techniques. Studio, lab. Fee. Prerequisite: ART 301 or instructor approval.

ART 409 Photographic Exhibition. (3)*once a year*

Care of photographic prints, print presentation, and exhibition. Practical experience in gallery operations. 6 hours a week. May be repeated for credit. Prerequisite: ART 304 or instructor approval.

ART 498 Pro-Seminar. (1–7)*not regularly offered*

Possible topics:

- (a) Landscape Photography: Theory
Fee.

ART 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Advanced Color Photography
Fee.
- (b) Nonsilver Photography
Fee.
- (c) Portraiture Photography
Fee.
- (d) View Camera
Fee.

PRINTMAKING**ART 452 Advanced Lithography. (3)***fall and spring*

Continuation of ART 352. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 352 or instructor approval.

ART 454 Advanced Screen Printing. (3)*once a year*

Continuation of ART 354. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 354 or instructor approval.

ART 455 Advanced Photo Processes for Printmaking. (3)*once a year*

Continued study of photomechanical techniques and applications to printmaking or photographic processes. Fee. Prerequisite: ART 355 or instructor approval.

ART 456 Fine Printing and Bookmaking I. (3)*once a year*

Letterpress printing and typography as fine art. Study of history, alphabets, mechanics of hand typesetting, presswork, and various forms of printed matter. Fee. Prerequisite: instructor approval.

ART 457 Fine Printing and Bookmaking II. (3)*once a year*

Continuation of ART 456. Bookbinding, book design and printing, advanced typography, theory, and presswork. May be repeated for credit. Fee. Prerequisites: ART 456; instructor approval.

ART 458 Papermaking. (3)*fall and spring*

History, theory, demonstrations, sheet forming, collage treatments, and 3-dimensional approaches. 6 hours a week. May be repeated for credit. Fee. Prerequisite: instructor approval.

ART 459 Monoprinting. (3)*fall and spring*

Nonmultiple printed image using a variety of technical approaches. 6 hours a week. May be repeated for credit. Fee. Prerequisites: ART 311, 323 (or any 300-level printmaking class); instructor approval.

ART 494 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Experimental Paper
Fee.
- (b) Experimental Printmaking
Fee.
- (c) Relief Printmaking
Fee.

ART 551 Intaglio Projects. (3)*fall and spring*

Materials and methods of intaglio as a matrix for exploring various contemporary issues. Specifically structured to accommodate the graduate-level drawing student with no printmaking background. Studio. Fee.

ART 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Advanced Photo Process for Printmaking
Fee.
- (b) Experimental Paper
Fee.
- (c) Fine Printing and Bookmaking I
Fee.
- (d) Fine Printing and Bookmaking II
Fee.
- (e) Lithography
Fee.
- (f) Monoprinting
Fee.
- (g) Papermaking
Fee.
- (h) Photo Processes for Printmaking I
Fee.
- (i) Relief Printmaking
Fee.
- (j) Screen Printing
Fee.

SCULPTURE**ART 431 Special Problems in Sculpture. (3)***fall and spring*

Development of a personal approach to sculpture. Emphasis on form, individual problems, and related color technology. Professional practices and presentation. 6 hours a week. May be repeated for credit. Fee. Prerequisites: ART 332; instructor approval.

ART 432 Neon Sculpture. (3)*fall*

Techniques for creating neon in an art context. Glass tube bending and fabrication. Construction of artworks utilizing light-generating gases. 6 hours a week. May be repeated for credit. Fee. Prerequisite: instructor approval.

ART 433 Foundry Research Methods. (3)*fall and spring*

Research in foundry techniques. Studio. Pre- or corequisite: ART 333 or instructor approval.

ART 436 Architectural Sculpture. (3)*not regularly offered*

Sculptural concepts as related to architecture and other man-made environments. Scale drawing, models, and relief sculpture. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 332 or instructor approval.

ART 437 Film Animation. (3)*fall*

Production of short 16mm films that feature articulated sculptural objects, models, dolls, puppets, and graphics through the use of single-frame filming techniques. 6 hours a week. May be repeated for credit. Fee. Prerequisite: instructor approval.

ART 438 Experimental Systems in Sculpture. (3)*spring*

Simple electrical and mechanical systems that can be utilized in the context of studio art and installations. Active production of studio artworks required. 6 hours a week. May be repeated for credit. Fee. Prerequisite: instructor approval.

ART 474 Advanced Wood. (3)*fall and spring*

Extended experience and advanced techniques in the use of wood to create functional works of art. 6 hours a week. May be repeated for credit. Fee. Prerequisites: ART 374; instructor approval.

ART 494 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Advanced Sculpture
Fee.
- (b) Carving
Fee.
- (c) Film: Post-Production
Fee.
- (d) Foundry Casting Methods
Fee.
- (e) Live Action Film
Fee.

ART 594 Conference and Workshop. (1–12)*not regularly offered*

Possible topics:

- (a) Carving
Fee.

ART 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Advanced Sculpture
Fee.
- (b) Architectural Sculpture
Fee.
- (c) Experimental Systems in Sculpture
Fee.
- (d) Film: Post-Production
Fee.
- (e) Foundry Casting Methods
Fee.
- (f) Live Action Film
Fee.
- (g) Neon Sculpture
Fee.
- (h) Special Problems in Sculpture
Fee.
- (i) Wood
Fee.

SPECIAL STUDIO ART**ART 582 Art Research. (1–12)***fall, spring, summer*

Independent study research using classroom facilities and supplies. Studio.

ART 621 Studio Problems. (3)*fall, spring, summer*

Advanced study. 6 hours a week each section. May be repeated for credit. Possible topics:

Possible topics:

- (a) Ceramics
Fee.
- (b) Drawing
- (c) Fiber Art
- (d) Jewelry Metalworking
Fee.
- (e) Metals
- (f) Painting
- (g) Photography
- (h) Printmaking
Fee.
- (i) Sculpture
- (j) Studio Art
- (k) Wood

Prerequisite: instructor approval.

ART 680 Practicum: M.F.A. Exhibition. (1–15)*fall, spring, summer*

Studio work in preparation for required M.F.A. exhibition. Public exhibit to be approved by the student's supervisory committee and accompanied by a final oral examination. Photographic documentation and written statement of problem. Prerequisite: approval of the student's supervisory committee.

ART 682 M.F.A. Exhibition Research. (1–12)*fall, spring, summer*

M.F.A. exhibition practicum using classroom facilities and supplies. Can be used in place of ART 680. Prerequisite: approval of the student's supervisory committee.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Artist Diploma, Post-Bachelor's

See "Post-Bachelor's Artist Diploma," page 274.

Asian Languages and Civilizations— Chinese/Japanese

See “Languages and Literatures,” page 247.

Bioengineering

Master’s and Doctoral Programs

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ASSOCIATE PROFESSORS
GARCIA, HE, KIPKE, MASSIA, PIZZICONI,
SWEENEY, YAMAGUCHI

ASSISTANT PROFESSORS
MUTHUSWAMY, PANITCH, VERNON

The Bioengineering faculty within the Department of Bioengineering offer graduate programs leading to the M.S. and Ph.D. degrees in Bioengineering. Areas of study include biochemical engineering, bioelectrical engineering, biomechanical engineering, biosystems/biotransport engineering, bioinstrumentation, biomaterial engineering, and biocontrol engineering. Research topics include artificial organs, biocontrol systems, biomechanics, bioinstrumentation, biomaterials, biosystems engineering, biotechnology, cardiovascular engineering, cellular and tissue bioengineering, neural bioengineering, noninvasive imaging, and rehabilitation engineering.

The faculty also participate in offering the Tri-University Master of Engineering degree program. See “Master of Engineering,” page 195, for program description.

Graduate Record Examination. Graduate Record Examination scores are required from all students.

Transition Program. Students applying to the Bioengineering M.S. or Ph.D. degree programs may have an undergraduate B.S. degree in a major field other than Bioengineering. The qualifications of transition students are reviewed by the department graduate committee, and a special program of transition course work is designed for successful applicants. In general, transition students should have had, or be prepared to take, calculus through ordinary differential equations, inorganic chemistry, physics, and a number of undergraduate engineering courses in order to be prepared for graduate bioengineering courses. Other course work from the undergraduate program may be required depending upon the research topic selected by the student.

Transition students should contact the graduate coordinator to evaluate the undergraduate transcript.

MASTER OF SCIENCE

See “Master’s Degrees,” page 100, for general requirements.

Program of Study. All candidates pursuing a M.S. degree in Bioengineering are required to complete an approved program of study consisting of the minimum required semester hours, including research and thesis. Special course requirements for the different areas of study are established by the faculty and are available from the Department of Bioengineering. Part-time students must successfully complete a research seminar course for at least three semesters during the course of study. Candidates whose undergraduate degree was in a field other than bioengineering may be required to complete more than 30 semester hours of credit on the program of study.

Research Seminar Requirements. In addition to the course work and thesis requirements, all full-time master’s degree students must successfully complete a research seminar course during each semester of attendance.

Thesis Requirements. A written thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

Nonthesis Option

The nonthesis option within the M.S. degree program in Bioengineering is reserved for students who have full-time employment in industry and who intend to enroll in the M.S. degree program on a part-time basis, or for students who wish to continue their study of bioengineering past the baccalaureate level before seeking admission to a medical school.

Admission Requirements. Students seeking admission to the nonthesis option must request this option when applying for admission to the M.S. degree program. Students who are admitted to the thesis option are not allowed to subsequently transfer into the nonthesis option. Students admitted to the nonthesis option, however, may subsequently request approval to transfer into the thesis option. Additionally, the student must meet the following criteria to qualify for the nonthesis option: (1) be a full-time employee of a local industry and indicate at the time of application that he or she intends to pursue the M.S. degree on a part-time basis or (2) declare at the time of application that his or her career goal is to seek admission to a medical school.

Course Requirements. A total of 33 semester hours, including a bioengineering seminar and project, is required for graduation in the nonthesis option. The program of study for the nonthesis option requires the same set of core courses and seminar in bioengineering that is required of students in the thesis option. Instead of research and thesis hours, the student must complete six additional credits of course work selected from the catalog list of BME courses (the total course work requirement, including seminar, is 33 semester hours).

Project. Students admitted to the nonthesis option must also register for three semester hours of BME 593 Applied

Project. Students are required to complete an in-depth literature survey and/or research design in some aspect of bioengineering, resulting in a written report.

Defense of the Applied Project. The student is required to successfully defend the Applied Project in bioengineering before his or her graduate supervisory committee.

Financial Aid. Students admitted to the nonthesis option within the bioengineering master's degree program do not qualify for graduate research or teaching assistantships or other financial assistance available to thesis option master's degree students.

Admission to the Ph.D. Program. If the student wishes to subsequently enter the Ph.D. program after completing the requirements for the nonthesis option, the application procedure is the same as if the student was applying with a thesis-track M.S. degree.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Bioengineering is conferred upon evidence of excellence in research resulting in a scholarly dissertation that is a contribution to knowledge.

See "Doctor of Philosophy," page 103, for general requirements.

Program of Study. Upon admission of the applicant with regular or provisional status, a supervisory committee (program committee) is appointed. This committee is responsible for the guidance and direction of the student's graduate program of study. The program committee is composed of a minimum of three faculty members, including a chair. Generally, the student's graduate advisor serves as chair of the program committee. The program committee advises the student in developing a program of study and assumes primary responsibility in assessing the student's progress in the program.

Research Seminar Requirements. In addition to the course work and dissertation requirements, all full-time doctoral students must successfully complete a research seminar course during each semester of attendance.

Qualifying Examination. A qualifying exam is administered to test the student's mastery of basic engineering fundamentals. The examination is usually taken early in the student's program of study (after two semesters of residence at ASU, and no later than three semesters). A student must express in writing the intention to take the exam to the department graduate committee through the graduate coordinator.

Foreign Language Requirements. None.

Comprehensive Examinations. When the Ph.D. student has essentially completed the course work in the approved program of study, the student is given a written comprehensive examination covering the field of study. The written examination is followed by an oral examination.

Admission to Candidacy and Appointment of Dissertation Committee. After the student passes the comprehensive examinations, a dissertation committee composed of at least five faculty members is appointed. The dissertation committee meets to approve the student's dissertation prospectus. Generally, the prospectus should include a perti-

nent review of the literature, a statement of the proposed study, the hypothesis to be tested, a description of the research design, a discussion of the specific data to be collected, and a description of the means by which the data is to be analyzed. After the dissertation committee has approved the prospectus, the student applies to the Graduate College for admission to candidacy.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required. The dissertation is expected to reflect and contribute significantly to knowledge. It must clearly indicate mastery of research methods.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

For current information about research activity, access the Department of Bioengineering Web site at www.eas.asu.edu/~bme.

BIOENGINEERING (BME)

BME 411 Biomedical Engineering I. (3)

once a year

Review of diagnostic and prosthetic methods using engineering methodology. Introduction to transport, metabolic, and autoregulatory processes in the human body. Prerequisite with a grade of "C" or higher: BME 334.

BME 412 Biomedical Engineering II. (3)

once a year

Review of electrophysiology and nerve pacing applications, introduction to biomechanics and joint/limb replacement technology, cardiovascular and pulmonary fluid mechanics, and the application of mathematical modeling. Prerequisite: instructor approval.

BME 415 Biomedical Transport Processes. (3)

once a year

Principles of momentum, heat, and mass transport with applications to medical and biological systems and medical device design. Prerequisites: MAT 274; PHY 131.

BME 416 Biomechanics. (3)

fall

Mechanical properties of bone, muscle, and soft tissue. Static and dynamic analysis of human movement tasks such as locomotion. Prerequisite with a grade of "C" or higher: BME 318.

BME 417 Biomedical Engineering Capstone Design I. (3)

fall

Technical, regulatory, economic, legal, social, and ethical aspects of medical device systems engineering design. Lecture, field trips. Prerequisite: ECE 300. Prerequisites with a grade of "C" or higher: BME 318, 334.

BME 419 Biocontrol Systems. (3)

fall

Application of linear and nonlinear control systems techniques toward analysis of neuromusculoskeletal, cardiovascular, thermal, and mass transfer systems of the body. Prerequisites: ECE 201; MAT 274.

BME 435 Physiology for Engineers. (4)

fall

Physiology of the nervous, muscular, cardiovascular, endocrine, renal, and respiratory systems. Emphasizes use of quantitative methods in understanding physiological systems. Lecture, lab. Prerequisites: a combination BIO 181 and CHM 116 and PHY 131 or only instructor approval.

BME 470 Microcomputer Applications in Bioengineering. (4)

spring

Use of microcomputers for real-time data collection, analysis, and control of experiments involving actual and simulated physiological systems. Lecture, lab. Prerequisites: ECE 100, 334. Prerequisite with a grade of "C" or higher: BME 435.

BME 511 Biomedical Engineering I. (3)*once a year*

Diagnostic and prosthetic methods using engineering methodology. Transport, metabolic, and autoregulatory processes in the body.

BME 512 Biomedical Engineering II. (3)*once a year*

Electrophysiology and nerve pacing applications, introduction to biomechanics and joint/limb replacement, technology, cardiovascular and pulmonary fluid mechanics, and mathematical modeling.

BME 513 Biomedical Instrumentation. (3)*fall*

Principles of medical instrumentation. Studies of medical diagnostic instruments and techniques for the measurement of physiologic variables in living systems.

BME 514 Advanced Biomedical Instrumentation. (3)*not regularly offered*

Principles of applied biophysical measurements using bioelectric and radiological approach. Prerequisites: ECE 334; MAT 274 (or its equivalent).

BME 515 Biomedical Transport Processes. (3)*not regularly offered*

Principles of momentum, heat, and mass transport with applications to medical and biological systems and medical device design. Prerequisite: instructor approval.

BME 516 Topics in Biomechanics. (3)*fall*

Mechanical properties of bone, muscle, and soft tissue. Static and dynamic analysis of human movement tasks, including in-depth project. Prerequisite: instructor approval.

BME 518 Introduction to Biomaterials. (3)*spring*

Topics include structure property relationships for synthetic and natural biomaterials, biocompatibility, and uses of materials to replace body parts. Prerequisite: ECE 350 (or its equivalent) or instructor approval.

BME 519 Topics in Biocontrol Systems. (3)*fall*

Linear and nonlinear control systems analysis of neuromusculoskeletal, cardiovascular, thermal, and mass transfer systems of the body, including in-depth project. Prerequisites: both ECE 201 and MAT 274 or only instructor approval.

BME 520 Bioelectric Phenomena. (3)*not regularly offered*

Study of the origin, propagation, and interactions of bioelectricity in living things; volume conductor problem, mathematical analysis of bioelectric interactions, and uses in medical diagnostics.

BME 521 Neuromuscular Control Systems. (3)*spring*

Overview of sensorimotor brain structures. Application of nonlinear, adaptive, optimal, and supervisory control theory to eye-head-hand coordination and locomotion.

BME 522 Biosensor Design and Application. (3)*once a year*

Theory and principles of biosensor design and application in medicine and biology. Principles of measurements with biosensors. Prerequisite: instructor approval.

BME 523 Physiological Instrumentation Lab. (1)*fall*

Laboratory experience with problems, concepts, and techniques of biomedical instrumentation in static and dynamic environments. Lab. Prerequisites: BME 435; ECE 334. Pre- or corequisite: BME 513.

BME 524 Fundamentals of Applied Neural Control. (3)*once a year*

Fundamental concepts of electrical stimulation and recording in the nervous system with the goal of functional control restoration. Pre- or corequisite: BME 435 or instructor approval.

BME 525 Surgical Techniques. (2)*spring*

Principles of surgical techniques, standard operative procedures, federal regulations, guidelines, and state-of-the-art methods. Lecture, lab.

BME 532 Prosthetic and Rehabilitation Engineering. (3)*once a year*

Analysis and critical assessment of design and control strategies for state-of-the-art medical devices used in rehabilitation engineering. Pre- or corequisite: BME 416 or 516 or EPE 610.

BME 533 Transport Processes I. (3)*fall*

Unified treatment of momentum, heat, and mass transfer from molecular theory, and continuum points of view. Continuum equations of microscopic and macroscopic systems and multicomponent and multiphase systems. Cross-listed as CHE 533. Credit is allowed for only BME 533 or CHE 533.

BME 534 Transport Processes II. (3)*spring*

Continuation of BME 533 or CHE 533, emphasizing mass transfer. Cross-listed as CHE 534. Credit is allowed for only BME 534 or CHE 534. Prerequisite: BME 533 or CHE 533.

BME 543 Thermodynamics of Chemical Systems. (3)*fall*

Classical and statistical thermodynamics of nonideal physicochemical systems and processes; prediction of optimum operating conditions. Cross-listed as CHE 543. Credit is allowed for only BME 543 or CHE 543.

BME 544 Chemical Reactor Engineering. (3)*spring*

Reaction rates, thermodynamics, and transport principles applied to the design and operation of chemical reactors. Cross-listed as CHE 544. Credit is allowed for only BME 544 or CHE 544. Prerequisite: BME 543 or CHE 543.

BME 551 Movement Biomechanics. (3)*spring*

Mechanics applied to the analysis and modeling of physiological movements. Computational modeling of muscles, tendons, joints, and the skeletal system with application to sports and rehabilitation. Prerequisite: BME 416 or 516 or instructor approval.

BME 566 Medical Imaging Instrumentation. (3)*not regularly offered*

Design and analysis of imaging systems and nuclear devices for medical diagnosis, therapy, and research. Laboratory experiments using diagnostic radiology, fluoroscopy, ultrasound, and CAT scanning. Lecture, lab. Prerequisite: instructor approval.

BME 568 Medical Imaging. (3)*not regularly offered*

CT, SPECT, PET, and MRI. 3-dimensional *in vivo* measurements. Instrument design, physiological modeling, clinical protocols, reconstruction algorithms, and quantitation issues. Prerequisite: instructor approval.

BME 593 Applied Project. (1–12)*not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Biology

Master's and Doctoral Programs

James P. Collins

Chair

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DAVIDSON, PEARSON

ASSISTANT RESEARCH PROFESSOR

WILSON-RAWLS

ACADEMIC PROFESSIONAL

DOUGLAS

The faculty in the Department of Biology offer programs leading to the M.S. and Ph.D. degrees in Biology. A concentration in ecology is available, among other areas of study.

The faculty collaborate with the Departments of Microbiology and Plant Biology in offering the program leading to the Master of Natural Science degree when one of the concentrations is biology (see "Natural Science," page 278).

Students admitted to the Master of Education degree program with a major in Secondary Education may also elect biology as the subject matter field.

These programs are designed to prepare students for careers in teaching and research in educational, medical, industrial, and governmental institutions.

Graduate Record Examination. Submission of scores on the verbal, quantitative, analytical, and advanced sections of the Graduate Record Examination is required for admission to the M.S. and Ph.D. degree programs.

Application Deadline. Completed college and departmental application materials should be received by December 15 for admission in the fall semester.

MASTER OF SCIENCE

The program of each student is prepared in consultation with the supervisory committee, consisting of a major professor and two additional faculty members. A minimum of 30 semester hours is required. The program must include six hours of thesis, one hour of seminar, and may include a maximum of eight additional hours in various special graduate courses such as research and reading and conference. A final oral examination covering the thesis and related subject matter is administered by the supervisory committee.

DOCTOR OF PHILOSOPHY

The Ph.D. program in the Department of Biology allows the student to acquire high research competency in one or more specialized areas while receiving a broad, solid grounding in biological sciences.

See "Doctor of Philosophy," page 103, for general requirements.

Program of Study. The program of study is planned by the student and the supervisory committee, consisting of a major professor and four additional faculty members. The program is tailored to the needs of the individual student.

Foreign Language Requirements. None are required by the department. However, each student's supervisory committee may specify a reading proficiency in one or more foreign languages if appropriate to the student's educational objectives.

Comprehensive Examinations. The comprehensive examination consists of a written and oral component. To advance to candidacy for the Ph.D., the student must successfully complete three graduate seminars in areas different from the major area of emphasis; one of these must be a two-semester-hour writing seminar completed by the end of the third semester (see topics outlines under "Research Activity"). The seminars include evaluation of synthetic writing skills. A synthetic, detailed research proposal must be completed by the fourth semester. The student must defend the proposal orally to the supervisory committee within three weeks after successful completion of the written research proposal.

Dissertation Requirements. A dissertation based on original research is required. (See "Doctoral Dissertations," page 102.)

Final Examinations. A final defense of the dissertation is required. (See "Open Dissertation Defenses," page 102.)

FACILITIES

The modern Life Science Center houses well-equipped research laboratories and teaching facilities. The W. M. Keck Bioimaging Laboratory includes a laser-equipped scanning confocal microscope and an LFO high resolution scanning electronic microscope. The Life Sciences Electron Microscopy Laboratory includes both scanning and transmission electron microscopes as well as a freeze-fracture unit. Housing of laboratory animals and maintenance of breeding colonies are provided by the Animal Research Center. Arizona fauna is well represented in departmental collections. Desert, montane, riparian, and lacustrine habitats are within driving distance; species diversity is high.

RESEARCH ACTIVITY

Research of faculty and graduate students includes a wide range of biological topics. Current research interests within the department include these topics.

Behavior. Reproductive behavior; sexual selection; communication; neural and hormonal mechanisms of behavior; behavioral ecology; behavioral genetics.

Biology Education. Student reasoning patterns and alternative conceptual frameworks; the nature of scientific reasoning; learning styles, instructional techniques, and issues in curriculum development.

Cell and Molecular Biology. Cytoskeleton assembly; localization of RNA in oocytes and embryos; regulation of exocytosis and endocytosis; cell-division; cell-cell interaction; recombinant DNA; gene mapping; regulation of gene expression in eukaryotes; mechanisms of interferon action; signal transduction; confocal and electron microscopy; cellular bases of vertebrate photoperiodic responses.

Computational, Statistical, and Mathematical Biology. Functional genomics; population and statistical genetics; genome computing; computational molecular evolution; population and community ecology, including extinction risk, spatial dynamics, and the evolution and assembly of communities; spatial modeling of species richness; environmental monitoring and assessment; environmental statistics.

Conservation Biology. Conservation genetics; fragmentation effects; extinction dynamics; patterns and consequences of rarity; design and operation of reserves; urban

ecology; conserving desert fishes and aquatic habitats; desert to rain-forest biodiversity; international dimensions; sustainable development.

Developmental Biology. Cell and organ differentiation; regulation; development of synapses; developmental genetics; control of oogenesis; in vitro fertilization; regulation of pattern formation; myogenesis; morphogens; intercellular signaling pathways.

Ecology. Life histories, dispersal, and foraging; plant-animal interactions; community structure; biogeography; physiological ecology; ecosystems structure and functioning; wildlife fisheries management. Research in terrestrial and aquatic desert habitats reflects the unique location of ASU, metapopulation dynamics.

Evolution. Population genetics, molecular evolution, systematics, speciation, evolution of behavior, morphological diversification.

Genetics. Molecular and developmental genetics; genetic regulatory mechanisms of cellular differentiation; behavioral genetics; variation in natural populations; molecular evolutionary genetics; functional genomics.

History and Philosophy of Biology. The nature of biological science and the way science changes; who does biology and why; what assumptions biologists make and how they influence the research done; questions about funding, institutions, and the social context for biology; history of ideas about the origin of life; how scientists decide what kinds of ideas are believable about nature and which ones are unbelievable; how the relationship between science and religion has changed over the centuries.

Neuroscience. Behavioral neuroendocrinology; invertebrate and vertebrate neurobiology; control of locomotion; actions of stress on the brain; mechanisms of hormone action in the brain; action of neuropeptides, neural basis of behavior; neuroanatomical correlates of behavior; hormonal control of neural plasticity.

Physiology. Membrane metabolism and function, thermal adaptation, regulation, and ion transport; tissue, epithelial, and cuticular function; comparative and reproductive endocrinology; neurophysiology; environmental physiology especially related to desert adaptations; parasites and reproduction; comparative biochemistry; the physiology of temperature; environmental regulation of gene expression; renal and respiratory physiology; energetics and physiology of flight.

BIOLOGY (BIO)

BIO 406 Computer Applications in Biology. (3)

fall

Computer analysis techniques in biology emphasizing data entry, management and analysis, and graphic portrayal. Employs mainframe and microcomputers. 2 hours lecture, 3 hours lab. Cross-listed as PLB 432. Credit is allowed for only BIO 406 or PLB 432. Prerequisites: both BIO 182 and MAT 117 (or 210) or only instructor approval.

General Studies: CS

BIO 410 Techniques in Wildlife Conservation Biology. (3)

fall

Field and analytical techniques used in evaluating population structure, viability and environmental impacts. Lecture, lab. Fee. Prerequisites: both BIO 317 and 320 or only instructor approval.

General Studies: L

BIO 411 Advanced Conservation Biology I. (3)

fall

Principles of conservation science, biology of threatened species, management principles that meet conservation goals, emphasizing North American ecosystems. Prerequisites: BIO 317, 320.

BIO 412 Advanced Conservation Biology II. (3)

spring

Global biodiversity patterns, processes, and conservation; global environmental change; sustainable use of natural resources; emphasizing international approaches to conservation biology. Prerequisites: BIO 317, 320.

BIO 415 Biometry. (4)

fall

Statistical methods applied to biological problems, design of experiments, estimation, significance, analysis of variance, regression, correlation, chi square, and bioassay; the use of computers. Does not satisfy laboratory requirements for the College of Liberal Arts and Sciences' General Studies program. 3 hours lecture, 3 hours lab. Prerequisite: MAT 210 (or its equivalent).

General Studies: CS

BIO 416 Professional Values in Science. (3)

once a year

Considers issues related to values in science such as collaboration, finances, legal issues, media, mentoring, ownership of ideas, scientific integrity. Discussion, student projects. Cross-listed as HPS 410. Credit is allowed for only BIO 416 or HPS 410.

General Studies: L

BIO 423 Population and Community Ecology. (3)

not regularly offered

Organization and dynamics of population and communities, emphasizing animals. Theoretical and empirical approaches. Prerequisite: BIO 320 or instructor approval.

BIO 424 Mathematical Models in Ecology. (4)

not regularly offered

Mathematical modeling of populations, communities, and ecosystems, including case studies and student-designed projects. 3 hours lecture, 3 hours lab. Prerequisites: BIO 320; any calculus course.

BIO 425 Animal Ecology. (3)

not regularly offered

Physiological and behavioral adaptations of individual animals to both abiotic and biotic environments. Prerequisite: BIO 320.

BIO 426 Limnology. (4)

not regularly offered

Structure and function of aquatic ecosystems, with emphasis on freshwater lakes and streams. 3 hours lecture, 3 hours lab or field trip. Fee. Prerequisite: BIO 320 or instructor approval.

General Studies: L

BIO 428 Biogeography. (3)

fall

Environmental and historical processes determining distributional patterns of animals and plants, emphasizing terrestrial life. Prerequisites: BIO 182 (or its equivalent); junior standing.

General Studies: L

BIO 435 Research Techniques in Animal Behavior. (3)

not regularly offered

Experimental and field studies of animal behavior; description and quantification of animal behavior and interpretation of behavior within an evolutionary framework. 1 hour lecture, 6 hours lab. Prerequisite: BIO 331.

General Studies: L

BIO 441 Cytogenetics. (3)

not regularly offered

Chromosomal basis of inheritance. Cross-listed as PLB 412. Credit is allowed for only BIO 441 or PLB 412. Prerequisite: BIO 340.

BIO 442 Cytogenetics Laboratory. (2)

not regularly offered

Microscopic analysis of meiosis, mitosis, and aberrant cell division. 6 hours lab. Cross-listed as PLB 413. Credit is allowed for only BIO 442 or PLB 413. Pre- or corequisite: BIO 441 or PLB 412.

BIO 446 Principles of Human Genetics. (3)

once a year

Molecular and cellular analysis of the human genome. Prerequisite: BIO 340.

General Studies: L

BIO 450 Advanced Developmental Biology. (3)*spring*

Current concepts and experimental methods involving differentiation and biosynthetic activities of cells and organisms, with examples from microorganisms, plants, and animals. Prerequisite: BIO 351.

BIO 453 Animal Histology. (4)*spring*

Microscopic study of animal tissues. 3 hours lecture, 3 hours lab. Fee. Prerequisite: BIO 182 or instructor approval.

BIO 454 Aquatic Insects. (3)*not regularly offered*

Systematics and ecology of aquatic insects. Prerequisite: BIO 386.

BIO 464 Photobiology. (3)*not regularly offered*

Principles underlying the effects of light on growth, development, and behavior of plants, animals, and microorganisms. Cross-listed as PLB 440. Credit is allowed for only BIO 464 or PLB 440. Prerequisites: CHM 231 (or 331); 12 hours in life sciences.

BIO 465 Neurophysiology. (3)*spring in even years*

Detailed treatment of cellular and organismal neurophysiology and nervous system function. Prerequisite: BIO 360.

BIO 466 Neurophysiology Laboratory. (2)*not regularly offered*

Intracellular and extracellular electrophysiological recording techniques, histological preparations, and dye-filling techniques. 6 hours lab. Pre- or corequisite: BIO 465.

BIO 470 Systematic Zoology. (4)*spring in odd years*

Philosophy, theory, practice of interpreting animal diversity, including species concepts speciation, nomenclature, and evolutionary and phylogenetic classification emphasizing phylogenetics. 3 hours lecture, 3 hours lab. Prerequisites: junior standing; 18 hours in life sciences.

*General Studies: L***BIO 471 Ornithology. (3)***spring in odd years*

Biology of birds. 2 hours lecture, 3 hours lab, weekend field trips. Fee. Prerequisite: BIO 370 or instructor approval.

BIO 472 Mammalogy. (4)*fall in odd years*

Classification, structure, habits, ecology, and distribution of mammals, emphasizing North American forms. 3 hours lecture, 3 hours lab or field trip, weekend field trips. Fee. Prerequisite: BIO 370 or instructor approval.

BIO 473 Ichthyology. (3)*spring in odd years*

Systematics and biology of recent and extinct fishes. 2 hours lecture, 3 hours lab or field trip, weekend field trips required. Fee. Prerequisites: both BIO 370 and 425 or only instructor approval.

BIO 474 Herpetology. (3)*spring in even years*

Systematics and biology of recent and extinct reptiles and amphibians. 2 hours lecture, 3 hours lab or field trip. Fee. Prerequisite: BIO 370.

BIO 480 Methods of Teaching Biology. (3)*spring*

Methods of instruction, experimentation, organization, and presentation of appropriate content in biology. Prerequisite: 20 hours in the biological sciences.

BIO 495 Undergraduate Thesis. (3)*fall, spring, summer*

Guided research culminating in the preparation of an undergraduate thesis based on supervised research done in this and previous semesters. Prerequisites: at least 3 hours of BIO 310 (or 499); formal conference with instructor; instructor and department chair approval.

BIO 502 Transmission Electron Microscopy. (3)*not regularly offered*

Theory, use, and methods of preparing biological materials for transmission electron microscopy. Lecture, lab. Materials fee. Prerequisite: instructor approval.

BIO 505 Scanning Electron Microscopy. (3)*not regularly offered*

Theory, use, and methods of preparing biological materials for scanning electron microscopy. 2 hours lecture, 3 hours lab. Materials fee. Prerequisite: instructor approval.

BIO 508 Scientific Data Presentation. (2)*spring*

Techniques necessary for presentation of scientific data used in journal publications, grant proposals, and visual presentations. Lecture, lab. Prerequisite: instructor approval.

BIO 520 Biology of the Desert. (2)*not regularly offered*

Factors affecting plant and animal life in the desert regions and adaptations of the organisms to these factors. Prerequisite: 10 hours in biological sciences or instructor approval.

BIO 522 Populations: Evolutionary Ecology. (3)*not regularly offered*

Principles of population biology and community ecology within an evolutionary framework. 2 hours lecture, 2 hours recitation. Prerequisites: BIO 320, 415 (or MAT 210), 545.

BIO 524 Ecosystems. (3)*not regularly offered*

Structure and function of terrestrial and aquatic ecosystems, with emphasis on productivity, energetics, biogeochemical cycling, and systems integration. Prerequisite: BIO 320 (or its equivalent).

BIO 526 Quantitative Ecology. (3)*not regularly offered*

Sampling strategies, spatial pattern analysis, species diversity, classification, and applications of multivariate techniques to ecology. 2 hours lecture, 3 hours lab. Prerequisites: BIO 415 (or its equivalent); a course in ecology.

BIO 529 Advanced Limnology. (3)*not regularly offered*

Recent literature, developments, methods, and limnological theory; field and lab application to some particular topic in limnology. Prerequisite: BIO 426.

BIO 543 Molecular Genetics. (3)*fall*

Nature and function of the gene; emphasis on the molecular basis of inheritance and gene expression in prokaryotes and eukaryotes. Prerequisites: BIO 340; a course in organic chemistry.

BIO 545 Populations: Evolutionary Genetics. (3)*not regularly offered*

Mathematical models in the description and analysis of the genetics of populations. Prerequisites: a combination of BIO 320 and 345 and 415 or only instructor approval.

BIO 547 Techniques in Evolutionary Genetics. (4)*not regularly offered*

Practical experience in modern techniques for the study of evolution. Lecture, lab. Prerequisites: BIO 340, 345; instructor approval.

BIO 550 Advanced Cell Biology. (3)*spring*

Applications of contemporary electron microscopic and biochemical/molecular techniques for studying eukaryotic cell functions. Mechanisms of intracellular protein trafficking. Prerequisites: BIO 353 (or 360 or its equivalent or PLB 360); CHM 231 (or 331 or its equivalent).

BIO 551 Biomembranes. (3)*not regularly offered*

Structure and function of biological membranes, emphasizing synthesis, fluidity, exocytosis, endocytosis, and cell responses to hormones and neurotransmitters. Prerequisites: BIO 353 (or its equivalent); CHM 231 (or 331 or its equivalent).

BIO 552 Developmental Genetics. (3)*spring*

Genetic approaches to the analysis of development during the life cycle of eukaryotic organisms, and the role of genes in the unfolding of the differentiated phenotype. Prerequisite: BIO 340.

BIO 560 Comparative Physiology. (3)*not regularly offered*

Analysis of function in invertebrates and vertebrates, emphasizing evolutionary trends in physiological systems. Prerequisite: BIO 360 (or its equivalent).

BIO 566 Environmental Physiology. (3)*not regularly offered*

Physiological responses and adaptations of animals to various aspects of the physical environment. Prerequisites: BIO 320, 360.

BIO 568 Mammalian Physiology. (3)*not regularly offered*

Detailed treatment of mammalian organ system functions emphasizing integrative mechanisms. Prerequisite: BIO 360 (or its equivalent).

BIO 569 Cellular Physiology. (3)*not regularly offered*

Emphasizes the molecular basis for cell structure and function. Prerequisites: BIO 360; a course in organic chemistry.

BIO 583 OTS: Fieldwork in Tropical Biology. (6–8)*spring and summer*

Intensive field-orientated classes with Organization for Tropical Studies (OTS) in Costa Rica with emphasis on research in ecology and systematics. Lecture, lab, fieldwork. Cross-listed as PLB 583. Credit is allowed for only BIO 583 or PLB 583. Prerequisites: graduate standing; a course in basic ecology.

BIO 584 Internship. (1–12)*fall and spring***BIO 591 Seminar. (1–12)***fall and spring*

May be repeated for credit. Possible topics:

- (a) Adaptations. (1–3)
- (b) Behavior. (1–3)
- (c) Cell Biology. (1–3)
- (d) Ecology. (1–3)
- (e) Evolution. (1–3)
- (f) Genetic Engineering. (1–3)
- (g) Genetics. (1–3)
- (h) Physiology. (1–3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

MOLECULAR BIOSCIENCES/BIOTECHNOLOGY (MBB)**MBB 445 Techniques in Molecular Biology/Genetics. (2)***fall and spring*

Molecular genetic principles: plasmid construction, purification, and characterization; PCR; mutageneses; hybridization and sequence analysis; protein quantitation, immunologic detection, and electrophoresis. Cross-listed as MIC 445. Credit is allowed for only MBB 445 or MIC 445. Prerequisites: both BIO 340 and MIC 302 or only instructor approval.

MBB 446 Techniques in Molecular Biology/Genetics Lab. (2)*fall and spring*

Molecular genetic techniques; plasmid construction, purification, and characterization; PCR; mutageneses; hybridization and sequence analysis; protein quantitation; immunologic detection and electrophoresis. Cross-listed as MIC 446. Credit is allowed for only MBB 446 or MIC 446. Pre- or corequisite: MBB 445 or MIC 445.

MBB 484 Internship. (3)*not regularly offered***MBB 490 Capstone: Issues in Biotechnology. (2)***fall and spring*

Integration of science and humanities within problem-solving exercises dealing with intellectual property, ethics, regulatory issues, business practices, and commercialization. Prerequisite: Molecular Biosciences/Biotechnology major or instructor approval.

MBB 499 Individualized Instruction. (3)*not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Building Design

See “Master of Science in Building Design,” page 118.

Business Administration

Master's and Doctoral Programs**Department of Finance****Herbert M. Kaufman***Chair***(BAC 519) 480/965-3131**

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Department of Management**William H. Glick***Chair***(BA 323) 480/965-7586**

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Department of Supply Chain Management**Joseph R. Carter***Chair***(BA 318) 480/965-6044**

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Finance

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Associate Professors: Cesta, Gallinger, Hertz, Hoffmeister;
Assistant Professors: Griffin, Nardari, Perry

Management

Professors: Ashforth, Bohlander, Cardy, Dooley, Glick,
Gomez-Mejia, Hershauer, Hom, Kinicki, Kulik, Ostroff,
Penley, V. Smith-Daniels;
Associate Professors: Boyd, Brenenstuh, Callarman, Choi,
Cook, Keats, Keller, Moorhead, Olivas, Roberson,
D. Smith-Daniels, Van Hook;
Assistant Professors: Blancero, Koka,
Lane, Rungtusanatham;
Senior Lecturer: Kreitner;
Lecturers: Davila, Sack

Marketing

Professors: Bitner, Brown, Hutt, Jackson, Kumar, Lastovicka,
Mokwa, L. Ostrom, Reingen, Schlacter, Ward;
Associate Professors: Blasko, Nowlis, Sinha,
Stephens, Walker;
Assistant Professors: A. Ostrom, Roundtree

Supply Chain Management

Professors: J. Carter, P. Carter, Ellram, Guntermann, Hendrick, Jennings, Kirkwood, Pearson, Smeltzer;
Associate Professors: Aranda, Bohlman, Brooks, Butler, Choi, Davis, Dundas, Keefer, Leonard, Lock, Lynch, Maltz, Murranka, Siferd, Verdini;
Assistant Professor: Amundson;
Senior Lecturer: Flynn

The faculty in the College of Business offer a Ph.D. degree in Business Administration and a Master of Business Administration (M.B.A.) degree offered in day (full-time), evening, and executive programs.

Other professional master's degrees offered through the College of Business are described in this catalog under their respective degree program headings.

ASU West also offers a Master of Business Administration (M.B.A.) degree. For more information about the ASU West program, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

MASTER OF BUSINESS ADMINISTRATION

The central theme of the program is to build and strengthen capabilities in knowledge and analysis of the functional areas of business, basic skills, and managerial abilities. Knowledge involves textbook and case materials. Basic skills include computing, writing and critical thinking, presentation and speaking, team and group work, interpersonal relations, and time management. There is a strong team emphasis throughout the ASU curriculum.

The M.B.A. program is supported by each of the seven academic units within the College of Business.

Admission. See "Admission to the Graduate College," page 92. All students applying to graduate business administration programs (except those applying to the M.S. degree in Economics) are required to take the GMAT. The TOEFL is required of all international applicants whose native language is not English or who are not graduates of an institution located in the United States. The TSE is not required for admission to the ASU M.B.A. program. However, it may be required for a dual degree program. For more information on testing, call 609/771-7330 or write

EDUCATIONAL TESTING SERVICE
PO BOX CN 6103
PRINCETON NJ 08541-6103

Students applying to the M.B.A. program are required to have at least two years of full-time work experience and to submit a statement of personal objectives for the degree program addressing commitment, goals, qualifications, and reasons for interest in the program. Applicants are to provide letters of recommendation commenting on the student's motivation, commitment, achievements, work experience, and opportunity for success in the program. In addition to the above data, students are to communicate their interest for either the day, evening, or executive program.

Registration. Registration in courses numbered 502 and above is limited to students who have been admitted to a graduate degree program, have the approval of the M.B.A. program office, and have the prerequisites of calculus and computer literacy.

Structure of the M.B.A. Program. M.B.A. courses are open only to students admitted to the M.B.A. program.

Program Requirements. While there are no business course prerequisites, applicants must have computer proficiency and expertise in using a spreadsheet package, a word processing package, a presentation software package, an e-mail package, and an Internet browser. Potential students must also demonstrate strong quantitative ability. This is accomplished through an above average performance (65th percentile or above) on the GMAT quantitative section or a college math course in calculus or advanced statistics.

At least 48 hours are required to complete the evening and executive programs. The day program has additional requirements that vary by area of study. Students are admitted to the fall semester only and, generally, enter and graduate as a class in two years.

The core courses are designed to provide a foundation in business knowledge and skills and must be taken in the prescribed sequence.

Elective courses build upon the business core and focus on the further development of an area of study.

The College of Business does not accept credits earned while students are in nondegree status; moreover, graduate business courses are not open to nondegree students.

Foreign Language Requirements. None.

Thesis Requirements. None.

Comprehensive Examinations. All students must successfully complete the comprehensive requirement established by the College of Business and Graduate College for the M.B.A. degree. The comprehensive exam is integrated with MGT 589 Strategic Management. Students passing this course with a grade of "A" or "B" satisfy the comprehensive exam requirement.

Dual/Concurrent Degree Programs. See "Dual/Concurrent Degree Programs," page 62.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Business Administration prepares candidates for scholarly careers at leading educational institutions and for positions in business and government organizations where advanced research and analytical capabilities are required. Major emphasis is placed upon the development of expertise in a chosen subject area, a disciplined and inquiring mind, competence in research methodology, and skill in effectively communicating advanced business concepts.

Students are encouraged to work closely with the faculty from the beginning of their programs. A ratio of resident doctoral students to faculty of less than one to one ensures that faculty may serve effectively as mentors for doctoral students.

Admission. A completed application for admission to the Ph.D. in Business Administration degree program includes

1. application for admission to the Graduate College,
2. undergraduate and postgraduate transcripts,
3. Graduate Management Admission Test score or scores from the Graduate Record Examination,

4. applicant's letter of personal career objectives and rationale for pursuing the Ph.D. program,
5. three letters of recommendation,
6. Test of Spoken English score for applicants whose native language is not English, and
7. Test of English as a Foreign Language score for applicants whose native language is not English and who have not completed a degree from a U.S. college or university.

Admission is granted for fall semesters only. The deadline for receipt of all required application materials is February 1.

Areas of Concentration. The Ph.D. student may choose from among six areas of concentration: accountancy, finance, computer information systems, management, marketing, and supply chain management. The accountancy specialization area includes financial accounting, managerial accounting, tax policy, auditing, and information systems. Research activities in information management encompass areas of theory and application in computer information systems. Research interests of the finance faculty offering the finance concentration focus on corporate finance, investments, financial markets, and banking. The management concentration requires three core courses: organizational theory, organizational behavior, and research methodology. In addition to these core courses, students choose one of two specialty tracks: strategic management or human resource management. Research conducted by the marketing faculty offering the marketing concentration is focused in several areas: advertising, buyer behavior, distribution channels, services marketing, and other dimensions of marketing, including sales management, industrial marketing, and public-policy implications of marketing. The faculty in the Department of Supply Chain management offer the supply chain management concentration and are actively involved in the input-conversion-output process.

Program of Study. See "Doctor of Philosophy," page 103, for general requirements. The Ph.D. degree program requires mathematical competence through linear algebra and calculus and computer skills. The program of study includes graduate study in economics, behavioral sciences, and quantitative/statistical analysis. The advanced program is composed of an area of concentration and supporting course work that best prepares students for conducting scholarly work in their areas of interest.

Comprehensive Examinations. A written comprehensive examination, designed to ascertain the candidate's knowledge and orientation in the major field of study and fitness to proceed to the completion of a dissertation, is required at the end of course work. An additional written comprehensive examination on a candidate's supporting course work is a departmental option. An oral examination after completion of written examinations is also a departmental option.

Dissertation Requirements. The candidate must present an acceptable dissertation based on original investigation. The dissertation must represent a significant contribution to knowledge, be written in a scholarly manner, and demonstrate the ability of the candidate to do independent research of high quality.

Final Examinations. A final oral examination in defense of the dissertation is required. The examination covers the subject matter of the dissertation and the field most nearly corresponding with that of the dissertation.

Department of Finance

FINANCE (FIN)

FIN 502 Managerial Finance. (3)

once a year

Theory and practice of financial decision making, including risk analysis, valuation, capital budgeting, cost of capital, and working capital management. Prerequisites: ACC 502; ECN 502; QBA 502.

FIN 521 Investment Management. (3)

once a year

Valuation of equities, fixed incomes, and options/financial futures in an individual security and portfolio context; mathematical asset allocation approaches. Lecture, discussion. Prerequisite: FIN 502.

FIN 527 Derivative Financial Securities. (3)

once a year

Analysis of forwards, futures, and option contracts on bonds, commodities, equities, and foreign exchange. Design of speculative and hedging strategies. Lecture, discussion. Prerequisites: FIN 502, 521.

FIN 531 Capital Markets and Institutions. (3)

once a year

Recent theoretical and operational developments in economic sectors affecting capital markets and institutions. Lecture, discussion. Prerequisite: FIN 502.

FIN 551 Financial Statement Analysis. (3)

once a year

Analysis of corporations' financial statements to ascertain their financial strength and default risk. Emphasis on studying cash flows. Lecture, cases. Prerequisites: ACC 502; FIN 502.

FIN 556 International Financial Management. (3)

once a year

Behavior of real and nominal currency exchange rates, management of international investment portfolios, corporate exchange exposure, and hedging exchange risk. Lecture, discussion. Prerequisite: FIN 502.

FIN 561 Financial Management Cases. (3)

once a year

Case-oriented course in applications of finance theory to management issues. Acquisition, allocation, and management of funds within the business enterprise. Working capital management, capital budgeting, capital structure, and financial strategy. Lecture, discussion, presentation. Prerequisite: FIN 502.

FIN 581 Applied Corporate Finance. (3)

once a year

Applies theories in corporate finance. Market efficiency, capital structure, "principal-agent" theory, corporate control, dividend policy, and capital budgeting. Prerequisite: FIN 502.

FIN 781 Theory of Finance. (3)

once a year

Fundamental tools of financial economics; asset pricing, arbitrage, option pricing, capital structure, dividend policy, asymmetric information, and transaction-cost economics. Prerequisites: FIN 502, 521, 531.

FIN 791 Doctoral Seminar in Finance. (1-12)

once a year

Possible topics:

- (a) Financial Institutions and Markets. (3)
Economic and monetary theory applied to financial markets and institutions; implications of financial structure for market performance and efficiency.
- (b) Financial Management. (3)
Financial theory pertaining to capital structure, dividend policy, valuation, cost of capital, and capital budgeting.
- (c) Investments. (3)
Investments and market theory; efficient markets hypothesis; option and commodity markets.

Prerequisite: FIN 781.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Department of Management

MASTER'S DEGREE PROGRAM

The faculty in the Department of Management participate in offering the High Technology M.B.A., Executive M.B.A., Evening M.B.A., and Day M.B.A. programs. These programs are administered by the College of Business. For more information see "College of Business," page 61. Areas of study offered to high technology, evening, and executive M.B.A. students include process management in high technology organizations; globalization and diversity management; entrepreneurship and small business development; and management consulting.

PH.D. DEGREE PROGRAM

The faculty in the department offer students the opportunity to obtain a Ph.D. degree in Business Administration with a concentration in management. The doctoral program places primary emphasis on the development of research competence and emphasizes teaching as a vehicle to academic professionalism. The mission of the program is to provide an environment that is conducive to the development of scholars who are prepared to assume the diverse responsibilities of positions at leading research universities. The goal is to prepare students for research careers in the academic community.

Doctoral students are encouraged to design an individually meaningful course of study within the larger context of the management field. Opportunities for doing this are available through course work, individual work with faculty members, and independent research and study. Students in the Ph.D. program select a series of Ph.D. course modules within the department and several supporting courses from other departments on campus. Students develop additional focus and expertise through collaboration on major papers with individual faculty members.

The faculty in the Department of Management cover the areas of human resource management, management science, operations management, organizational behavior, organizational theory, and strategic management. The faculty's research and teaching emphasizes high tech management, quality, process and project management, decision analysis, globalization, diversity, small business and entrepreneurship, change management, stress, job loss, organizational identity, corporate governance, and human resource management practices. The faculty has distinguished itself with research and publications in premier journals. The department ranks 12th internationally for its rate of publication in premier academic journals. The department also ranks sixth internationally in premier journal articles that impact practice in operations and management science.

Further information, links to courses, current faculty, and updates on the Department of Management areas of study for the M.B.A. programs can be found on the Web at www.cob.asu.edu/mgt.

General information on the M.B.A. programs can be found at www.cob.asu.edu/mba.

Further information, application procedures, links to current faculty, and updates on the Ph.D. program in Business with a concentration in management can be found at www.cob.asu.edu/mgt/degree/PhDMainPg.htm.

MANAGEMENT (MGT)

MGT 413 Compensation Management. (3)

fall and spring

Establishing base and incentive pay with job analysis, job evaluation, and wage surveys; performance appraisal; conformance to compensation laws. Prerequisites: MGT 311; professional program business student.

MGT 422 Training and Development. (3)

fall and spring

Learning theory, orientation and basic-level training, management development, resource materials and methods. Prerequisites: MGT 311; professional program business student.

MGT 423 Employee-Management Relations. (3)

fall and spring

Employment relationship in union/nonunion setting. Employee-management rights/responsibilities, complaint administration, negotiations, union structure, and mock government negotiations.

MGT 424 Employee Selection and Appraisal. (3)

fall and spring

Concepts and methods of personnel selection and performance appraisal. Includes job analysis, measurement, and legal issues. Emphasizes experiential exercises. Prerequisite: MGT 311.

MGT 433 Management Decision Analysis. (3)

fall and spring

Decision-making concepts and methods in the private and public sectors and their application to organizational problems. Understanding of individual and group decision making. Prerequisites: MGT 301; professional program business student.

MGT 434 Social Responsibility of Management. (3)

fall, spring, summer

Relationship of business to the social system and its environment. Criteria for appraising management decisions. Managers as change agents. Prerequisites: MGT 301; professional program business student.

MGT 440 Small Business and Entrepreneurship. (3)

fall, spring, summer

Opportunities, risks, and problems associated with small business development and operation.

MGT 445 Business Plan Development. (3)

fall and spring

Develops a complete strategic business plan emphasizing the planning process undertaken by successful small business owners and entrepreneurs. Lecture, discussion, experiential exercise. Prerequisite: MGT 440.

MGT 459 International Management. (3)

fall, spring, summer

Concepts and practices of multinational and foreign firms. Objectives, strategies, policies, and organizational structures for operating in various environments. Credit is allowed for only MGT 459 or IBS 494 ST: International Management or IBS 494 ST: Multinational Management. Prerequisite: IBS 300 or MGT 301.

MGT 463 Strategic Management. (3)

fall, spring, summer

Strategic formulation and administration of the total organization, including integrative analysis and strategic planning. To be taken last semester of senior year. Prerequisites: completion of 108 hours, including all other business administration core requirements; professional program business student.

General Studies: L

MGT 468 Management Systems. (3)

fall and spring

Systems theory and practice applied to organization process and research. Organizations seen as open systems interacting with changing environments. Prerequisite: MGT 301.

MGT 480 Team Management Skills. (3)

fall and spring

Cooperative education class teaching team skills in active listening, conflict resolution, decision making, effective meetings, norming, and team roles. Cooperative learning.

MGT 484 Internship. (3)

fall, spring, summer

Nonmajor elective credit only.

MGT 494 Special Topics. (1–4)*not regularly offered*

Current topics in management, primarily designed for business majors. See the *Schedule of Classes* for current offerings. Possible topics:

- (a) Applied International Management. (3)
 - (b) Cultural Factors in International Business. (3)
- Prerequisite: IBS 300 or MGT 301 or IBS 494 or MGT 459.

MGT 502 Organization Theory and Behavior. (3)*once a year*

Important concepts and applications in management, including communication, decision making, group dynamics, leadership, motivation, organization change, and organization design. Prerequisites: computer literacy; graduate degree program student.

MGT 522 Human Resource Activity and the Management of Diversity. (3)*once a year*

Applies general and human resource management principles to work effectively with a diverse spectrum of people. Discussion, exercises. Prerequisite: M.B.A. degree program student.

MGT 523 Managing People for Service Advantage. (3)*once a year*

Covers HRM practices that are conducive to building and maintaining internal customer equity and maximizing external customer service. Discussion, lecture, class exercises, cases. Prerequisite: M.B.A. degree program student.

MGT 559 International Management. (2–3)*once a year*

Studies international and cross-cultural influences on management processes and development of global leadership capabilities for experienced management professionals. Discussion, company analyses, case analyses, lecture, guest speakers. Prerequisite: M.B.A. degree program student.

MGT 561 Advanced Integrated Project. (2–3)*once a year*

Capstone project of the high-technology ASU M.B.A. Student teams develop business plans for new technology-based products. Online project. Prerequisite: M.B.A. degree program student.

MGT 570 Management Consulting. (3)*once a year*

Develops understanding of how internal and external consultants add value. Prerequisites: ability to use common business software, including Microsoft Office; familiarity with spreadsheets.

MGT 589 Strategic Management. (3–4)*spring*

Formulation of strategy and policy in the organization, emphasizing the integration of decisions in the functional areas. Prerequisite: M.B.A. degree program student.

MGT 591 Seminar. (1–12)*not regularly offered*

Possible topics:

- (a) Business Plan Competition. (3)
- (b) Entrepreneurship. (3)
- (c) Human Resource Activity and the Management of Diversity. (3)
- (d) Human Resource Management and Service Delivery. (3)
- (e) Human Resources and High-Technology Management. (3)
- (f) International Management. (3)
- (g) Management Consulting. (3)
- (h) Organizational Change and Business Process Consulting. (3)

MGT 593 Applied Projects. (3)*once a year*

Cross-functional teams initiate (possibly implement) organizational change within a local firm. Lecture, discussion, experiential learning. Pre- or corequisite: all core courses in the M.B.A. program.

MGT 598 Special Topics. (3)*not regularly offered*

Graduate special topics chosen from human resources, strategic management, and international management, including special topics in international management in Asia or Europe. Prerequisite: instructor approval.

MGT 791 Seminar: Doctoral Seminar in Management. (1–12)*once a year*

Short module seminars. Possible topics:

- (a) Causal Modeling. (1)
- (b) Change and Coping. (1)
- (c) Cognition: Micro and Macro Perspectives. (1)
- (d) Dysfunction in Workplace. (1)
- (e) Economic Theories of the Firm. (1)
- (f) Levels of Analysis. (1)
- (g) Motivation and Attitudes. (1)
- (h) Organizational Identity and Identification. (1)
- (i) Organizational Learning and Organizational Identity. (1)
- (j) Organizational Performance and Reward Systems. (1)
- (k) Organizational Strategy and Culture. (1)
- (l) Organizational Structure, Technology, and Information Systems. (1)
- (m) Organizational Withdrawal. (1)
- (n) Performance Appraisal. (1)
- (o) Power and Organizational Change. (1)
- (p) Selection. (1)
- (q) Strategy Overview. (1)
- (r) Teams, Groups, and Leadership. (1)
- (s) The Craft of Research. (1)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

QUANTITATIVE BUSINESS ANALYSIS (QBA)**Department of Management****QBA 505 Management Science. (3)***not regularly offered*

Quantitative approaches to decision making, including linear programming and simulation, with emphasis on business applications. Prerequisites: MAT 210; QBA 502.

QBA 508 Product and Service Innovation. (3)*fall and spring*

Develops strategies for innovation in products and services. Prerequisites: basic algebra; basic probability concepts; elementary knowledge of Windows.

QBA 550 Intermediate Decision Analysis. (3)*not regularly offered*

Quantitative decision analysis methods for business decision making under uncertainty, including decision diagrams, subjective probabilities, and preference assessment. Prerequisites: MAT 210; QBA 502.

QBA 591 Seminar. (1–12)*fall and spring*

Current topics in quantitative business analysis primarily designed for technology, evening, and executive M.B.A. students. Elective courses for these programs may include the following possible topics:

- (a) Decision Models. (3)
- (b) Decision Models for Consulting. (3)
- (c) Management Problem Solving. (3)
- (d) Strategic Decision Analysis. (3)

QBA 593 Applied Project. (1–12)*not regularly offered***QBA 599 Thesis. (1–12)***not regularly offered***QBA 791 Doctoral Seminars in Quantitative Business Analysis. (1–12)***not regularly offered*

The Department of Management has adopted a modular approach to Ph.D. education. Possible topics:

- (a) Chaos Theory. (1)
- (b) Risk Analysis. (1)
- (c) Strategic Decision Making. (1)
- (d) Systems Dynamics. (1)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

OPERATIONS MANAGEMENT (OPM)**OPM 450 Changing Business Processes. (3)***once a year*

Describes and analyzes business processes. Generates and evaluates alternatives. Creates improvement and implementation plans. Prerequisites: SCM 300; QBA 221.

General Studies: L

OPM 540 Quality and Productivity Management. (3)*not regularly offered*

Organizational factors influencing quality and productivity in the production of goods and services. Quality and productivity strategies, improvement programs, and measurement systems. Prerequisite: SCM 502 or instructor approval.

OPM 581 Management of Technology and Innovation. (3)*fall*

Technology life cycles, technology forecasting, new product development process, innovation teams, innovation best practices. Prerequisite: M.B.A. degree program student.

OPM 583 Project Management in Service Organizations. (2–3)*fall*

Project management planning, leadership, and control in service organizations. Discussion, lecture, class exercises, cases. Prerequisite: M.B.A. degree program student.

OPM 585 Facilities Design and Management of Technology. (3)*once a year*

Decisions regarding management of facilities and technology for manufacturing and service firms. Facilities location, layout, process design, and selection.

OPM 586 High-Technology Project Management. (2–3)*fall*

Project management processes for high-technology organizations, including planning, scheduling, team development, and control. Prerequisite: M.B.A. degree program student.

OPM 587 Project Management. (3)*once a year*

Planning, scheduling, and controlling of projects in R & D, manufacturing, construction, and services. Project selection, financial considerations, and resource management. Prerequisite: QBA 502.

OPM 588 Strategic Project Management. (2–3)*fall*

Overview of strategic project management processes, project planning and control, project portfolio management, resource allocation, management of strategic project partners. Discussion, lecture, class exercises, cases. Prerequisite: M.B.A. degree program student.

OPM 591 Seminar. (1–12)*once a year*

Possible topics:

- High-Performance Management Processes. (3)
- Management of Technology. (3)
- Manufacturing Management in High Technology. (3)
- Manufacturing Strategy. (3)
- New Product and Process Development. (3)
- Technology/Project Management. (3)

OPM 593 Applied Projects. (3)*once a year*

Cross-functional teams initiate (possibly implement) organizational change within a local firm. Lecture, discussion, experiential learning. Pre- or corequisite: all core courses in the M.B.A. program.

OPM 791 Doctoral Seminars in Operations and Production Management. (1–12)*not regularly offered*

Short module seminars. Possible topics:

- Management of Technology. (1)
- Manufacturing Strategy. (1)
- Operations Management. (1)
- Project Management. (1)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Department of Marketing

MARKETING (MKT)

MKT 394 Special Topics. (1–4)*fall*

Possible topics:

- Global Markets. (3)
- Marketing and Selling. (3)

MKT 411 Sales Management. (3)*not regularly offered*

Applies management concepts to the administration of the sales operation. Prerequisite: MKT 302.

MKT 412 Promotion Management. (3)*once a year*

Integrates the promotional activities of the firm including advertising, personal selling, public relations, and sales promotion. Prerequisite: MKT 302.

MKT 424 Retail Management. (3)*once a year*

Role of retailing in marketing. Problems and functions of retail managers within various retail institutions. Prerequisite: MKT 300.

MKT 430 Marketing for Service Industries. (3)*once a year*

Concepts and strategies for addressing distinctive marketing problems and opportunities in service industries. Current issues and trends in the service sector. Prerequisites: MKT 300, professional program business student.

MKT 434 Industrial Marketing. (3)*once a year*

Strategies for marketing products and services to industrial, commercial, and governmental markets. Changing industry and market structures. Prerequisite: MKT 302 or instructor approval.

MKT 435 International Marketing. (3)*once a year*

Analyzes marketing strategies developed by international firms to enter foreign markets and to adapt to changing international environments. Prerequisites: MKT 302 (or instructor approval); professional program business student.

MKT 451 Marketing Research. (3)*fall and spring*

Integrated treatment of methods of market research and analysis of market factors affecting decisions in the organization. Prerequisites with a grade of "C" or higher: MKT 302; QBA 221.

MKT 460 Strategic Marketing. (3)*fall and spring*

Policy formulation and decision making by the marketing executive. Integrates marketing programs and considers contemporary marketing issues. Prerequisite: professional program business student. Prerequisites with a grade of "C" or higher: MKT 302, 304, 451.

*General Studies: L***MKT 494 Special Topics. (1–4)***fall, spring, summer*

Chosen from topics in the marketing and international marketing arenas to include seminars in international marketing in Europe and Asia. Possible topics:

- Applied International Marketing

MKT 499 Individualized Instruction. (1–3)*fall, spring, summer*

Topics of special interest chosen by students and agreed to by the departments to do independent studies with a professor acting as a guide.

MKT 502 Marketing Management. (3)*fall, spring, summer*

Managing the marketing function; market and environmental analysis; marketing planning, strategy, and control concepts. Development and management of marketing programs. Prerequisite: ECN 502.

MKT 524 Services Marketing. (3)*once a year*

Strategies for marketing services emphasizing the distinctive challenges and approaches that make marketing of services different from marketing manufactured goods. Prerequisite: MKT 502 (or its equivalent).

MKT 563 Marketing Strategy. (3)*not regularly offered*

Planning and control concepts and methods for developing and evaluating strategic policy from a marketing perspective. Prerequisite: MKT 502.

MKT 584 Internship. (3)*fall, spring, summer*

MKT 591 Seminar. (1–12)*once a year*

Offered in conjunction with the M.B.A. program (see M.B.A. program section). Possible topics:

- (a) Business-to-Business Marketing. (3)
- (b) Competitive Strategy for Services. (3)
- (c) Consumer Behavior and Market Strategy. (3)
- (d) Customer Satisfaction/Service Quality Measurement. (3)
- (e) International Marketing. (3)
- (f) Marketing in the Information Age. (3)
- (g) New Product and Service Development. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Department of Supply Chain Management

BUSINESS (BUS)

BUS 451 Business Research Methods. (3)*not regularly offered*

Methods of collecting information pertinent to business problem solving, including design, collection, analysis, interpretation, and presentation of primary and secondary data.

*General Studies: L***BUS 502 Managerial Communication. (1–3)***fall and spring*

Analysis of various business problems, situations, and development of appropriate communication strategies. Prerequisite: MGT 502.

BUS 504 Professional Report Writing. (3)*once a year*

Preparation and presentation of professional reports.

BUS 507 Business Research Methods. (3)*not regularly offered*

Techniques for gathering information for business decision making. Selection, design, and completion of a business-oriented research project.

BUS 591 Seminar. (3)*not regularly offered*

Selected managerial communication topics.

BUS 594 Study Conference or Workshop. (3)*not regularly offered***BUS 700 Research Methods. (3)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

LEGAL AND ETHICAL STUDIES (LES)

LES 411 Real Estate Law. (3)*once a year*

Legal and ethical aspects of land ownerships, interests, transfer, finance development, and regulations of the real estate industry.

LES 532 Negotiation Agreements. (3)*fall and spring*

Develops negotiation competencies to build partnerships and create lasting agreements with internal/external customers, suppliers, work teams, and external constituencies. Lecture and substantial student interaction through team exercises.

LES 579 Legal and Ethical Issues for Business. (3)*fall and spring*

Studies legal and ethical components of business decisions; self-regulation and social responsibility as strategies. Prerequisites: ACC 503; FIN 502; MGT 502; MKT 502.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

REAL ESTATE (REA)

REA 401 Real Estate Appraisal. (3)*once a year*

Factors affecting the value of real estate. Theory and practice of appraising and preparation of the appraisal report. Appraisal techniques. Prerequisites: REA 300; professional program business student.

REA 441 Real Estate Land Development. (3)*once a year*

Neighborhood and city growth. Municipal planning and zoning. Development of residential, commercial, industrial, and special purpose properties. Prerequisites: REA 300; professional program business student.

REA 456 Real Estate Investments. (3)*once a year*

Analyzes investment decisions for various property types. Cash flow and rate of return analysis. Prerequisites: FIN 300; professional program business student.

REA 461 Current Real Estate Topics. (3)*not regularly offered*

Discusses and analyzes current real estate topics of interest. Prerequisites: REA 300; professional program business student.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

SUPPLY CHAIN MANAGEMENT (SCM)

SCM 405 Urban Transportation. (3)*not regularly offered*

Economic, social, political, and business aspects of passenger transportation. Public policy and government aid to urban transportation development. Prerequisite: upper-division standing or instructor approval.

SCM 432 Materials Management. (3)*fall and spring*

Studies managing the productive flow of materials in organizations, including MRPII, JIT, quality, facility planning, and job design. Fee. Prerequisites: SCM 300; professional program business student majoring in Supply Chain Management.

SCM 440 Productivity and Quality Management. (3)*fall and spring*

Productivity concepts at the national, organizational, and individual levels. Quality management and its relationship to productivity in all organizations. Prerequisite: professional program business student majoring in Supply Chain Management.

SCM 455 Research and Negotiation. (3)*fall and spring*

Current philosophy, methods, and techniques used to conduct both strategic and operations supply chain management research and negotiation. Includes negotiation simulations. Prerequisite: professional program business student majoring in Supply Chain Management. Prerequisite with a grade of "C" or higher: SCM 355.

*General Studies: L***SCM 460 Carrier Management. (3)***not regularly offered*

Analyzes carrier economics, regulation, management, and rate-making practice; evaluates public policy issues related to carrier transportation. Prerequisite: upper-division standing or instructor approval.

SCM 463 Global Supply Chain Management. (3)*once a year*

Supply chain activities in international business with special emphasis on management of transportation, global sourcing, customs issues, and facility location in a global environment.

SCM 479 Supply Chain Strategy. (3)*fall and spring*

Synthesis of purchasing, production, transportation, and distribution systems to provide an integrated perspective of supply chain management. Prerequisite: professional program business student majoring in Supply Chain Management. Prerequisites with a grade of "C" or higher: SCM 345, 355, 432.

SCM 502 Operations and Supply Management. (3)*fall and spring*

Contemporary management issues, including environmental, project, and supply chain management; new product development; quality control; TQM. Prerequisite: M.B.A. degree program student.

SCM 532 Supply Chain Design and Development Strategies. (3)*fall*

Strategic orientation toward the design and development of the supply chain for purchasing, materials, and logistics systems.

SCM 541 Supply Chain Management and Control. (3)*spring*

Management and control of purchasing and logistics management systems. Total Quality Management to assess and assure customer satisfaction. Global strategies.

SCM 545 Supply Chain Continuous Improvement Strategies. (3)*spring*

Leading-edge strategies such as reengineering high-performance teams and expert systems for continuous improvement of the supply chain. Seminar.

SCM 591 Seminar. (1–12)*not regularly offered*

Possible topics:

- (a) Global Supply Chain Management. (3)
- (b) New Product Development. (3)
- (c) Quality and Productivity Management. (3)
- (d) Services Operations Management. (3)

SCM 791 Doctoral Seminar. (1–12)*once a year*

Possible topics:

- (a) Logistics, Transportation, and Physical Distribution Management. (3)
- (b) Purchasing and Materials Management. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Chemical Engineering

Master's and Doctoral Programs

Subhash Mahajan

Chair

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ASSOCIATE PROFESSORS

BEAUDOIN, BECKMAN, BURROWS, RIVERA, SIERKS

ASSISTANT PROFESSORS

ALLEN, DILLNER, RAZATOS

The faculty in the Department of Chemical and Materials Engineering offer graduate programs leading to the M.S., Master of Science in Engineering, and the Ph.D. degrees in Chemical Engineering. Areas of research emphasis include biotechnology and biomaterials, chemical therapies for neurodegenerative diseases, adhesion in biological and inorganic systems, electronic materials processing, environmentally-benign manufacturing, process design and operations, water and air purification, surface and reaction engineering, and photocatalysis. For students interested in the Bioengineering major, see "Bioengineering," page 130, for program description. Within the Engineering Science major, students may select materials science and engineering as the area of study (see "Engineering Science," page 201, for program description).

The faculty also participate in offering the interdisciplinary program leading to the Doctor of Philosophy degree with a major in Science and Engineering of Materials (see "Science and Engineering of Materials," page 307, for program description). A *Graduate Student Handbook*, detailing information on graduate studies in Chemical Engineering, is

available to admitted students. Students should contact the department.

The faculty also participate in offering the Tri-University Master of Engineering degree program. See "Master of Engineering," page 195, for program description.

Graduate Record Examination. Graduate Record Examination scores are required from all students.

MASTER OF SCIENCE

See "Master's Degrees," page 100, for general requirements.

Transition Program. Students applying for the program leading to a master's degree with a major in Chemical Engineering, or in the area of study of materials science and engineering under the Engineering Science major, may have an undergraduate B.S. degree in a major field other than chemical engineering or materials science. The qualifications of transition students are reviewed by the department graduate committee, and a special program is designed for successful applicants. In general, applicants should have had, or should be prepared to take, calculus through differential equations and physics. Transition students are expected to complete the essential courses in their area of study from the undergraduate program in order to be prepared for the graduate courses. Other course work from the undergraduate program may be required depending upon the area of study selected by the student.

Transition students should contact the graduate coordinator for an evaluation of the undergraduate transcript.

Program of Study. All candidates for the Master of Science in Engineering or M.S. degree in Chemical Engineering, or in the area of study of materials science and engineering under the Engineering Science major, are required to complete an approved program of study consisting of the minimum required semester hours, including research report (M.S.E.) or thesis (M.S.). Special course requirements for the different areas of study are established by the faculty and are available from the departmental graduate coordinator. In addition to the course/thesis requirements, all full-time graduate students must successfully complete a seminar course during each semester of attendance; part-time students must enroll in a seminar course at least three times during the course of study. Candidates whose undergraduate degree was in a field other than chemical engineering or materials science may be required to complete more than 30 semester hours.

Thesis Requirements. A thesis or equivalent is required.

Final Examinations. A final oral examination is required in defense of the thesis or equivalent.

MASTER OF SCIENCE IN ENGINEERING

See "Master of Science in Engineering," page 200, for information on the Master of Science in Engineering degree.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Chemical Engineering, or in the area of study of materials science and engineering under the Engineering Science major, is conferred upon evidence of

excellence in research resulting in a scholarly dissertation that is a contribution to existing knowledge.

See "Doctor of Philosophy," page 103, for general requirements.

Doctoral Program. Upon successful completion of the qualifying examination, a research supervisory committee is formed and the doctoral student is required to submit a research proposal. Following the acceptance of the research proposal, the student is given a comprehensive examination to determine initiative, originality, breadth, and high level of professional commitment to the problem selected for investigation. Upon successful completion of the comprehensive examination, the student applies for admission to candidacy.

Master's Degree in Passing. Students who are enrolled in the Ph.D. degree program in Chemical Engineering, but who do not hold a previously earned master's degree in chemical engineering, can obtain the M.S.E. degree (the "Master's in Passing") upon completion of course requirements, the Ph.D. qualifying examination, prospectus, and the comprehensive examination.

As this degree is only available to students who are enrolled as regular students in the Ph.D. program in Chemical Engineering, all of the above requirements (including course work) can be applied toward the Ph.D. requirements.

Foreign Language Requirements. Candidates in the program leading to the Ph.D. degree in Chemical Engineering, or in the area of study materials science and engineering under the Engineering Science major, normally are not required to pass an examination showing reading competency of a foreign language. However, the supervisory committee may establish such a requirement in special cases depending upon the research interests of the candidate. If the foreign language is required, the student must successfully fulfill the requirement before taking the comprehensive examination.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

Research in the department is centered on core programs in analytical chemistry, biochemistry, inorganic chemistry, organic chemistry, physical and solid state chemistry, and geochemistry. Some examples of specific research areas are nonequilibrium gas-phase chemical systems, chemistry at high pressures, bacterial and artificial photosynthesis, design of potential antitumor agents, separations and chromatographic detectors, novel materials containing supramolecular motifs, and dynamics in disordered materials. A complete listing of the research interests of faculty members can be found at www.asu.edu/clas/chemistry.

In addition to the strong core programs, the department emphasizes multidisciplinary research at the leading edge of science, where departmental strengths interface with materials and solid-state research, life sciences and photobiology, physics, engineering, geology and space science, and environmental studies.

Approximately 30 faculty members from the Departments of Chemistry and Biochemistry, Physics and Astronomy, and Geology and the College of Engineering and Applied Sciences are associated with the center for Solid-State Science. The center includes a number of specialized facilities such as electron microscopy and crystal-growing laboratories. Fourteen faculty members from the Departments of Chemistry and Biochemistry and Plant Biology are associated with the Center for the Study of Early Events in Photosynthesis. This center has unique instrumentation for studying the earliest energy storing reactions of photosynthesis. The Center for Meteorite Studies and the Cancer Research Institute also foster interdisciplinary research efforts. Faculty in the Department of Chemistry and Biochemistry also participate in collaborative programs in the science and engineering of materials and in molecular and cellular biology.

CHEMICAL ENGINEERING (CHE)

CHE 458 Semiconductor Material Processing. (3)

not regularly offered

Introduction to the processing and characterization of electronic materials for semiconductor applications. Prerequisites: CHE 333, 342.

CHE 475 Biochemical Engineering. (3)

not regularly offered

Application of chemical engineering methods, mass transfer, thermodynamics, and transport phenomena to industrial biotechnology. Prerequisite: instructor approval.

CHE 476 Bioreaction Engineering. (3)

not regularly offered

Principles of analysis and design of reactors for processing with cells and other biologically active materials; applications of reaction engineering in biotechnology. Prerequisite: instructor approval.

CHE 477 Bioseparation Processes. (3)

not regularly offered

Principles of separation of biologically active chemicals; the application, scale-up, and design of separation processes in biotechnology. Prerequisite: instructor approval.

CHE 501 Introduction to Transport Phenomena. (3)

fall and spring

Transport phenomena, with emphasis on fluid systems. Prerequisite: transition student with instructor approval.

CHE 502 Introduction to Energy Transport. (3)

fall and spring

Continuation of transport principles, with emphasis on energy transport in stationary and fluid systems. Prerequisite: transition student with instructor approval.

CHE 503 Introduction to Mass Transport. (3)

fall and spring

Application of transport phenomena to mass transfer. Design of mass transfer equipment, including staged processes. Prerequisite: transition student with instructor approval.

CHE 504 Introduction to Chemical Thermodynamics. (3)

fall and spring

Energy relations and equilibrium conversions based on chemical potentials and phase equilibria. Prerequisite: transition student with instructor approval.

CHE 505 Introduction to Chemical Reactor Design. (3)

fall and spring

Application of kinetics to chemical reactor design. Prerequisite: transition student with instructor approval.

CHE 527 Advanced Applied Mathematical Analysis in Chemical Engineering. (3)

fall

Formulation and solution of complex mathematical relationships resulting from the description of physical problems in mass, energy, and momentum transfer and chemical kinetics.

CHE 528 Process Optimization Techniques. (3)

spring

Method for optimizing engineering processes. Experimental design and analysis; linear and nonlinear regression methods; classical, search, and dynamic programming algorithms.

CHE 533 Transport Processes I. (3)*fall*

Unified treatment of momentum, heat, and mass transfer from molecular theory, and continuum points of view. Continuum equations of microscopic and macroscopic systems and multicomponent and multiphase systems. Cross-listed as BME 533. Credit is allowed for only BME 533 or CHE 533.

CHE 534 Transport Processes II. (3)*spring*

Continuation of BME 533 or CHE 533, emphasizing mass transfer. Cross-listed as BME 534. Credit is allowed for only BME 534 or CHE 534. Prerequisite: BME 533 or CHE 533.

CHE 536 Convective Mass Transfer. (3)*not regularly offered*

Turbulent flow for multicomponent systems, including chemical reactions with applications in separations and air pollution. Prerequisite: CHE 533 or MAE 571.

CHE 543 Thermodynamics of Chemical Systems. (3)*fall*

Classical and statistical thermodynamics of nonideal physicochemical systems and processes; prediction of optimum operating conditions. Cross-listed as BME 543. Credit is allowed for only BME 543 or CHE 543.

CHE 544 Chemical Reactor Engineering. (3)*spring*

Reaction rates, thermodynamics, and transport principles applied to the design and operation of chemical reactors. Cross-listed as BME 544. Credit is allowed for only BME 544 or CHE 544. Prerequisite: BME 543 or CHE 543.

CHE 548 Topics in Catalysis. (3)*not regularly offered*

Engineering catalysis, emphasizing adsorption, kinetics, characterization, diffusional considerations, and reactor design. Other topics include mechanisms, surface analyses, and electronic structure.

CHE 552 Industrial Water Quality Engineering. (3)*not regularly offered*

Water pollutants, quality criteria and control, chemical treatment processing, and system design. Case studies. Prerequisite: CHE 331 (or its equivalent).

CHE 553 Air Quality Control. (3)*not regularly offered*

Air pollutant origins, effects, and control. Physical and chemical processes, including dispersion, combustion, sampling, control equipment design, and special topics. Prerequisite: CHE 331 (or its equivalent).

CHE 554 New Energy Technology. (3)*not regularly offered*

Gasification, liquefaction pyrolysis, and combustion processes for coal, wastes, and other raw materials. In-situ processes for coal, oil, shale, and geothermal energy. Environmental quality issues.

CHE 556 Separation Processes. (3)*not regularly offered*

Topics in binary/multicomponent separation, rate governed and equilibrium processes, mass transfer criteria, energy requirements, separating agents and devices, and staged operations.

CHE 558 Electronic Materials. (3)*not regularly offered*

Processing and characterization of electronic materials for semiconductor-type uses. Thermodynamics and transport phenomena, phase equilibria and structure, mass transfer, and diffusion and thermal properties.

CHE 561 Advanced Process Control. (3)*spring*

Dynamic process representation, linear optimal control, optimal state reconstruction, and parameter and state estimation techniques for continuous and discrete time systems.

CHE 563 Chemical Engineering Design. (3)*not regularly offered*

Computational methods; the design of chemical plants and processes.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

MATERIALS SCIENCE AND ENGINEERING (MSE)**MSE 510 X-ray and Electron Diffraction. (3)***spring*

Fundamentals of X-ray diffraction, transmission electron microscopy, and scanning electron microscopy. Techniques for studying surfaces, internal microstructures, and fluorescence. Lecture, demonstrations. Prerequisite: transition student with instructor approval.

MSE 511 Corrosion and Corrosion Control. (3)*not regularly offered*

Introduction to corrosion mechanisms and methods of preventing corrosion. Topics include: electrochemistry, polarization, corrosion rates, oxidation, coatings, and cathodic protection. Prerequisite: transition student with instructor approval.

MSE 512 Analysis of Material Failures. (3)*not regularly offered*

Identification of types of failures. Analytical techniques. Fractography, SEM, nondestructive inspection, and metallography. Mechanical and electronic components. Prerequisite: transition student with instructor approval.

MSE 513 Polymers and Composites. (3)*fall*

Relationship between chemistry, structure, and properties of engineering polymers. Design, properties, and behavior of fiber composite systems.

MSE 514 Physical Metallurgy. (3)*spring*

Crystal structure and defects. Phase diagrams, metallography, solidification and casting, and deformation and annealing. Prerequisite: transition student with instructor approval.

MSE 515 Thermodynamics of Materials. (3)*not regularly offered*

Principles of statistical mechanics, statistical thermodynamics of single crystals, solutions, phase equilibrium, free energy of reactions, free electron theory, and thermodynamics of defects. Prerequisite: transition student with instructor approval.

MSE 516 Mechanical Properties of Solids. (3)*fall*

Effects of environmental and microstructural variables of mechanical properties, including plastic deformation, fatigue, creep, brittle fracture, and internal friction. Prerequisite: transition student with instructor approval.

MSE 517 Introduction to Ceramics. (3)*fall*

Principles of structure, property relations in ceramic materials. Processing techniques. Applications in mechanical, electronic, and superconducting systems. Prerequisite: transition student with instructor approval.

MSE 518 Integrated Circuits Materials Science. (3)*not regularly offered*

Principles of materials science applied to semiconductor processing and fabrication in metals, ceramics, polymers, and semiconductors. Prerequisite: transition student with instructor approval.

MSE 519 Physical Metallurgy Laboratory. (1)*spring*

Analyzes microstructure of metals and alloys and includes some correlation with mechanical properties. Lab. Pre- or corequisite: MSE 514.

MSE 520 Theory of Crystalline Solids. (3)*not regularly offered*

Anisotropic properties of crystals; tensor treatment of elastic, magnetic, electric and thermal properties, and crystallography of Martensitic transformations.

MSE 521 Defects in Crystalline Solids. (3)*not regularly offered*

Introduction to the geometry, interaction, and equilibrium between dislocations and point defects. Discusses relations between defects and properties. Prerequisite: ECE 350 or instructor approval.

MSE 530 Materials Thermodynamics and Kinetics. (3)*not regularly offered*

Thermodynamics of alloy systems, diffusion in solids, kinetics of precipitation, and phase transformations in solids. Prerequisites: ECE 340, 350.

MSE 540 Fracture, Fatigue, and Creep. (3)*not regularly offered*

Relationship between microstructure and fracture; fatigue and creep properties of materials. Environmental effects and recent developments. Current theories and experimental results. Prerequisite: MSE 440 (or its equivalent).

MSE 550 Advanced Materials Characterization. (3)*not regularly offered*

Analytical instrumentation for characterization of materials; SEM, SIMS, Auger, analytical TEM, and other advanced research techniques.

MSE 556 Electron Microscopy Laboratory. (3)*fall*

Lab support for MSE 558. Cross-listed as SEM 556. Credit is allowed for only MSE 556 or SEM 556. Pre- or corequisite: MSE 558 or SEM 558.

MSE 557 Electron Microscopy Laboratory. (3)*spring*

Lab support for MSE 559. Cross-listed as SEM 557. Credit is allowed for only MSE 557 or SEM 557. Pre- or corequisite: MSE 559 or SEM 559.

MSE 558 Electron Microscopy I. (3)*fall*

Microanalysis of the structure and composition of materials using images, diffraction, X-ray, and energy loss spectroscopy. Requires knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables. Cross-listed as SEM 558. Credit is allowed for only MSE 558 or SEM 558. Prerequisite: instructor approval.

MSE 559 Electron Microscopy II. (3)*spring*

Microanalysis of the structure and composition of materials using images, diffraction, X-ray, and energy loss spectroscopy. Requires knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables. Cross-listed as SEM 559. Credit is allowed for only MSE 559 or SEM 559. Prerequisite: instructor approval.

MSE 560 Strengthening Mechanisms. (3)*not regularly offered*

Deformation of crystalline materials. Properties of dislocations. Theories of strain hardening, solid solution, precipitation, and transformation strengthening. Prerequisite: ECE 350 (or its equivalent).

MSE 561 Phase Transformation in Solids. (3)*not regularly offered*

Heterogeneous and homogeneous precipitation reactions, shear displacive reactions, and order-disorder transformation.

MSE 562 Ion Implantation. (3)*not regularly offered*

Includes defect production and annealing. Generalized treatment, including ion implantation, neutron irradiation damage, and the interaction of other incident beams. Prerequisite: MSE 450.

MSE 570 Polymer Structure and Properties. (3)*not regularly offered*

Relationships between structure and properties of synthetic polymers, including glass transition, molecular relaxations, crystalline state viscoelasticity, morphological characterization, and processing.

MSE 571 Ceramics. (3)*not regularly offered*

Includes ceramic processing, casting, molding, firing, sintering, crystal defects, and mechanical, electronic, and physical properties. Prerequisites: MSE 521, 561.

MSE 573 Magnetic Materials. (3)*not regularly offered*

Emphasizes ferromagnetic and ferrimagnetic phenomena. Domains, magnetic anisotropy, and magnetostriction. Study of commercial magnetic materials. Prerequisite: MSE 520 (or its equivalent).

MSE 598 Special Topics. (1-4)*not regularly offered*

Possible topics:

(a) Growth and Processing of Semiconductor Devices. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.



Larry Duff, an instrument maker/designer in Engineering Technical Services, operates an automated lathe/shaping machine.

John Phillips photo

Chemistry

Master's and Doctoral Programs

James P. Allen
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 (PS D102A) 480/965-4664
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REGENTS' PROFESSORS

ANGELL, BUSECK, C. MOORE,
 O'KEEFFE, PETTIT

PROFESSORS

ALLEN, BIRK, BLANKENSHIP, FUCHS, GLAUNSINGER,
 GUST, HOLLOWAY, LOHR, A. MOORE, T. MOORE, MUNK,
 PETUSKEY, ROSE, SKIBO, STEIMLE,
 WILLIAMS, WOODBURY

ASSOCIATE PROFESSORS

KOUVETAKIS, WOLF

ASSISTANT PROFESSORS

BOOKSH, CAUDLE, FRANCISCO,
 GOULD, HAYES, MATYUSHOV, RICHERT

RESEARCH PROFESSOR

BIEBER

The faculty in the Department of Chemistry and Biochemistry offer programs leading to the M.S. and the Ph.D. degrees in Chemistry. Areas of concentration include analytical chemistry, biochemistry, geochemistry, inorganic chemistry, organic chemistry, physical chemistry, and solid-state chemistry.

The faculty also participate in offering programs leading to the Master of Natural Science degree when one of the concentrations is chemistry (see "Natural Science," page 278), and the interdisciplinary programs, leading to the Ph.D. degrees with majors in Exercise Science (see "Exercise and Wellness," page 214) and the Science and Engineering of Materials (see "Science and Engineering of Materials," page 307).

Students admitted to the Master of Education degree program with a major in Secondary Education may also elect chemistry as the subject matter field.

The graduate programs offered by the faculty in the Department of Chemistry and Biochemistry prepare students for professional careers in chemistry and related fields in industry, government, and educational institutions. All students applying for admission to one of these programs must submit scores for the Graduate Record Examination.

MASTER OF SCIENCE

See "Master's Degrees," page 100, for general requirements.

Program of Study. A minimum of 30 semester hours of credit is required. A thesis carrying six semester hours is also included in the total. The remaining courses are selected by the student in consultation with the supervisory committee.

Thesis Requirements. A thesis is required.

Final Examinations. A general oral examination is required of all candidates for the master's degree. A written examination may also be required.

DOCTOR OF PHILOSOPHY

See "Doctor of Philosophy," page 103, for general requirements.

Program of Study. A minimum of 84 semester hours, including dissertation, is required. Approximately 20–30 hours of this total is formal course work. Courses, including research and dissertation, are selected by the student in consultation with the supervisory committee.

Cumulative Examinations. Written examinations are required. In addition, an oral examination is required which includes material of a general nature, and the presentation and defense of current research and an original research proposal prepared by the student.

Foreign Language Requirements. There is no departmental foreign language requirement, but the student's supervisory committee may specify a reading proficiency in one or more foreign languages.

Dissertation Requirements. A dissertation based on original work of high quality and demonstrating proficiency in the student's special field is required. (See "Research and Dissertation Requirements," page 104.)

Final Examinations. The final oral examination is a defense of the dissertation, during which the candidate presents a summary of the dissertation research. Evidence of a publishable contribution of original research must be presented.

BIOCHEMISTRY (BCH)

BCH 461 General Biochemistry. (3)

fall

Structure, chemistry, and metabolism of biomolecules and their role in the biochemical processes of living organisms. Credit is allowed for only BCH 461 or 361. Prerequisite: CHM 318 or 332. Corequisite: CHM 341 or 346.

BCH 462 General Biochemistry. (3)

spring

Continuation of BCH 461. Prerequisite: BCH 461 or instructor approval.

BCH 463 Biophysical Chemistry. (3)

spring

Principles of physical chemistry as applied to biological systems. Prerequisite: CHM 341 or 346.

BCH 467 Analytical Biochemistry Laboratory. (3)

spring

Quantitative analysis, separation and purification of biological molecules. Application of chemical and physical methods to the characterization of biological macromolecules. 1 conference, 1 hour lecture, 5 hours lab. Prerequisite: BCH 461. Corequisite: BCH 462.

General Studies: L

BCH 501 Current Topics in Biochemistry. (1)

fall and spring

May be repeated for credit. Seminar. Prerequisite: instructor approval.

BCH 561 Advanced Topics in Biochemistry. (3)

spring

Topics selected from emerging areas of biochemistry based primarily on current literature. Prerequisite: BCH 462.

BCH 563 Biophysical Chemistry. (3)*not regularly offered*

Physical chemistry of macromolecules, especially proteins, nucleic acids, and polysaccharides. Thermodynamics, hydrodynamics, and spectroscopy of and their relation to structure. Prerequisites: BCH 462; CHM 346.

BCH 568 Molecular Mechanisms of Photosynthesis. (3)*spring*

Structure and function of photosynthetic complexes; mechanism of energy conversion in plants, bacteria, and model systems. Cross-listed as PLB 558. Credit is allowed for only BCH 568 or PLB 558. Prerequisite: instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

CHEMISTRY (CHM)**CHM 424 Separation Science. (3)***not regularly offered*

Basic theory and practical aspects of gas, liquid, ion-exchange, and gel-permeation chromatographies, and other important industrial and research techniques. 2 hours lecture, 4 hours lab. Fee. Prerequisite: CHM 318 or 332 or 346 or instructor approval.

CHM 431 Qualitative Organic Analysis. (3)*spring*

Systematic identification of organic compounds. 1 hour lecture, 6 hours lab. Fee. Prerequisites: both CHM 118 (or 327) and 320 (or 336) or only instructor approval.

CHM 452 Inorganic Chemistry Laboratory. (1–2)*fall*

Preparation and characterization of typical inorganic substances, emphasizing methods and techniques. 1 conference, 5 hours lab. Fee. Prerequisite: instructor approval.

General Studies: L (if credit also earned in CHM 348 and 349)

CHM 453 Inorganic Chemistry. (3)*fall*

Principles and applications of inorganic chemistry. Prerequisite: CHM 341 or 346.

CHM 460 Biological Chemistry. (3)*spring*

Structure and function of macromolecules and their involvement in the processing of energy and information by living cells. Prerequisites: CHM 318, 346, 453.

CHM 471 Solid-State Chemistry. (3)*fall*

Crystal chemistry, thermodynamics and electrochemistry of solids, nonstoichiometric compounds, diffusion and solid-state reactions, crystal growth, and selected topics. Pre- or corequisite: CHM 346 or instructor approval.

CHM 480 Methods of Teaching Chemistry. (3)*spring*

Organization and presentation of appropriate content of chemistry; preparation of reagents, experiments, and demonstrations; organization of stock rooms and laboratories; experience in problem solving. Fee. Prerequisite: instructor approval.

CHM 481 Geochemistry. (3)*spring*

Origin and distribution of the chemical elements. Geochemical cycles operating in the earth's atmosphere, hydrosphere, and lithosphere. Cross-listed as GLG 481. Credit is allowed for only CHM 481 or GLG 481. Prerequisite: CHM 341 (or 346) or GLG 321.

CHM 485 Meteorites and Cosmochemistry. (3)*not regularly offered*

Chemistry of meteorites and their relationship to the origin of the earth, solar system, and universe. Cross-listed as GLG 485. Credit is allowed for only CHM 485 or GLG 485.

CHM 494 Special Topics. (1–4)*not regularly offered*

Possible topics:

(a) Chemistry of Global Climate Change. (3)

CHM 501 Current Topics in Chemistry. (1)*fall and spring*

May be repeated for credit. Prerequisite: instructor approval.

CHM 521 Computer-Enhanced Analytical Chemistry. (3)*not regularly offered*

Overview of chemometric tools in analytical chemistry, including multivariate calibration, spectral deconvolution, and experimental design. 2 hours lecture, 4 hours lab.

CHM 523 Advanced Analytical Chemistry. (3)*once a year*

Theoretical principles of analytical instrumentation and measurements. Prerequisites: both CHM 325 and 346 or only instructor approval.

CHM 525 Spectrochemical Methods of Analysis. (4)*not regularly offered*

Theoretical and practical considerations involving the use of optical instruments for chemical analyses. Emphasis on state-of-the-art trends. 3 hours lecture, 3 hours lab. Prerequisite: CHM 346 or instructor approval.

CHM 526 X-ray Methods of Analysis. (4)*not regularly offered*

Theoretical and practical considerations involving the use of X-ray diffraction and spectroscopy for chemical and structural analyses. 3 hours lecture, 3 hours lab. Prerequisite: CHM 346.

CHM 527 Electrical Methods of Chemical Analysis. (4)*not regularly offered*

Theoretical and practical considerations of polarographic, potentiometric, amperometric techniques, including modern electrochemical methods. 2 hours lecture, 6 hours lab. Prerequisite: CHM 346.

CHM 531 Advanced Organic Chemistry I. (3)*fall*

Reaction mechanisms, reaction kinetics, linear free energy relationships, transition state theory, molecular orbital theory, and Woodward-Hoffmann rules. Prerequisites: CHM 318 (or 332), 346.

CHM 532 Advanced Organic Chemistry II. (2)*spring*

Continuation of CHM 531. Prerequisite: CHM 531.

CHM 537 Organic Reactions. (3)*spring*

Important synthetic reactions of organic chemistry emphasizing recently discovered reactions of preparative value. Prerequisite: CHM 531.

CHM 541 Advanced Thermodynamics. (3)*fall*

Equilibrium thermodynamics, chemical reactions, and phase equilibria. Introduction to statistical thermodynamics, critical phenomena, and kinetics. Prerequisite: CHM 346.

CHM 545 Quantum Chemistry I. (3)*fall*

Basic quantum theory, chemical bonding, and molecular structure. Prerequisite: CHM 346.

CHM 546 Quantum Chemistry II. (3)*spring*

Quantum theory of rate processes. Principles of spectroscopy and nonlinear optics. Prerequisite: CHM 545.

CHM 548 Chemical Kinetics. (2)*not regularly offered*

Kinetic theory and rate processes. Prerequisite: CHM 545.

CHM 553 Advanced Inorganic Chemistry. (3)*spring*

Principles of modern inorganic chemistry and their applications over the entire periodic system. Prerequisites: CHM 346 and 453 (or their equivalents).

CHM 556 Topics in Inorganic Chemistry. (3)*not regularly offered*

May be repeated for credit. Prerequisites: CHM 553; instructor approval.

CHM 579 Topics in Solid-State Chemistry. (3)*not regularly offered*

May be repeated for credit. Prerequisite: instructor approval.

CHM 582 Topics in Geochemistry and Cosmochemistry. (3)*not regularly offered*

Topics of current interest for students in chemistry and other fields. Sampling of data and thought concerning phase equilibria, element distribution, meteorites, the Earth, and other planets. May be repeated for credit. Prerequisite: instructor approval.

CHM 583 Phase Equilibria and Geochemical Systems. (3)*not regularly offered*

Natural reactions at high temperatures and pressures; silicate, sulfide, and oxide equilibria. Cross-listed as GLG 583. Credit is allowed for only CHM 583 or GLG 583. Prerequisite: instructor approval.

CHM 593 Applied Project. (1-12)*not regularly offered*

Possible topics:

- (a) Glass Blowing
Fee.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Civil Engineering

Master's and Doctoral Programs

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PROFESSORS

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MAYS, RAJAN, SINGHAL, WITCZAK

ASSOCIATE PROFESSORS

ABBASZADEGAN, FAFITIS, FOX,
HINKS, JOHNSON, MOBASHER

ASSISTANT PROFESSORS

ALLEN, DILLNER, MUCCINO, OWUSU-ANTWI,
WESTERHOFF, ZHU

The faculty in the Department of Civil and Environmental Engineering offer graduate programs leading to the M.S., the Master of Science in Engineering, and the Ph.D. degrees in Civil Engineering.

The faculty also participate in offering the Tri-University Master of Engineering degree program. See "Master of Engineering," page 195, for program description.

Graduate Record Examination. Submission of Graduate Record Examination (GRE) scores, general test, is required for all degree-seeking applicants.

TOEFL Examination. International applicants, whose native language is not English, are required to have taken the Test of English as a Foreign Language (TOEFL), and achieved a minimum score of 550.

MASTER OF SCIENCE

See "Master's Degrees," page 100, for general requirements.

MASTER OF SCIENCE IN ENGINEERING

See "Master of Science in Engineering," page 200.

DOCTOR OF PHILOSOPHY

The Ph.D. degree is conferred upon students based on evidence of excellence in research leading to a scholarly

dissertation that is a contribution to knowledge in the field of civil engineering.

See "Doctor of Philosophy," page 103, for general requirements.

Letters of Recommendation. Submission of three letters of recommendation is required for those applying for admission to the Ph.D. degree program. One letter must be from the chair or advisor of the applicant's previous degree program.

Program of Study. The program of study must be prepared soon after a student has been admitted to the program, a supervisory committee has been formed, and a preliminary examination (if required by the supervisory committee) has been taken.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral comprehensive examinations are required. The examinations are administered by the supervisory committee. Students should request permission from the Graduate College to take the comprehensive examinations when they have essentially completed the course work in their approved program of study.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

A broad range of theoretical and experimental research programs have been established in civil and environmental engineering to prepare graduate students for careers in professional practice and research. These programs are constantly evolving with the changes in society and the profession, and many are multidisciplinary in nature.

Experimental and theoretical research conducted by the civil and environmental engineering faculty and students is carried out in the specialized areas of environmental engineering, geotechnical/geoenvironmental engineering, structures/materials engineering, transportation/materials engineering, and water resources engineering. Within these specialized areas, faculty are actively pursuing research on the following topics.

Environmental Engineering. Wastewater treatment and reclaimed water reuse in arid lands, relationships between the characteristics for dissolved organic carbon and its transport and reactivity in natural ecosystems and engineered systems (e.g., water treatment plants, groundwater recharge systems, wastewater treatment plants), algae-related metabolite production, biotechnology applications, contaminant fate and transport in the subsurface, risk assessment, soil and groundwater remediation, in-situ bioremediation.

Geotechnical/Geoenvironmental Engineering. Study of properties and engineering behavior of unsaturated soils, arid soils, moisture distribution in unsaturated soils, collapsible soils, applications to foundation and geoenvironmental issues, laboratory and field testing of soils, unsaturated

soils, geotechnical earthquake engineering, foundations, slope stability and dam safety.

Structures/Materials Engineering. Development and application of finite element analysis, design optimization and software system in different areas in civil, mechanical, aerospace, biomedical, and electrical engineering.

Transportation/Materials Engineering. Mechanistic-based analysis and design of pavements, advanced pavement materials research, and infrastructure performance assessment and management, pavement analysis and design, pavement management systems, pavement maintenance and evaluation, highway materials, vehicle-pavement interaction, and computer applications, micro thermomechanical testing of thin films, fibers, biomaterials contact based constitutive theory on viscous matrix composites and asphalt concrete, theoretical and experimental investigation of asphalt, asphalt mortar and asphalt concrete, computer applications in civil engineering.

Water Resources Engineering. The application of optimization methods and risk/reliability methods to the design, analysis, and operation of hydrosystems including water distribution systems, storm water management systems, flood and sediment control of river-reservoir systems, estuarine systems, groundwater systems, and the planning and management of watersheds and river basins. Numerical modeling with particular emphasis on data assimilation techniques and finite element models in analysis of environmental fluid flows.

Areas of Study

Areas of study in the civil and environmental engineering curriculum are described below.

Construction Engineering. This area of study includes the analysis, design, and construction of civil engineering structures; construction materials and practice; quality control; and civil engineering project management.

Environmental Engineering. This area of study includes the quality of air, water, and land resources; transport, use, and disposal of hazardous wastes; water and wastewater treatment; and water reuse.

Geotechnical/Geoenvironmental Engineering. This area of study includes the analysis and design of foundation systems, seepage control, earthdams and water resource structures, earthwork operations, fluid flow-through porous media, response of foundations and embankments to earthquakes, and solutions to environmental problems.

Structures/Materials Engineering. This area of study considers the planning, analysis, and design of steel and concrete bridges, buildings, dams; special offshore and space structures; Portland cement concrete; composite materials; and structural retrofit of existing bridges.

Transportation/Materials Engineering. This area of study includes (1) transportation planning, design, and operation and (2) pavements and materials. Transportation planning, design, and operation covers urban transport planning, geometric design of facilities, traffic operations, evaluation of highway capacity and safety, and intelligent vehicle/highway systems. Pavements and materials focus on pavement analysis and design; pavement maintenance and rehabilita-

tion; pavement evaluation and management; characterization of highway materials and durability of highway structures.

Water Resources Engineering. This area of study is concerned with surface and groundwater flow, planning and management of water supply, and water distribution system modeling.

CIVIL AND ENVIRONMENTAL ENGINEERING (CEE)

CEE Note 1. Students enrolled in CEE 580, 590, 592, 599, 792, and 799 are required to attend graduate student seminars at the times shown in the *Schedule of Classes*.

CEE Note 2. Each semester, every graduate student enrolled for more than eight semester hours is to enroll for at least one semester hour of CEE 592, 599, 792, or 799.

CEE 412 Pavement Analysis and Design. (3)

fall

Design of flexible and rigid pavements for highways and airports. Surface, base, and subgrade courses. Cost analysis and pavement selection. Prerequisites: CEE 351; ECE 351.

CEE 423 Structural Design. (3)

fall

Analysis and design of reinforced concrete steel, masonry, and timber structures. Lecture, lab. Prerequisite: CEE 323. Pre- or corequisite: CEE 322.

CEE 432 Matrix and Computer Applications in Structural Engineering. (3)

spring

Matrix and computer applications to structural engineering and structural mechanics. Stiffness and flexibility methods, finite elements, and differences. Prerequisite: CEE 321.

CEE 440 Engineering Hydrology. (3)

fall

Descriptive hydrology; hydrologic cycle, models, and systems. Rain-runoff models. Hydrologic design. Concepts, properties, and basic equations of groundwater flow. Prerequisite: CEE 341.

CEE 441 Water Resources Engineering. (3)

spring

Application of the principles of hydraulics and hydrology to the engineering of water resources projects; design and operation of water resources systems; water quality. Prerequisite: CEE 341.

CEE 452 Foundations. (3)

fall

Applications of soil mechanics to foundation systems, bearing capacity, lateral earth pressure, and slope stability. Prerequisite: CEE 351.

CEE 466 Sanitary Systems Design. (3)

fall

Capacity, planning and design of water supply, domestic and storm drainage, and solid waste systems. Prerequisite: CEE 361.

CEE 471 Intelligent Transportation Systems. (3)

not regularly offered

Application of advanced technology to the vehicle and the roadway to solve traffic congestion, safety, and air quality problems. Prerequisite: CEE 372 or instructor approval.

CEE 475 Highway Geometric Design. (3)

spring

Design of the visible elements of the roadway. Fundamental design controls with application to rural roads, at-grade intersections, freeways, and interchanges. Lecture, recitation. Prerequisite: CEE 372.

CEE 486 Integrated Civil Engineering Design. (3)

fall and spring

Students are required to complete a civil engineering design in a simulated practicing engineering environment. Limited to undergraduates in their final semester. Lecture, team learning. Prerequisites: CEE 321, 341, 351, 361, 372.

General Studies: L

CEE 512 Pavement Performance and Management. (3)

not regularly offered

Pavement management systems, including data collection, evaluation, optimization, economic analysis, and computer applications for highway and airport design. Prerequisite: instructor approval.

CEE 514 Bituminous Materials and Mixture. (3)*not regularly offered*

Types of bituminous materials used in pavement mixtures. Chemical composition, physical properties, desirable aggregate characteristics, optimum asphalt contents, superpave asphalt binder, mixture design. Lecture, lab. Prerequisite: ECE 351.

CEE 515 Properties of Concrete. (3)*not regularly offered*

Materials science of concrete. Cement chemistry, mechanisms of hydration, interrelationships among micro- and macro-properties of cement-based materials. Mechanical properties, failure theories, fracture mechanics of concrete materials. Cement-based composite materials and the durability aspects. Lecture, lab. Prerequisite: ECE 350 or 351.

CEE 521 Stress Analysis. (3)*fall*

Advanced topics in the analytical determination of stress and strain. Prerequisite: CEE 321.

CEE 524 Advanced Steel Structures. (3)*fall*

Strength properties of steel and their effects on structural behavior. Elastic design of steel structures. Plastic analysis and design of beams, frames, and bents. Plastic deflections. Plastic design requirements. Multistory buildings. Prerequisite: CEE 322.

CEE 526 Finite Element Methods in Civil Engineering. (3)*fall*

Finite element formulation for solutions of structural, geotechnical, and hydraulic problems. Prerequisite: CEE 432.

CEE 527 Advanced Concrete Structures. (3)*not regularly offered*

Ultimate strength design. Combined shear and torsion. Serviceability. Plastic analysis. Special systems. Prerequisite: CEE 323.

CEE 530 Prestressed Concrete. (3)*not regularly offered*

Materials and methods of prestressing. Analysis and design for flexure, shear, and torsion. Prestress losses due to friction, creep, shrinkage, and anchorage set. Statically indeterminate structures. Design of flat slabs, bridges, and composite beams. Prerequisite: CEE 323.

CEE 533 Structural Optimization. (3)*not regularly offered*

Linear and nonlinear programming. Problem formulation. Constrained and unconstrained optimization. Sensitivity analysis. Approximate techniques. FEM-based optimal design of mechanical and aerospace structures. Cross-listed as MAE 521. Credit is allowed for only CEE 533 or MAE 521. Prerequisite: instructor approval.

CEE 536 Structural Dynamics. (3)*not regularly offered*

Structures and structural members subjected to dynamic loadings, response spectra theory applications to bridges and power plants, investigations of the responses of multidegree of freedom structures, and matrix and numerical methods of analysis. Lecture, recitation. Prerequisites: CEE 321; instructor approval.

CEE 537 Topics in Structural Engineering. (1–3)*not regularly offered*

Advanced topics, including nonlinear structural analysis, experimental stress analysis, advanced finite elements, plasticity and viscoelasticity, composites, and damage mechanics. Prerequisite: instructor approval.

CEE 540 Groundwater Hydrology. (3)*fall*

Physical properties of aquifers, well pumping, subsurface flow modeling, unsaturated flow, numerical methods, land subsidence, and groundwater pollution. Prerequisite: CEE 440 or instructor approval.

CEE 541 Surface Water Hydrology. (3)*spring*

Hydrologic cycle and mechanisms, including precipitation, evaporation, and transpiration; hydrograph analysis; flood routing; statistical methods in hydrology and hydrologic design. Prerequisite: CEE 440 or instructor approval.

CEE 543 Water Resources Systems. (3)*not regularly offered*

Theory and application of quantitative planning methodologies for the design and operation of water resources systems; class projects using a computer; case studies. Prerequisite: instructor approval.

CEE 546 Free Surface Hydraulics. (3)*not regularly offered*

Derivation of 1-dimensional equations used in open channel flow analysis; computations for uniform and nonuniform flows, unsteady flow, and flood routing. Mathematical and physical models. Prerequisite: CEE 341.

CEE 547 Principles of River Engineering. (3)*not regularly offered*

Uses of rivers, study of watershed, and channel processes. Sediment sources, yield, and control; hydrologic analysis. Case studies. Prerequisite: CEE 341 or instructor approval.

CEE 548 Sedimentation Engineering. (3)*not regularly offered*

Introduction to the transportation of granular sedimentary materials by moving fluids. Degradation, aggregation, and local scour in alluvial channels. Mathematical and physical models. Prerequisite: CEE 547 or instructor approval.

CEE 550 Soil Behavior. (3)*not regularly offered*

Physicochemical aspects of soil behavior, stabilization of soils, and engineering properties of soils. Prerequisite: CEE 351.

CEE 551 Advanced Geotechnical Testing. (3)*not regularly offered*

Odometer, triaxial (static and cyclic) back pressure saturated and unsaturated samples, pore pressure measurements, closed-loop computer-controlled testing, in-situ testing, and sampling. Lecture, lab. Prerequisite: CEE 351.

CEE 552 Geological Engineering. (3)*not regularly offered*

Geological investigations for engineering purposes, case histories, geologic structure, weathering, remote sensing, geophysics, and air photo interpretation for engineering site locations. Lecture, field trips. Prerequisite: CEE 351.

CEE 553 Advanced Soil Mechanics. (3)*not regularly offered*

Application of theories of elasticity and plasticity to soils, theories of consolidation, failure theories, and response to static and dynamic loading. Prerequisite: CEE 351.

CEE 554 Shear Strength and Slope Stability. (3)*not regularly offered*

Shear strength of saturated and unsaturated soils strength-deformation relationships, time-dependent strength parameters, effects of sampling, and advanced slope stability. Prerequisite: CEE 351.

CEE 555 Advanced Foundations. (3)*not regularly offered*

Deep foundations, braced excavations, anchored bulkheads, reinforced earth, and underpinning. Prerequisite: CEE 351.

CEE 557 Hazardous Waste: Site Assessment and Mitigation Measures. (3)*not regularly offered*

Techniques for hazardous waste site assessment and mitigation. Case histories presented by instructor and guest speakers. Prerequisites: graduate standing; instructor approval.

CEE 559 Earthquake Engineering. (3)*not regularly offered*

Characteristics of earthquake motions, selection of design earthquakes, site response analyses, seismic slope stability, and liquefaction. Prerequisite: CEE 351.

CEE 560 Soil and Groundwater Remediation. (3)*fall*

Techniques for remediation of contaminated soils and groundwaters are presented with basic engineering principles. Prerequisite: instructor approval.

CEE 561 Physical-Chemical Treatment of Water and Waste. (3)*fall*

Theory and design of physical and chemical processes for the treatment of water and wastewaters. Prerequisite: CEE 361.

CEE 562 Environmental Biochemistry and Waste Treatment. (3)*spring*

Theory and design of biological waste treatment systems. Pollution and environmental assimilation of wastes. Prerequisite: CEE 362.

CEE 563 Environmental Chemistry Laboratory. (3)*fall*

Analysis of water, domestic and industrial wastes, laboratory procedures for pollution evaluation, and the control of water and waste treatment processes. Lecture, lab. Prerequisite: CEE 361.

CEE 565 Modeling and Assessment of Aquatic Systems. (3)*not regularly offered*

Development of predictive models of water quality; methods to assess environmental impacts; applications to water quality management.

Prerequisite: CEE 361 or instructor approval.

CEE 566 Industrial/Hazardous Waste Treatment. (3)*not regularly offered*

Emphasis on treatment of local industrial/hazardous waste problems, including solvent recovery and metals. Lecture, project. Prerequisites: CEE 561, 563.

CEE 573 Traffic Engineering. (3)*not regularly offered*

Driver, vehicle, and roadway characteristics, laws and ordinances, traffic control devices, traffic engineering studies, and Transportation System Management measures. Prerequisite: CEE 372.

CEE 574 Highway Capacity. (3)*not regularly offered*

Highway capacity for all functional classes of highways. Traffic signalization, including traffic studies, warrants, cycle length, timing, phasing, and coordination. Prerequisite: CEE 372.

CEE 575 Traffic Flow Theory and Safety Analysis. (3)*not regularly offered*

Traffic flow theory; distributions, queuing, delay models, and car-following. Highway safety; accident records systems, accident analysis, identifying problem locations, and accident countermeasures. Prerequisite: CEE 573 or 574.

CEE 577 Urban Transportation Planning. (3)*not regularly offered*

Application of land use parameters traffic generation theory, traffic distribution and assignment models, transit analysis, and economic factors to the solution of the urban transportation problem. Prerequisite: CEE 372.

CEE 580 Practicum. (1–12)*not regularly offered*

See CEE Note 1.

CEE 590 Reading and Conference. (1–12)*not regularly offered*

See CEE Note 1.

CEE 592 Research. (1–12)*not regularly offered*

See CEE Notes 1, 2.

CEE 599 Thesis. (1–12)*not regularly offered*

See CEE Notes 1, 2.

CEE 792 Research. (1–15)*not regularly offered*

See CEE Notes 1, 2.

CEE 799 Dissertation. (1–15)*not regularly offered*

See CEE Notes 1, 2.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Communication

Master's Program

Kristin B. Valentine*Director of Graduate Studies***(STAUF A412) 480/965-5096****Fax: 480/965-4291****Kristin.Valentine@asu.edu****com.pp.asu.edu/academic/masters.html**

PROFESSORS

ALBERTS, ARNOLD, BROOME, CANARY, CARLSON,
JAIN, MARTIN, MCPHEE, NAKAYAMA, VALENTINE

ASSOCIATE PROFESSORS

BULEY, COREY, CORMAN, CRAWFORD, DAVEY,
GUERRERO, MAYER, TROST

ASSISTANT PROFESSORS

BROOKEY, BROUWER, DAVIS, FLOYD, MARTINEZ,
MESSMAN, PARK-FULLER, TRACY, TRETHERWEY

INSTRUCTIONAL PROFESSIONAL

OLSON

ASSISTANT INSTRUCTIONAL PROFESSIONAL

McDONALD

The Hugh Downs School of Human Communication strives to advance the understanding of message-related human behavior, for the purpose of improving communicative interactions. Teaching, research, and service are directed to the continued development of knowledge and application of the principles of communication. Courses of study are designed to provide students with relevant programs adapted to individual academic and professional goals.

MASTER OF ARTS

Faculty in the Hugh Downs School of Human Communication offer a program leading to the M.A. degree in Communication. Current areas of study within the major are intercultural communication, interpersonal communication, performance studies, organizational communication, and rhetoric.

Admission Requirements. Admission is competitive, based upon evidence of the applicant's scholarly and research abilities. All applicants must submit the following:

1. a Graduate College application, completed either online or on paper, along with official undergraduate and graduate transcripts;
2. a statement of professional goals (approximately 500 words);
3. Graduate Record Examination scores (verbal, quantitative, and analytical) taken within the past five years, plus other relevant test data provided by the applicant;
4. three letters of recommendation prepared within the preceding 12 months;

5. an optional writing sample; and
6. all applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL). Minimum scores are 550 on the paper and pencil version of this test or 213 on the computer version of this test. The Hugh Downs School of Human Communication also requires a minimum score of 230 on the Test of Spoken English.

A completed application for admission and two transcripts of all undergraduate and graduate work must be submitted to the Graduate Admissions Office. See "Admission to the Graduate College," page 92, for Graduate College general requirements. All application materials must be received by February 1.

Program of Study. The program consists of a minimum of 30 semester hours of graduate course work, which includes six semester hours of thesis credit. All students must successfully complete the following:

1. COM 501 Research Methods in Communication with a minimum grade of "B";
2. COM 504 Theories and Models in Communication with a minimum grade of "B";
3. at least one of the following three courses: COM 508 Quantitative Research Methods in Communication, COM 509 Qualitative Research Methods in Communication, or COM 521 Rhetorical Criticism of Public Discourse with a minimum grade of "B";
4. at least three content seminars;
5. a written comprehensive examination on theory and methodology, and an area of study (an oral examination may be required); and
6. a thesis, which is an account of original research, and an oral examination in defense of the thesis.

Applicants with undergraduate deficiencies must remove such deficiencies, and these courses do not count toward the master's degree. The student's program of study is the mutual responsibility of the student and the supervisory committee. A foreign language is not required, but is encouraged as appropriate. Descriptions of current program options and requirements are available from the Hugh Downs School of Human Communication, STAUF A412.

HUGH DOWNS SCHOOL OF HUMAN COMMUNICATION (COM)

COM 400 CIP: Communication in Professions. (3)

fall, spring, summer

Specialized study of communication processes in professional and organizational settings. May be repeated for credit. Open to B.I.S. majors only. Lecture, discussion. Prerequisites: both COM 100 and 225 or only COM 259; 2.00 GPA.

General Studies: HU, C

COM 404 Research Apprenticeship. (3)

fall and spring

Direct research experience on faculty projects. Student/faculty match based on interests. Lecture, apprenticeship. Prerequisites: COM 308 (or instructor approval); minimum cumulative ASU GPA of 2.50; application required.

COM 407 Advanced Critical Methods in Communication. (3)

spring

Examination of critical approaches relevant to communication, including textuality, social theory, cultural studies, and ethnography. Lecture, discussion. Prerequisites: COM 308; minimum cumulative ASU GPA of 2.50.

COM 408 Quantitative Research Methods in Communication. (3)

fall and spring

Advanced designs, measurement techniques, and methods of data analysis of communication research. Prerequisites: COM 308 and a generic statistics course (EDP 454 or POS 401 or PSY 230 or QBA 221 or SOC 390 or STP 226); minimum cumulative ASU GPA of 2.50.

COM 410 Interpersonal Communication Theory and Research. (3)

fall, spring, summer

Survey and analysis of major research topics, paradigms, and theories dealing with message exchanges between and among social peers. Prerequisites: COM 110 (or 310), 308; minimum cumulative ASU GPA of 2.50.

General Studies: SB

COM 411 Communication in the Family. (3)

once a year

Broad overview of communication issues found in marriage and family life, focusing on current topics concerning communication in the family. Prerequisites: COM 110 (or 310), 207; minimum cumulative ASU GPA of 2.50.

General Studies: SB

COM 414 Crisis Communication. (3)

not regularly offered

Role of communication in crisis development and intervention. Prerequisite: minimum cumulative ASU GPA of 2.50.

COM 417 Communication and Aging. (3)

not regularly offered

Critical study of changes in human communicative patterns through the later adult years, with attention on intergenerational relationships and self-concept functions. Prerequisite: minimum cumulative ASU GPA of 2.50.

COM 421 Rhetoric of Social Issues. (3)

fall and spring

Critical rhetorical study of significant speakers and speeches on social issues of the past and present. Prerequisites: COM 308, 321 (or 323).

General Studies: HU

COM 422 Advanced Argumentation. (3)

not regularly offered

Advanced study of argumentation theories and research as applied to public forum, adversary, scholarly, and legal settings. Prerequisites: COM 222; minimum cumulative ASU GPA of 2.50.

COM 426 Political Communication. (3)

fall

Theories and criticism of political communication; including campaigns, mass persuasion, propaganda, and speeches. Emphasis on rhetorical approaches. Prerequisite: minimum cumulative ASU GPA of 2.50.

General Studies: SB

COM 430 Leadership in Group Communication. (3)

not regularly offered

Theory and process of leadership in group communication, emphasizing philosophical foundations, contemporary research, and applications to group situations. Prerequisites: COM 230; minimum cumulative ASU GPA of 2.50.

COM 441 Performance Studies. (3)

fall, spring, summer

Theory, practice, and criticism of texts in performance. Emphasis on the interaction between performer, text, audience, and context. Prerequisites: COM 241, 308; minimum cumulative ASU GPA of 2.50.

General Studies: HU

COM 445 Narrative Performance. (3)

not regularly offered

Theory and practice of performing narrative texts (e.g., prose fiction, oral histories, diaries, essays, letters). Includes scripting, directing, and the rhetorical analysis of storytelling. Prerequisites: COM 241; minimum cumulative ASU GPA of 2.50.

General Studies: HU

COM 446 Interpretation of Literature Written by Women. (3)*not regularly offered*

Explores, through performance and critical writing, literature written by women. Prerequisite: minimum cumulative ASU GPA of 2.50.

General Studies: HU, C

COM 450 Theory and Research in Organizational Communication. (3)*fall, spring, summer*

Critical review and analysis of the dominant theories of organizational communication and their corollary research strategies. Prerequisites: COM 250, 308; minimum cumulative ASU GPA of 2.50.

General Studies: SB

COM 453 Communication Training and Development. (3)*once a year*

Examination of the procedures and types of communication training and development in business, industry, and government. Prerequisites: COM 250; minimum cumulative ASU GPA of 2.50.

COM 463 Intercultural Communication Theory and Research. (3)*fall, spring, summer*

Survey and analysis of major theories and research dealing with communication between people of different cultural backgrounds, primarily in international settings. Lecture, discussion, small group work. Cross-listed as AFR 463. Credit is allowed for only AFR 463 or COM 463.

Prerequisites: both COM 263 (or AFR 263) and 308 or only instructor approval; minimum cumulative ASU GPA of 2.50.

General Studies: SB, G

COM 465 Intercultural Communication Workshop. (3)*not regularly offered*

Experientially based study of communication between members of different cultures designed to help students improve their intercultural communication skills. Prerequisites: minimum cumulative ASU GPA of 2.50; instructor approval.

COM 494 Special Topics. (1–3)*fall, spring, summer*

Prerequisite: minimum cumulative ASU GPA of 2.50.

COM 501 Research Methods in Communication. (3)*fall*

Critical analysis of systems of inquiry in communication, focusing on the identification of variables and approaches to conducting research in communication. Prerequisite: instructor approval.

COM 504 Theories and Models in Communication. (3)*fall*

Theory construction, metatheoretical concerns, models, construct definition, and comparative analysis of current theories in communication. Prerequisite: instructor approval.

COM 508 Quantitative Research Methods in Communication. (3)*fall*

Empirical research designs, measurements, and statistical strategies and techniques in analyzing and evaluating experimental and descriptive research in communication. Prerequisites: both COM 501 and 504 or only instructor approval.

COM 509 Qualitative Research Methods in Communication. (3)*spring*

Qualitative research methods, including interviewing, field methods, and other nonquantitative techniques for analyzing communication. Prerequisites: both COM 501 and 504 or only instructor approval.

COM 510 Interpersonal Communication Theory and Research. (3)*once a year*

Contemporary theories and research in interpersonal communication. Prerequisites: both COM 501 and 504 or only instructor approval.

COM 512 Death, Society, and Human Experience. (3)*not regularly offered*

Examines dying, death, bereavement, and suicide from both individual and sociocultural perspectives in terms of options for communication and action in death-related situations. Prerequisite: instructor approval.

COM 521 Rhetorical Criticism of Public Discourse. (3)*not regularly offered*

History and significance of rhetorical theory and criticism in the analysis of public discourse. Prerequisites: both COM 501 and 504 or only instructor approval.

COM 584 Communication Internship. (1–12)*fall, spring, summer*

Fee.

COM 596 Pro-Seminar in Communication. (0)*fall*

Discussion of research projects with the faculty. Prerequisite: admission to the graduate program.

COM 604 Theory Construction in Communication. (3)*fall*

Review and analysis of philosophical problems inherent in communicative research and of metatheories designed to deal with these problems. Prerequisite: COM 504 or instructor approval.

COM 607 Contemporary Rhetorical Methods. (3)*spring*

Analysis of issues in the practice of rhetorical communication research, including criticism and scholarship. Seminar.

COM 608 Multivariate Statistical Analysis of Data in Communication. (3)*spring*

Statistical analysis of communication research data. Multivariate procedures used in communication research and methods of causal analysis. Prerequisites: COM 501 and 508 (or their equivalents).

COM 609 Advanced Qualitative Research Methods in Communication. (3)*fall*

Analysis of issues in the practice of qualitative communication research, including data gathering, fieldwork issues, analysis strategies, and reporting results. Prerequisite: COM 509 or instructor approval.

COM 680 Practicum: Research in Communication. (3)*spring*

Guided practice in the conduct of communication research. Topic identification; procedures, formats, and ethics of publishing. Prerequisite: COM 604.

COM 691 Seminar. (1–12)*fall, spring, summer*

Lecture, discussion. Possible topics:

- (a) Current Organizational Approaches to Communication. (3)
- (b) Examination of Privacy and Disclosure. (3)
- (c) Intercultural Aspects of Communication. (3)
- (d) Interpersonal and Relational Communication. (3)
- (e) Research in Performance Studies. (3)
- (f) Rhetorical Issues. (3)
- (g) Social Influence. (3)

Prerequisite: instructor approval.

COM 792 Research. (1–12)*not regularly offered***COM 799 Dissertation. (1–15)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Communication

Interdisciplinary Doctoral Program

Robert D. McPhee

Director

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Communication

Professors: Alberts, Arnold, Broome, Canary, Carlson, Jain, Martin, McPhee, Nakayama, Valentine;

Associate Professors: Buley, Corey, Corman, Davey, Guerrero, Mayer, Trost;

Assistant Professors: Brookey, Brouwer, Davis, Floyd, Martinez, Messman, Park-Fuller, Tracy, Trethewey

Educational Leadership and Policy Studies

Assistant Professor: Margolis

English

Professor: Roen;

Associate Professor: Miller

Family and Human Development

Professors: Christopher, Fabes

Industrial Management Systems Engineering

Professor: Dooley

Journalism and Telecommunications

Professor: Godfrey

Justice Studies

Regents' Professor: Altheide;

Professors: Johnson, Romero

Recreation Management and Tourism

Professor: Allison

Sociology

Professor: Nagasawa

Supply Chain Management

Professor: Smeltzer

DOCTOR OF PHILOSOPHY

The Committee of Faculty offers an interdisciplinary graduate program leading to the Ph.D. degree in Communication. Concentrations are available in communicative development, intercultural communication, and organizational communication.

The program is designed to prepare scholars for research-oriented careers in universities and in the public or private sectors. Students are provided training in communication theory, research methodology, and a specialization in one or more areas of concentration. The goal of the program is to meet the needs of students whose interests transcend traditional disciplinary boundaries.

See "Doctor of Philosophy," page 103, for general requirements.

Admission Requirements. Admission to the program is competitive. Applications are considered once a year for fall admission. Applicants must have earned either a bachelor's

or master's degree and must present evidence of scholarly writing (e.g., an undergraduate honors thesis, a master's thesis, or their equivalent). All applicants should be knowledgeable in the basic principles of both qualitative and quantitative methods of research, social statistics, and communication theory. If course work in these areas has not been completed, admitted students are required to successfully complete COM 501 Research Methods in Communication and COM 504 Theories and Models in Communication (plus any other courses stipulated by the admissions committee) before enrolling in the required theory and methodology sequence. Knowledge in statistics must be demonstrated either by completion of a graduate-level statistics course within two years before admission to the program, by completion of COM 508 within the first two years of course work, or by some other option approved by the director of the doctoral program. In addition to meeting the minimum Graduate College admission requirements, the applicant's scholastic and professional record must indicate special interest in and aptitude for systematic research in communication. All applicants must submit the following:

1. a completed Graduate College application and official undergraduate and graduate transcripts;
2. a formal *curriculum vitae*, including a statement of career goals and the relevance of this degree program to those goals;
3. Graduate Record Examination (GRE) scores (verbal, quantitative, and analytical) taken within the past five years, plus other relevant test data volunteered by the applicant;
4. three letters of recommendation written within the preceding 12 months, including at least one letter from a previous faculty member;
5. a sample of writing (e.g., master's thesis, course paper); and
6. A minimum score of 600 on the Test of English as a Foreign Language and a minimum score of 230 on the Test of Spoken English for all applicants whose native language is not English.

All application materials must be in the program office by January 15 to be considered. Late applications are not processed.

Supervisory/Dissertation Committee. This committee consists of a chair and at least two other members appointed by the dean of the Graduate College based upon the director's recommendation. At least two-thirds of the committee must be full-time faculty at the ASU Main Campus and at least two-thirds of the committee must be from the communication faculty. At least one member must be from an academic discipline outside of communication. The chair of the supervisory committee, who serves as the student's advisor, must be knowledgeable in the student's area of concentration, have an active research agenda, publish regularly in appropriate refereed academic journals, and be experienced in graduate education. Members of the committee must represent more than one academic discipline. The purpose of the committee is to guide the student through the completion of the program of study, the comprehensive examinations, and the dissertation research.

Areas of Concentration. Students admitted to the program select a formal area of concentration in any of the three broad areas of communicative development, intercultural communication, and organizational communication. However, the interdisciplinary nature of the program and breadth of its faculty allow students to design individual programs of study geared toward more specialized topics in human communication. As a rule, these cut across the formal areas of concentration and generally follow the areas of expertise of program faculty. Program graduates study areas such as interpersonal communication, organizational communication, performance studies, rhetoric, critical/cultural studies, relational communication, and information technology. Contact the director for an up-to-date list of program faculty and their areas of interest.

Communicative Development. This area includes the study of communicative behaviors and functions as they evolve and change over time. Students in this area study the role of communication in interpersonal processes, performance studies, and rhetoric.

Intercultural Communication. The theoretical relationship between culture and communication is the focus of this area. Students in this area study the effects of cultural/ethnic differences and similarities on a wide range of communication processes. Students may also explore the communication of culture and ethnicity.

Organizational Communication. This area examines the role of communicative processes and systems in public and private organizations with an emphasis on the interaction between organizational participants and organizational structures, practices, informational channels, networks, and message forms.

Because of the interdisciplinary nature of the Ph.D. program, students may explore relevant course work in disciplines such as communication, social and development psychology, family studies, educational psychology, cultural anthropology, comparative sociology, linguistics, justice studies, industrial psychology, management, and public administration, among others.

Program of Study. If the student has completed an appropriate master's degree, the Ph.D. requires a minimum of 60 hours beyond the master's degree. Course work for a typical program of study is distributed as follows: required core courses (9 semester hours), area of concentration (27 semester hours), dissertation (COM 799) and research (COM 792) (24 semester hours) for a total of 60 hours (minimum). Three interdisciplinary theory and methodology courses are required of all students entering the program. The required theory course is COM 604 Theory Construction in Communication. Students are also required to take COM 792 Practicum: Research in Communication. In addition, students must take two of the three methods courses, which consist of COM 607 Contemporary Rhetorical Methods, COM 608 Multivariate Statistical Analysis of Data in Communication, and COM 609 Advanced Qualitative Research Methods in Communication.

In addition to the three-hour section of COM 792 described above, students are required to complete at least three additional hours of 792. Products of at least one 792 course are presented in a public colloquium.

The student is also required to demonstrate proficiency in research methods (statistics, computer languages, content

analysis methods, participant observation, etc.) which, in the judgment of the supervisory committee, is needed for the student's dissertation research. Evidence of required proficiency may be demonstrated by established university examination procedures or by successful completion of a sequence of courses designated by the student's program committee.

For students who have completed only the bachelor's degree before admission to the Ph.D. program, a minimum of 84 hours of interdisciplinary graduate work is required for the program, including the same 60-hour requirement for students with the master's degree. The initial course work for students admitted with only a bachelor's degree is similar to the M.A. degree requirements in Communication except that no thesis is required. These requirements include a general overview of research in communication (COM 501), an overview of theories and models of communication (COM 504), a statistics course (COM 508), and electives from communication or other disciplines to total 24 hours of course work. The methods, theory, and statistics courses must be completed before beginning the required theory and methodology sequence for the Ph.D. (i.e., they are prerequisites for the required courses).

Foreign Language Requirements. None.

Comprehensive Examinations. Upon completion of course work and before the formal approval of the dissertation proposal, the student is examined in the relevant area of concentration and research methods. The examination consists of written and oral components designed to test the student's interdisciplinary knowledge in the field and chosen area of concentration and the student's readiness to undertake interdisciplinary dissertation research. The examination is conducted by the student's supervisory committee.

Admission to Candidacy. After the student has passed both the written and oral portions of the comprehensive examination and the student's dissertation topic has been approved, the student may apply to the Graduate College for admission to candidacy. Before admission to candidacy, it is expected that students have completed a mixture of academic experiences, including formal course work, participation in doctoral seminars, research with faculty, and independent research that are related to the topic of the dissertation and lead up to the dissertation. It is also expected that students have been exposed to both quantitative and qualitative methods of research before candidacy. No dissertation hours (COM 799) may be taken before admission to candidacy, but six hours of research (COM 792) may be taken before admission to candidacy. Students must enroll for 12 hours of research (COM 792)/dissertation (COM 799) credit following the semester in which they are advanced to candidacy.

Dissertation Proposal. Before conducting the research for the dissertation, each student must submit a dissertation proposal that is defended orally and approved by the student's dissertation committee.

Research and Dissertation. The dissertation consists of a fully documented written analysis of a problem that extends the knowledge and/or theoretical framework of the field and reflects the student's creativity and competence in indepen-

dent, interdisciplinary research using an appropriate research methodology.

Final Examinations. An oral examination in defense of the dissertation, conducted by the dissertation committee, is required.

Communication Disorders

Master's Program

David Ingram
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 www.asu.edu/clas/shs

PROFESSORS

S. BACON, CASE, DORMAN, D. INGRAM, WILCOX

ASSOCIATE PROFESSORS

LISS, SINEX

ASSISTANT PROFESSORS

AZUMA, GRAY, SHARMA

CLINICAL PROFESSOR

MATHY

CLINICAL ASSOCIATE PROFESSORS

C. BACON, BROWN, MINTZ, REMSON

CLINICAL ASSISTANT PROFESSORS

K. INGRAM, WEBER, WEXLER

MASTER OF SCIENCE

The faculty in the Department of Speech and Hearing Science offer a program leading to the M.S. degree in Communication Disorders. Thesis and nonthesis degree options are available, and students may study either speech-language pathology or audiology. The program is accredited by the Council on Academic Accreditation of the American Speech-Language-Hearing Association.

Admission Requirements. Students applying for admission to this program should have their undergraduate transcripts mailed to the Graduate Admissions Office. In addition, candidates should have their Graduate Record Examination scores, a statement of professional and academic goals not to exceed 200 words, and three letters of recommendation sent to the Department of Speech and Hearing Science. All materials must be received in the department by January 15 for fall admission which is the only term in which students may begin their program of study. Candidates who have undergraduate deficiencies may need to take required prerequisite courses.

Academic Requirements. A student must complete a minimum of 30 or 33 semester hours of graduate course work, exclusive of credit for practicum, approved by the supervisory committee.

Statistical Proficiency Requirements. A student pursuing the M.S. degree must provide satisfactory evidence of com-

petency in statistical methods appropriate to the behavioral sciences.

Clinical Requirements. A student in the M.S. program must complete at least 375 clock hours of supervised clinical practicum experience, of which a minimum of 250 clock hours must be obtained at the graduate level.

Thesis Option. Students wishing to pursue the thesis option will complete 30 semester hours of course work, six hours of which must be thesis credit, excluding practicum and internship hours. The thesis must meet requirements established by the Graduate College.

Nonthesis Option. Students choosing the nonthesis option will complete 33 semester hours of course work, excluding practicum and internship hours.

Final Examinations. For a candidate for the M.S. degree (thesis option), two final examinations are required: (1) the National Teacher Examination in speech pathology, or the National Teacher Examination in audiology, administered by Educational Testing Service and available at ASU through the University Testing Service, and (2) an oral defense of the thesis. For a candidate for the M.S. degree (nonthesis option), two final examinations are required: (1) the National Teacher Examination in speech pathology, or the National Teacher Examination in audiology, administered as described above, and (2) a four-hour comprehensive written examination administered in October and March of each year by the departmental graduate faculty.

Students should expect to spend two years completing the academic, practicum and research requirements for either degree option.

SPEECH AND HEARING SCIENCE (SHS)

SHS 401 Introduction to Audiologic Evaluation. (3)

fall

Measurement of the basic audiologic test battery, including audiograms, immittance, masking, and speech recognition. Prerequisites: SHS 311 and 376 and 384 (or their equivalents).

SHS 402 Modifying Communicative Behavior. (3)

fall

Principles and techniques of modifying speech and language behavior. Prerequisite: SHS 250 (or its equivalent).

SHS 465 Speech and Language Acquisition. (3)

spring

Speech and language development in the normal child. Prerequisite: SHS 367 (or its equivalent).

General Studies: SB

SHS 485 Acquired Speech and Language Disorders. (3)

spring

Introduction to acquired speech and language disorders across the lifespan. Prerequisites: SHS 250, 310.

SHS 496 Aural Rehabilitation. (3)

spring

Approaches to aural rehabilitation of children and adults. Introduction to educational audiology and assistive listening devices. Prerequisites: SHS 375 and 376 and 401 (or their equivalents).

SHS 501 Introduction to Audiologic Evaluation. (3)

fall

Measurement of the basic audiologic test battery, including audiograms, immittance, masking, and speech recognition. Prerequisites: SHS 311 and 376 and 384 (or their equivalents).

SHS 502 Differential Diagnosis for Audiology. (4)

fall

Differential diagnosis of cochlear and retrocochlear disorders, and assessment of vestibular system. 3 hours lecture, 2 hours lab. Prerequisite: SHS 401 or 501 (or its equivalent).

SHS 504 Hearing Aids. (4)*spring*

Operation, application, and fitting of amplification devices for the hearing impaired. 3 hours lecture, 2 hours lab. Prerequisite: SHS 401 or 501 (or its equivalent).

SHS 508 Pediatric Audiology. (3)*fall*

Audiologic assessment, screening, and development considerations for infants and young children. Prerequisite: SHS 401 or 501 (or its equivalent).

SHS 511 Auditory Perception by the Hearing Impaired. (3)*fall*

Studies how and why sensorineural hearing loss alters the perception of sound. Prerequisite: SHS 376 or instructor approval.

SHS 512 Medical Aspects of Speech and Hearing. (3)*fall*

Correlation of history and physical findings with pathologic physiology and test results in speech and hearing abnormalities.

SHS 515 Audiologic Instrumentation and Calibration. (3)*fall*

Electronic instruments used to produce, modify, and measure characteristics of sound. Measurement standards and methods for calibration of audiologic equipment. Lecture, lab. Prerequisite: SHS 401 or 501 (or its equivalent).

SHS 516 Auditory-Evoked Potentials. (4)*spring*

Continuation of SHS 502, including electrophysiologic assessment of peripheral and central auditory nervous system. Lecture, lab. Prerequisite: SHS 502.

SHS 545 Speech Perception by the Hearing Impaired. (3)*fall*

Speech perceptual problems of the hearing impaired including those who have cochlear implants. Prerequisite: SHS 375 or instructor approval.

SHS 552 Otoacoustic Emissions as a Diagnostic Tool. (3)*spring*

Studies the types of otoacoustic emissions, their theoretical implications and application to clinical diagnostics. Lecture, discussion, lab. Prerequisite: SHS 376 or instructor approval.

SHS 555 Cochlear Implants. (3)*spring*

Current status of cochlear implant research and development. Prerequisites: both SHS 504 and 545 or only instructor approval.

SHS 565 Speech and Language Acquisition. (3)*spring*

Speech and language development in the normal child. Prerequisite: SHS 367 (or its equivalent).

SHS 566 Psychology of Language. (3)*spring*

Psycholinguistic study of the production and comprehension of language across the lifespan.

SHS 567 Neural Bases of Communication Disorders. (3)*fall*

Neuroscience and its application to matters of normal and disordered communication. Pre- or corequisite: SHS 310 (or its equivalent).

SHS 570 Communication Disorders and Multicultural Populations. (3)*spring*

Studies racial and ethnic biases and the communication behaviors and disorders in various cultural groups.

SHS 571 Augmentative Communication and Language Programming. (3)*spring*

Focuses on individuals across the age span who are unable or who are at risk for being unable to communicate with spoken language. Lecture, lab.

SHS 572 Language Assessment and Intervention in Early Childhood. (3)*fall*

Focuses on the birth to 5-year-old population who are at risk for or who have communication and language disabilities. Prerequisite: SHS 470 (or its equivalent).

SHS 573 Language Assessment and Intervention with School-Age Populations. (3)*spring*

Focuses on later language development, linguistic demands of academic settings, assessment and intervention strategies for older children and adolescents. Prerequisite: SHS 565 (or its equivalent).

SHS 574 Fluency Disorders and Treatment. (3)*fall*

Presents phenomena, etiology, assessment, and theories of stuttering, followed by various treatment procedures for children and adults who stutter. Prerequisite: SHS 431 (or its equivalent).

SHS 575 Aphasia and Related Neurogenic Language Disorders. (3)*fall*

Assessment and treatment of acquired neurolinguistic impairment. Prerequisite: SHS 567.

SHS 576 Neuromotor Speech Disorders. (3)*spring*

Evaluation and treatment of the dysarthrias and apraxia of speech. Emphasis on acquired adult disorders.

SHS 577 Craniofacial Disorders of Communication. (3)*summer*

Communication disorders related to anomalies of the craniofacial structures, including orofacial clefting of the lip and palate. Prerequisite: SHS 310 (or its equivalent).

SHS 578 Disorders of Voice. (3)*spring*

Communication disorders related to dysfunction of the phonatory and resonance systems of voice production, assessment, and treatment. Prerequisite: SHS 310 or instructor approval.

SHS 579 Feeding and Swallowing Disorders Across the Lifespan. (3)*fall*

Focuses on individuals across the age span who have feeding and/or swallowing disorders. Presents assessment and treatment strategies. Prerequisite: SHS 567.

SHS 580 Clinical Practicum. (1–6)*fall, spring, summer*

Supervised practicum in audiology or speech-language pathology. 1 hour staffing and 3 hours of client contact per week per hour of credit. May be repeated for credit. Prerequisites: instructor approval; student must not have provisional admission status.

SHS 581 Right Hemisphere Syndrome, Traumatic Brain Injury, and Dementia. (3)*spring*

Studies the nature, characteristics, and clinical management of cognitive and communicative impairments accompanying right hemisphere damage, TBI, and dementia. Prerequisite: SHS 567.

SHS 582 Differential Diagnosis of Communication Disorders. (3)*spring*

Procedures for assessing speech/language disorders in children and adults. 3 hours lecture, 2 hours lab. Prerequisites: SHS 250 and 310 and 465 and 567 (or their equivalents).

SHS 584 Internship. (1–6)*fall, spring, summer*

Off-campus directed experiences in audiology or speech-language pathology. May be repeated for credit. Prerequisites: SHS 580; student must consult with coordinator before registration.

SHS 585 Articulation and Phonology: Assessment and Intervention. (3)*spring*

Assessment and treatment of developmental articulation and phonological disorders. Prerequisites: SHS 250 and 310 (or their equivalents).

SHS 591 Seminar. (1–12)*fall, spring, summer*

Possible topics:

- (a) Central Auditory Mechanisms and Learning Impairment. (3)
 - spring*
- (b) Cognitive and Linguistic Interactions in Adult Neurogenic Disorders. (3)
 - fall*
- (c) Fundamentals of Vestibular Evaluations. (3)
 - fall*
- (d) Research Methods in Communication Disorders. (3)
 - spring*

SHS 596 Aural Rehabilitation. (3)*spring*

Approaches to aural rehabilitation in children and adults. Introduction to educational audiology and assistive listening devices. Prerequisite: SHS 401 or 501 (or its equivalent).

SHS 792 Research. (1-12)*not regularly offered***SHS 799 Dissertation. (1-15)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Communication and Human Relations

Certificate Program

ASU West offers a postbaccalaureate certificate in Communication and Human Relations. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Communication Studies

Master's Program

ASU West offers a Master of Arts degree in Communication Studies. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Composition

See "Music," page 271.

Computer Science

Master's and Doctoral Programs

Stephen S. Yau

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ASSOCIATE PROFESSORS

BARAL, BHATTACHARYA, DASGUPTA, DIETRICH,
FALTZ, GHOSH, HUEY, LIU, MILLER, O'GRADY,
PANCHANATHAN, PHEANIS, SEN, S. URBAN

ASSISTANT PROFESSORS

BAZZI, CANDAN, GANNOD, RICHA, WAGNER

The faculty in the Department of Computer Science and Engineering offer graduate programs leading to M.S. and Ph.D. degrees in Computer Science. The faculty also offer a professional graduate program leading to the Master of Computer Science degree.

Areas of study include algorithms, software engineering, computer-aided geometric design, artificial intelligence, database and multimedia, operating systems, computer architecture, networking, and parallel and distributed systems.

MASTER OF SCIENCE

The M.S. degree program in Computer Science stresses formal course work to provide breadth of material, and it culminates with a thesis that demonstrates depth in a particular research area.

Admission. See "Admission to the Graduate College," page 92, for general requirements. An applicant for the M.S. program should normally have a baccalaureate degree in computer science, computer engineering, or a closely related area. The applicant's undergraduate GPA and depth of preparation in computer science and engineering are the primary factors affecting admission. Every applicant must submit scores for the Graduate Record Examination (GRE) (verbal, quantitative, and analytical required; the subject test in computer science is optional). An international student must also submit Test of English as a Foreign Language (TOEFL) scores. The application deadline for admission in the fall semester is February 1, and the deadline for admission in the spring semester is September 1.

Program of Study. Each student defines a potentially unique program of study in conjunction with an advisor, subject to approval of the department and the Graduate College. The program of study must include courses in four focus areas, at least nine credit hours in a research area, and a minimum of 30 semester hours of approved graduate-level course work (including a thesis). At least 21 semester hours must be formal course work, and at least 18 hours must be CSE 500-level credits (excluding CSE 598). The department may prescribe additional courses based on the background of the candidate. No foreign language is required.

Final Examinations. The student must pass a final oral examination in defense of the thesis and over the course work taken for the degree and the appropriate undergraduate prerequisites.

MASTER OF COMPUTER SCIENCE

The faculty in the Department of Computer Science and Engineering offer a professional program leading to the Master of Computer Science (M.C.S.) degree. The M.C.S. program provides a professionally oriented, graduate-level education in computer science and engineering. The program reflects the dual nature of computer science as both a scientific and engineering discipline by allowing emphasis on theory as well as practical applications. Students can study topics such as artificial intelligence, computer-aided geometric design, computer architecture, computer graphics, computer science theory, database concepts, digital sys-

tems design, distributed systems, language processing, networking, operating systems, and software engineering.

Admission. An applicant for the M.C.S. program should normally have a baccalaureate degree in computer science, computer engineering, or a closely related area. The applicant's undergraduate GPA, GRE (verbal, quantitative, and analytical) score, and depth of preparation in computer science and engineering are the primary factors affecting admission. The GRE subject test in computer science is optional. An international student must also submit the results of the TOEFL. The application deadline for admission in the fall semester is January 15, and September 1 for the spring semester. See "Admission to the Graduate College," page 92.

Program of Study. Each student defines a potentially unique program of study subject to approval by the department and the Graduate College. The program of study must include courses in four focus areas and must contain a minimum of 30 semester hours of approved graduate-level course work. At least 18 hours must be CSE 500-level credits (excluding CSE 598), and at least 27 hours must be for formal course work. A three-semester hour course, CSE 593 Applied Project, is also required. The department may prescribe additional courses based on the background of the candidate.

Foreign Language Requirements. None.

Thesis Requirements. None.

Final Examinations. M.C.S. students must complete a graded final project (CSE 593) and submit a report on the project.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Computer Science is available for students of high ability who show promise for original research.

Admission. An applicant for the Ph.D. program should have the equivalent of a baccalaureate major in computer science, computer engineering, or a closely related area. Most applicants should have earned the master's degree, but applicants with exceptional attainments in their baccalaureate are admitted directly into the Ph.D. program. The primary factors affecting admission include the applicant's GPA, depth of preparation in computer science and engineering, GRE (verbal, quantitative, analytical, and computer science) scores, a statement of purpose and three letters of recommendation. An international student must submit TOEFL scores. The application deadline for admission in the fall semester is March 15, and the deadline for admission in the spring semester is October 15. See "Doctor of Philosophy," page 103, for general requirements.

Residency. In addition to the Graduate College's requirement for one year of full-time residency, the Department of Computer Science and Engineering stipulates one additional year of full-time residency for dissertation research.

Program of Study. Each student must file a program of study for approval by the supervisory committee, the department, and the Graduate College.

Foreign Language Requirements. None. The program committee, however, may establish a requirement depending upon the research interests of the candidate.

Comprehensive Examinations. A student must pass a comprehensive examination, which has a mandatory written component, before being admitted to candidacy. The exam will have both oral and written components, testing the student's general knowledge in the dissertation area as well as closely related areas. International students must achieve a passing score on the TSE/SPEAK exam prior to comprehensive examinations.

Dissertation Requirements. A student must complete a dissertation based on original work to demonstrate creativity in research and scholarly proficiency in the subject area.

Final Examinations. The student must pass a final oral examination in defense of the dissertation.

RESEARCH ACTIVITY

Research areas include graph algorithms, combinatorial optimization, design and analysis of algorithms, artificial intelligence, distributed and incremental planning, computer aided geometric design, graphics, multiresolution flow visualization, distributed and visualization of databases, multimedia systems, parallel and distributed systems and networking, fault tolerant applications, software development, formal methods, reverse engineering, object oriented analysis and design, protocols, security, microprocessors, embedded systems, software engineering, software life cycle, and the Internet.

COMPUTER SCIENCE AND ENGINEERING (CSE)

CSE 408 Multimedia Information Systems. (3)

fall

Design, use, and applications of multimedia systems. Introduction to acquisition, compression, storage, retrieval, and presentation of data from different media such as images, text, voice, and alphanumeric. Prerequisite: CSE 310.

CSE 412 Database Management. (3)

fall and spring

Introduction to DBMS concepts. Data models and languages. Relational database theory. Database security/integrity and concurrency. Prerequisite: CSE 310.

CSE 420 Computer Architecture I. (3)

once a year

Computer architecture. Performance versus cost tradeoffs. Instruction set design. Basic processor implementation and pipelining. Prerequisite: CSE 330.

CSE 421 Microprocessor System Design I. (4)

fall and spring

Assembly language programming and logical hardware design of systems using 8-bit microprocessors and microcontrollers. Fundamental concepts of digital system design. Reliability and social, legal implications. Lecture, lab. Prerequisite: CSE 225 or EEE 225.

CSE 422 Microprocessor System Design II. (4)

fall and spring

Design of microcomputer systems using contemporary logic and microcomputer system components. Requires assembly language programming. Prerequisite: CSE 421.

CSE 423 Microcomputer System Hardware. (3)

once a year

Information and techniques presented in CSE 422 are used to develop the hardware design of a multiprocessor, multiprogramming, microprocessor-based system. Prerequisite: CSE 422.

General Studies: L

CSE 428 Computer-Aided Processes. (3)*not regularly offered*

Hardware and software considerations for computerized manufacturing systems. Specific concentration on automatic inspection, numerical control, robotics, and integrated manufacturing systems. Prerequisite: CSE 330.

CSE 430 Operating Systems. (3)*fall and spring*

Operating system structure and services, processor scheduling, concurrent processes, synchronization techniques, memory management, virtual memory, input/output, storage management, and file systems. Prerequisites: CSE 330, 340.

CSE 434 Computer Networks. (3)*fall and spring*

Cryptography fundamentals; data compression; error handling; flow control; multihop routing; network protocol algorithms; network reliability, timing, security; physical layer basics. Prerequisite: CSE 330.

CSE 438 Systems Programming. (3)*once a year*

Design and implementation of systems programs, including text editors, file utilities, monitors, assemblers, relocating linking loaders, I/O handlers, and schedulers. Prerequisite: CSE 421 or instructor approval.

*General Studies: L***CSE 440 Compiler Construction I. (3)***once a year*

Introduction to programming language implementation. Implementation strategies such as compilation, interpretation, and translation. Major compilation phases such as lexical analysis, semantic analysis, optimization, and code generation. Prerequisites: CSE 340, 355.

CSE 445 Distributed Computing with Java and CORBA. (3)*fall and spring*

Frameworks for distributed software components. Foundations of client-server computing and architectures for distributed object systems. Dynamic discovery and invocation. Lecture, projects. Prerequisite: CSE 360 or instructor approval.

CSE 446 Client-Server User Interfaces. (3)*spring*

Client-server model and its use in creating and managing window interfaces. Toolkits and libraries including X11, Microsoft Foundation Classes, and Java Abstract Window Toolkit. Lecture, projects. Prerequisite: CSE 310 or instructor approval.

CSE 450 Design and Analysis of Algorithms. (3)*fall and spring*

Design and analysis of computer algorithms using analytical and empirical methods; complexity measures, design methodologies, and survey of important algorithms. Prerequisite: CSE 310.

CSE 457 Theory of Formal Languages. (3)*once a year*

Theory of grammar, methods of syntactic analysis and specification, types of artificial languages, relationship between formal languages, and automata. Prerequisite: CSE 355.

CSE 459 Logic for Computing Scientists. (3)*not regularly offered*

Propositional logic, syntax and semantics, proof theory versus model theory, soundness, consistency and completeness, first order logic, logical theories, automated theorem proving, ground resolution, pattern matching unification and resolution, Dijkstras logic, proof obligations, and program proving. Prerequisite: CSE 355.

CSE 460 Software Analysis and Design. (3)*fall and spring*

Requirements analysis and design; architecture and patterns; representations of software; formal methods; component-based development. Lecture, projects. Prerequisite: CSE 360.

CSE 461 Software Engineering Project I. (3)*fall and spring*

First of two-course software team-development sequence. Planning, management, design, and implementation using object-oriented technology, CASE tools, CMM-level-5 guidelines. Lecture, lab, oral and written communications. Prerequisite: CSE 360.

CSE 462 Software Engineering Project II. (3)*fall and spring*

Second of two-course software team-development sequence. Software evolution, maintenance, reengineering, reverse engineering, component-based development, and outsourcing. Lecture, lab, oral and written communications. Prerequisite: CSE 461.

CSE 470 Computer Graphics. (3)*fall and spring*

Display devices, data structures, transformations, interactive graphics, 3-dimensional graphics, and hidden line problem. Prerequisites: CSE 310; MAT 342.

CSE 471 Introduction to Artificial Intelligence. (3)*fall and spring*

State space search, heuristic search, games, knowledge representation techniques, expert systems, and automated reasoning. Prerequisites: CSE 240, 310.

CSE 473 Nonprocedural Programming Languages. (3)*not regularly offered*

Functional and logic programming using languages like Lucid and Prolog. Typical applications would be a Screen Editor and an Expert System. Prerequisite: CSE 355.

CSE 476 Introduction to Natural Language Processing. (3)*not regularly offered*

Principles of computational linguistics, formal syntax, and semantics, as applied to the design of software with natural (human) language I/O. Prerequisite: CSE 310 or instructor approval.

CSE 477 Introduction to Computer-Aided Geometric Design. (3)*once a year*

Introduction to parametric curves and surfaces, Bezier and B-spline interpolation, and approximation techniques. Prerequisites: CSE 210, 470; MAT 342.

CSE 507 Virtual Reality Systems. (3)*not regularly offered*

Computer generated 3D environments, simulation of reality, spatial presence of virtual objects, technologies of immersion, tracking systems. Lecture, lab. Prerequisite: CSE 408 or 470 or 508 or instructor approval.

CSE 508 Digital Image Processing. (3)*once a year*

Digital image fundamentals, image transforms, image enhancement and restoration techniques, image encoding, and segmentation methods. Prerequisite: EEE 303 or instructor approval.

CSE 510 Database Management System Implementation. (3)*once a year*

Implementation of database systems. Data storage, indexing, querying, and retrieval. Query optimization and execution, concurrency control, and transaction management. Prerequisite: CSE 412.

CSE 512 Distributed Database Systems. (3)*once a year*

Distributed database design, query processing, and transaction processing. Distributed database architectures and interoperability. Emerging technology. Prerequisite: CSE 412.

CSE 513 Rules in Database Systems. (3)*not regularly offered*

Declarative and active rules. Logic as a data model. Evaluation and query optimization. Triggers and ECA rules. Current research topics. Prerequisite: CSE 412.

CSE 514 Object-Oriented Database Systems. (3)*not regularly offered*

Object-oriented data modeling, definition, manipulation. Identity and inheritance. Query languages. Schema evolution. Versioning. Distributed object management. Extended relational systems. Prerequisite: CSE 412.

CSE 515 Multimedia and Web Databases. (3)*spring*

Data models for multimedia and Web data; query processing and optimization for inexact retrieval; advanced indexing, clustering, and search techniques. Prerequisites: CSE 408, 412.

CSE 517 Hardware Design Languages. (3)*once a year*

Introduction to hardware design languages. Modeling concepts for specification, simulation, and synthesis. Prerequisite: CSE 423 or EEE 425 or instructor approval.

CSE 518 Synthesis with Hardware Design Languages. (3)*not regularly offered*

Modeling VLSI design in hardware design languages for synthesis. Transformation of language-based designs to physical layout. Application of synthesis tools. Prerequisite: CSE 517.

CSE 520 Computer Architecture II. (3)*fall*

Computer architecture description languages, computer arithmetic, memory-hierarchy design, parallel, vector, multiprocessors, and input/output. Prerequisites: CSE 420, 430.

CSE 521 Microprocessor Applications. (4)*not regularly offered*

Microprocessor technology and its application to the design of practical digital systems. Hardware, assembly language programming, and interfacing of microprocessor-based systems. Lecture, lab. Prerequisite: CSE 421.

CSE 523 Microcomputer Systems Software. (3)*not regularly offered*

Developing system software for a multiprocessor, multiprogramming, microprocessor-based system using information and techniques presented in CSE 421, 422. Prerequisite: CSE 422.

CSE 526 Parallel Processing. (3)*not regularly offered*

Real and apparent concurrency. Hardware organization of multiprocessors, multiple computer systems, scientific attached processors, and other parallel systems. Prerequisite: CSE 330 or 423.

CSE 530 Operating System Internals. (3)*once a year*

Implementation of process management and synchronization, system call and interrupt handling, memory management, device drivers and file systems in UNIX. Prerequisites: CSE 430; knowledge of C language.

CSE 531 Distributed and Multiprocessor Operating Systems. (3)*once a year*

Distributed systems architecture, remote file access, message-based systems, object-based systems, client/server paradigms, distributed algorithms, replication and consistency, and multiprocessor operating systems. Prerequisite: CSE 530 or instructor approval.

CSE 532 Advanced Operating System Internals. (3)*not regularly offered*

Memory, processor, process and communication management, and concurrency control in the Windows NT multiprocessor and distributed operating system kernels and servers. Prerequisites: CSE 530, 531 (or 536).

CSE 534 Advanced Computer Networks. (3)*fall and spring*

Advanced network protocols and infrastructure, applications of high-performance networks to distributed systems, high-performance computing and multimedia domains, special features of networks. Prerequisite: CSE 434.

CSE 536 Theory of Operating Systems. (3)*spring*

Protection. Communication and synchronization in distributed systems, distributed file systems, deadlock theory, virtual memory theory, and uniprocessor and multiprocessor thread management. Prerequisite: CSE 430.

CSE 537 ATM Network Design. (3)*not regularly offered*

Principles of ATM networks, switch architecture, traffic management, call and connection control, routing, internetworking with ATM networks, signaling, and OAM. Prerequisite: CSE 434.

CSE 539 Applied Cryptography. (3)*spring*

Use of cryptography for secure protocols over networked systems, including signatures, certificates, timestamps, electrons, digital cash, and other multiparty coordination. Prerequisite: CSE 310 or instructor approval.

CSE 540 Compiler Construction II. (3)*not regularly offered*

Formal parsing strategies, optimization techniques, code generation, extensibility and transportability considerations, and recent developments. Prerequisite: CSE 440.

CSE 545 Programming Language Design. (3)*not regularly offered*

Language constructs, extensibility and abstractions, and runtime support. Language design process. Prerequisite: CSE 440.

CSE 550 Combinatorial Algorithms and Intractability. (3)*once a year*

Combinatorial algorithms, nondeterministic algorithms, classes P and NP, NP-hard and NP-complete problems, and intractability. Design techniques for fast combinatorial algorithms. Prerequisite: CSE 450.

CSE 555 Theory of Computation. (3)*once a year*

Rigorous treatment of regular languages, context-free languages, Turing machines and decidability, reducibility, and other advanced topics in computability theory. Prerequisite: CSE 355 or instructor approval.

CSE 556 Expert Systems. (3)*not regularly offered*

Knowledge acquisition and representation, rule-based systems, frame-based systems, validation of knowledge bases, inexact reasoning, and expert database systems. Prerequisite: CSE 471.

CSE 562 Software Process Automation. (3)*once a year*

Representing the software process; creating a measured and structured working environment; using, constructing, and adapting component-based tools. Prerequisite: CSE 360.

CSE 563 Software Requirements and Specification. (3)*not regularly offered*

Examines the definitional stage of software development; analysis of specification representations, formal methods, and techniques emphasizing important application issues. Prerequisite: CSE 460.

CSE 564 Software Design. (3)*once a year*

Examines software design issues and techniques. Includes a survey of design representations and a comparison of design methods. Prerequisite: CSE 460.

CSE 565 Software Verification, Validation, and Testing. (3)*once a year*

Test planning, requirements-based and code-based testing techniques, tools, reliability models, and statistical testing. Prerequisite: CSE 460.

CSE 566 Software Project, Process, and Quality Management. (3)*once a year*

Project management, risk management, configuration management, quality management, and simulated project management experiences. Prerequisite: CSE 360.

CSE 570 Advanced Computer Graphics I. (3)*once a year*

Hidden surface algorithms, lighting models, and shading techniques. User interface design. Animation techniques. Fractals and stochastic models. Raster algorithms. Prerequisite: CSE 470.

CSE 571 Artificial Intelligence. (3)*once a year*

Definitions of intelligence, computer problem solving, game playing, pattern recognition, theorem proving, and semantic information processing; evolutionary systems; heuristic programming. Prerequisite: CSE 471.

CSE 573 Advanced Computer Graphics II. (3)*once a year*

Modeling of natural phenomena: terrain, clouds, fire, water, and trees. Particle systems, deformation of solids, antialiasing, and volume visualization. Lecture, lab. Prerequisite: CSE 470.

CSE 574 Planning and Learning Methods in AI. (3)*once a year*

Reasoning about time and action, plan synthesis and execution, improving planning performance, applications to manufacturing intelligent agents. Prerequisite: CSE 471 (or its equivalent).

CSE 575 Decision-Making Strategies in AI. (3)*not regularly offered*

Automatic knowledge acquisition, automatic analysis/synthesis of strategies, distributed planning/problem solving, causal modeling, predictive human-machine environments. Prerequisite: CSE 471 or 571 (or its equivalent).

CSE 576 Topics in Natural Language Processing. (3)*not regularly offered*

Comparative parsing strategies, scoping and reference problems, nonfirst-order logical semantic representations, and discourse structure. Prerequisite: CSE 476 or instructor approval.

CSE 577 Advanced Computer-Aided Geometric Design I. (3)*once a year*

General interpolation; review of curve interpolation and approximation; spline curves; visual smoothness of curves; parameterization of curves; introduction to surface interpolation and approximation. Prerequisites: both CSE 470 and 477 or only instructor approval.

CSE 578 Advanced Computer-Aided Geometric Design II. (3)*not regularly offered*

Coons patches and Bezier patches; triangular patches; arbitrarily located data methods; geometry processing of surfaces; higher dimensional surfaces. Prerequisites: both CSE 470 and 477 or only instructor approval.

CSE 579 NURBS: Nonuniform Rational B-Splines. (3)*not regularly offered*

Projective geometry, NURBS-based modeling, basic theory of conics and rational Bezier curves, rational B-splines, surfaces, rational surfaces, stereographic maps, quadrics, IGES data specification. Prerequisites: CSE 470, 477.

CSE 593 Applied Project. (1–12)*not regularly offered***CSE 598 Special Topics. (1–4)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Construction

Master's Program

W.W. Badger

Director

(SCOB 241) 480/965-3615

dewsc@asu.edu

construction.asu.edu

PROFESSORS

BADGER, MULLIGAN

ASSOCIATE PROFESSORS

BASHFORD, DUFFY, ERNZEN, KASHIWAGI, SAWHNEY,
WALSH, WEBER

ASSISTANT PROFESSORS

CHASEY, KNUTSON, WIEZEL

VISITING EMINENT SCHOLAR

SCHEXNAYDER

MASTER OF SCIENCE

The faculty in the Del E. Webb School of Construction offer a graduate program leading to the M.S. degree in Construction. Concentrations are available in construction science, facilities management, and construction management. The interdisciplinary nature of the program allows a candidate's program of study to reflect both individual interests and career goals.

The primary objective of the program is to allow students with a baccalaureate degree in construction or a related field such as architecture, business, or engineering to broaden and improve their professional capabilities in construction. The program is designed to meet the growing need for professionals with advanced technical, management, and applied research skills in the construction industry.

The *construction science* concentration allows students with an interest in field engineering or supervision of heavy and industrial construction projects to pursue a more technically oriented course of study. The *facilities management* concentration supports the needs of the student desiring a career in the maintenance, operation, renovation, or decommissioning of existing facilities. The *construction manage-*

ment concentration allows students seeking upper-level management positions in various sectors of the construction industry to improve their competency in project, program, and company management areas.

Admission Requirements. Applicants are expected to satisfy all requirements for admission to the Graduate College. In addition, applicants are expected to be competent in basic construction topics. Admission is based upon an evaluation of the student's academic background and potential for success. Students whose native language is not English must also submit a Test of English as a Foreign Language (TOEFL) score of at least 550.

Graduate Record Examination (GRE). Applicants must submit scores on the verbal, quantitative, analytical, and advanced sections of the GRE for admission.

Application Deadline. Completed college and departmental application materials should be received by February 1 for admission in the fall semester.

Program of Study. As soon as possible after selecting the student's supervisory committee, the student must file a program of study with the Graduate College.

The program of study consists of the following: thesis option—30 semester hours of graduate study culminating in a thesis and an oral defense; or nonthesis option—36 semester hours of graduate study culminating in an oral and written comprehensive examination.

RESEARCH ACTIVITY

Applied research is an integral part of the M.S. degree in Construction. Del E. Webb School of Construction has several major ongoing research projects. The general fields of study include Alliance for Construction Excellence, Construction Research Education Advanced Technology Environments, Advanced Technology Homes, Performance-Based Studies Research Group, alternative project delivery systems, construction productivity studies, construction information technology, and construction and behavior of deep foundation. For more information, access the Web site at construction.asu.edu.

CONSTRUCTION (CON)

CON 424 Structural Design. (3)

fall

Economic use of concrete, steel, and wood in building and engineered structures. Design of beams, columns, concrete formwork, and connections. Lecture, field trips. Prerequisite: CON 310.

CON 453 Construction Labor Management. (3)

fall and spring

Labor and management history, union, and open shop organization of building and construction workers; applicable laws and government regulations; goals, economic power, jurisdictional disputes, and grievance procedures. Lecture, lab. Prerequisites: CON 371; ECN 112.

CON 455 Construction Project Management. (3)

fall and spring

Study of methods for coordinating people, equipment, materials, money, and schedule to complete a project on time and within approved cost. Lecture, class projects. Prerequisite: CON 371. Pre- or corequisite: CON 495.

CON 463 Foundations. (3)

spring

Subsurface construction theory and practice for description, excavations, exploration, foundations, pavements, and slopes. Evaluation of specifications and plans of work. Lecture, recitation, field trips. Prerequisites: CON 424, 450.

CON 468 Mechanical and Electrical Estimating. (3)*fall*

Analysis and organization of performing a cost estimate for both mechanical and electrical construction projects. Computer usage. Prerequisites: a combination of CON 273 and 345 and 383 or only instructor approval.

CON 471 Mechanical and Electrical Project Management. (3)*spring*

Specialty contracts and agreements, scheduling, material handling, labor unit analysis, and job costing for mechanical and electrical construction. Prerequisite: CON 371.

CON 472 Development Feasibility Reports. (3)*fall and spring*

Integration of economic location theory, development cost data, market research data, and financial analysis into a feasibility report. Computer orientation. Prerequisite: REA 380.

*General Studies: L***CON 477 Residential Construction Business Practices. (3)***fall*

Topics addressed include development, marketing, financing, legal issues, and sales. Prerequisite: CON 377 or instructor approval.

CON 483 Advanced Building Estimating. (3)*fall and spring*

Concepts of pricing and markup, development of historic costs, life cycle costing, change order and conceptual estimating, and emphasizing microcomputer methods. Prerequisite: CON 383.

CON 486 Heavy Construction Estimating. (3)*fall*

Methods analysis and cost estimation for construction of highways, bridges, tunnels, dams, and other engineering works. Lecture, field trips. Prerequisites: CON 344, 383.

CON 495 Construction Planning and Scheduling. (3)*fall and spring*

Various network methods of project scheduling, such as AOA, AON Pert, bar-charting, line-of-balance, and VPM techniques. Microcomputers used for scheduling, resource allocation, and time/cost analysis. Lecture, lab. Prerequisites: CON 383; STP 226. Pre- or corequisite: CON 389.

*General Studies: CS***CON 496 Construction Contract Administration. (3)***fall and spring*

Surveys administrative procedures of general and subcontractors. Studies documentation, claims, arbitration, litigation, bonding, insurance, and indemnification. Discusses ethical practices. Lecture, field trips. Prerequisites: COM 225 or ECE 300; senior standing.

*General Studies: L***CON 533 Strategies of Estimating and Bidding. (3)***fall*

Explores advanced concepts of the estimating process, such as modeling and statistical analysis, to improve bid accuracies. Prerequisite: CON 483 or 486 or instructor approval.

CON 540 Construction Productivity. (3)*fall*

Productivity concepts. Data collection. Analysis of productivity data and factors affecting productivity. Means for improving production and study of productivity improvement programs. Pre- or corequisite: CON 495.

CON 543 Construction Equipment Engineering. (3)*spring*

Analysis of heavy construction equipment productivity using case studies. Applies engineering fundamentals to the planning, selection, and utilization of equipment. Lecture, case studies.

CON 545 Construction Project Management. (3)*spring*

Theory and practice of construction project management. Roles of designer, owner, general contractor, and construction manager. Lecture, field trips. Pre- or corequisite: CON 495.

CON 547 Strategic Planning. (3)*fall*

Business planning process of the construction enterprise. Differences between publicly held and closely held businesses and their exposure.

CON 561 International Construction. (3)*spring*

Investigation of the cultural, social, economic, political, and management issues related to construction in foreign countries and remote regions.

CON 565 Performance-Based Systems. (3)*fall*

Identifying the multicriteria methodology in the procurement of facilities contractual work. Prerequisite: instructor approval.

CON 567 Advanced Procurement Systems. (3)*spring*

Development of multicriteria decision procurement model for selecting the performing contractor. Prerequisite: instructor approval.

CON 570 Cleanroom Construction I. (3)*fall*

Design issues for cleanroom facilities; the construction's viewpoint including planning, structures, mechanical, and tool installation. Lecture, site visits. Prerequisite: instructor approval.

CON 571 Cleanroom Construction II. (3)*spring*

Construction issues for cleanroom facilities including scheduling, cost estimating, project management, mechanical, safety certification, and tool hook-up. Lecture, site visits. Prerequisite: CON 570 or instructor approval.

CON 575 Information Technology in Construction. (3)*spring*

Use of information technology in the construction enterprise for improved communications, process modeling, and decision making. Prerequisite: instructor approval.

CON 589 Construction Company Financial Control. (3)*fall*

Financial accounting and cost control at the company level in construction companies. Accounting systems. Construction project profit calculations. Financial analysis. Lecture, case studies.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Counseling

Master's Program

Elsie Moore*Director***(EDB 302) 480/965-3384****dpe@asu.edu****seamonkey.ed.asu.edu/~gail/division/divintro.htm**

PROFESSORS

BERNSTEIN, CLAIBORN, HACKETT, HORAN, KERR,
KINNIER, McWHIRTER, ROBINSON KURPIUS, TRACEY

ASSOCIATE PROFESSORS

ARCINIEGA, ARREDONDO, HOOD

ASSISTANT PROFESSORS

FISHER, MATTHEWS, OTA WANG

CLINICAL ASSOCIATE PROFESSOR

HOMER

CLINICAL ASSISTANT PROFESSOR

GLIDDEN-TRACEY

MASTER OF COUNSELING

The Master of Counseling (M.C.) degree is a two-year, 60-semester-hour professional program. The program is designed to prepare students for counseling as a profession, and it includes a set of required professional studies supported by elective subjects in related disciplines. Both practitioner and research options are available. The M.C. program, which focuses on community counseling, is

accredited by Council for Accreditation of Counseling and Related Educational Programs (CACREP).

The M.C. degree identifies the recipient as a professional counselor and prepares individuals to work in a variety of human service fields. Certified teachers who complete this degree are eligible for school counselor certification in Arizona and most other states.

Admission. A student initiates application for admission to the M.C. degree program with the Graduate College. Admission is determined by a variety of criteria in addition to GPAs. Applications are reviewed once a year. Applicants to the M.C. degree must submit all application materials by January 15 to be considered for admission for the following academic year. The number of students admitted to the M.C. degree program is limited by the size of the faculty and the facilities available for practica. Applicants may get the complete program brochure from the Division of Psychology in Education and the program Web site, seamonkey.ed.asu.edu/~gail/division/divintro.htm.

Supervisory Committee. Following admission to the M.C. program, a supervisory committee consisting of a chair and two other faculty members are appointed to plan a program of study with the student and to prepare, administer, and evaluate the final examination(s).

Program of Study. The program of study should be planned in consultation with the supervisory committee. Candidates for the M.C. degree must complete COE 501 Introduction to Research and Evaluation in Education. In addition to course work, the program may include supervised practica in consultation, individual and group counseling, marriage and family counseling, and stress management. These experiences involve a variety of client populations. The program of study must be approved by the supervisory committee, the division director, and the dean of the Graduate College.

Credit Before Admission. A maximum of 32 semester hours of graduate course work earned in a completed master's degree from an accredited institution may be applied to the program. In all other circumstances, a maximum of nine semester hours of prior course work may be applied to the M.C. degree program.

Final Examinations. Students in the practitioner option are required to take a final written comprehensive examination or prepare a final written paper.

Students in the research option are required to complete a thesis. An oral examination in defense of the thesis is also required.

RESEARCH ACTIVITY

See "Counseling Psychology," page 165, for research activity.

COUNSELOR EDUCATION (CED)

CED 512 Introduction to Helping Relationships. (3)

fall, spring, summer

Introduction to the skills used in the helping professions and an examination of the settings in which they occur.

CED 522 Theories of Counseling and Psychotherapy. (3)

fall, spring, summer

Presentation of major theories of psychological intervention as well as underlying personality theory upon which they are based.

CED 523 Psychological Tests. (3)

fall, spring, summer

Standardized tests in the study of the individual, with emphasis on test score interpretation in counseling.

CED 534 Occupations and Careers. (3)

fall, spring, summer

The world of work, career development, education, and training for occupational entry and mobility.

CED 545 Analysis of the Individual. (3)

fall, spring, summer

Theory and methods commonly used in studying the individual. Observational methods, diagnostic interviews, structured, and semi-structured methods for assessing personality. Pre- or corequisite: CED 523.

CED 567 Group Dynamics and Counseling. (3)

fall, spring, summer

Group process factors, theory, and diversity issues determining effective interaction in small groups. Emphasis placed on lecturettes, self awareness, and experiential components. Lecturettes, discussion, experiential. Prerequisite: admission to graduate degree program.

CED 577 Counseling Prepracticum. (3)

fall, spring, summer

Focus on racial, social, and cultural factors in the development of helping relationships through integration of cognitive and affective self-awareness with counseling skills. Lecture, lab. Prerequisite: admission to M.C. or school counselor certification program. Pre- or corequisite: CED 522.

CED 655 Student Development Programs in Higher Education. (3)

once a year

Emerging conceptual models of student development. Overview of student personnel and student affairs programs in community colleges, four-year colleges, and universities. Observation on campuses.

CED 656 The American College Student. (3)

spring

Overview of American college student from demographic, background characteristics, and values/attitudes/perspectives. Includes access, persistence, and degree completion. Lecture, group discussion, research projects. Cross-listed as HED 679. Credit is allowed for only CED 656 or HED 679.

CED 672 Marriage and Family Counseling. (3)

fall

Introduction to marriage and family counseling theories. Emphasis is on a systems-communication model utilizing cocounseling.

CED 684 Internship in Community Counseling. (3-6)

fall, spring, summer

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Counseling Psychology

Doctoral Program

Elsie Moore

Director

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seamonkey.ed.asu.edu/~gail/division/divintro.htm

PROFESSORS

BERNSTEIN, CLAIBORN, HACKETT, HORAN, KERR, KINNIER, McWHIRTER, ROBINSON KURPIUS, TRACEY

ASSOCIATE PROFESSORS

ARCINIEGA, ARREDONDO, HOOD

ASSISTANT PROFESSORS

FISHER, MATTHEWS, OTA-WANG

CLINICAL ASSOCIATE PROFESSOR
HOMER

CLINICAL ASSISTANT PROFESSOR
GLIDDEN-TRACEY

DOCTOR OF PHILOSOPHY

The faculty in the Division of Psychology in Education offer a graduate program leading to the Ph.D. degree in Counseling Psychology. The Ph.D. program in Counseling Psychology is accredited by the American Psychological Association. The Ph.D. program adheres closely to the scientist-practitioner model in preparing graduates for positions in academic and psychological service settings. Although faculty interests are diverse, there is a strong emphasis on empirical data as the basis for professional decision-making. All applicants must submit scores of the Graduate Record Examination and submit all application materials by January 15 to be considered for admission for the following academic year.

Curriculum requirements of the Counseling Psychology program include course work from several domains (general psychology core, empirical foundations, and counseling theory and methods) as well as practicum and internship experiences. Comprehensive examinations cover the psychology core, empirical foundations, and counseling theory and practice. Applicants should contact the Division of Psychology in Education and request the *Counseling Psychology Program* brochure for a complete description of admissions and curricular requirements. A copy of the program brochure is also available on the Web site, seamonkey.ed.asu.edu/~gail/division/divintro.htm.

RESEARCH ACTIVITY

Research activity includes career development and self-efficacy, counseling process, drug abuse prevention, adolescent suicide, problem solving and decision making, small-group process, interpersonal skill development, ethnic and gender issues, health psychology topics, student development, program evaluation, gerontological counseling, ethics, marriage and family counseling, at-risk youth, and the counseling of the gifted and talented.

COUNSELING PSYCHOLOGY (CPY)

CPY 613 Child Counseling. (3)

not regularly offered

Applications of counseling theory in working with children in clinics and elementary schools. Integrated practicum available with instructor approval. Prerequisite: CED 577 (or its equivalent).

CPY 622 Group Counseling. (3)

fall and spring

Theories and methodologies used in group counseling. Prerequisites: CED 567 and 577 (or their equivalents).

CPY 634 Organizational Development and Planned Change. (3)

not regularly offered

Organizational/individual dynamics, including theory, analysis, techniques, and consultation/intervention strategies used in organizational development. Field consultation projects. Prerequisites: CED 567 and 577 (or their equivalents).

CPY 644 Psychology of Careers. (3)

spring

Advanced career counseling, including theory, research, and practice. Prerequisite: CED 577 (or its equivalent).

CPY 645 Professional Issues and Ethics. (3)

fall and spring

Ethical, legal, and professional issues of concern to practitioners and researchers functioning in a variety of settings. Prerequisites: CED 512 and 523 (or their equivalents).

CPY 667 Patterns of Behavior Disorders. (3)

once a year

Etiology and treatment of a variety of psychological problems, particularly those represented in DSM III-R. Prerequisite: CED 577 (or its equivalent).

CPY 671 Multicultural Counseling. (3)

fall

Provides awareness of the influence of sociocultural variables on human development and explores implications for counseling minority populations.

CPY 672 Human Diversity: Social Psychological Perspectives. (3)

once a year

Implications for psychological practice of social, psychological, and biological factors in the development of behavioral differences.

CPY 674 Counseling Women. (3)

fall

Explores women's development and its implications for counseling. Sexism in mental health, sex differences in diagnosis and psychopathology, and women's particular treatment needs.

CPY 675 Health and Wellness Counseling. (3)

not regularly offered

Theory, research, and practice in health and wellness counseling. Prerequisite: CED 577.

CPY 677 Advanced Counseling. (3)

not regularly offered

Advanced topics in counseling theory, research, and practice. Prerequisite: CED 577 (or its equivalent).

CPY 679 History and Systems of Psychology. (3)

once a year

Examination of the development and differentiation of the discipline of psychology from its origins in philosophy to the present.

CPY 701 Science and Practice of Counseling Psychology. (3)

fall

Directed experiences involving the integration of theory, research, and practice in counseling psychology. Prerequisite: instructor approval.

CPY 702 Research Methods in Counseling Psychology. (3)

once a year

Application of experimental and/or quasi-experimental methods to theory construction and treatment evaluation in counseling psychology. Prerequisite: COE 502 (or its equivalent).

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Counselor Education

Master's Program

Elsie Moore

Director

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PROFESSORS

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CLINICAL ASSOCIATE PROFESSOR
HOMER

CLINICAL ASSISTANT PROFESSOR
GLIDDEN-TRACEY

The faculty in the Division of Psychology in Education offer a degree program leading to the Master of Education degree in Counseling.

MASTER OF EDUCATION

The Master of Education degree in Counseling is a 30-semester-hour program for certified or certifiable teachers. The degree is designed to provide a greater understanding of the psychological and behavioral development of individual students; a greater understanding of the dynamics and use of groups in the instructional process; a greater understanding of principles of testing and vocational and career dynamics that have applications in the instructional process; a greater understanding of the effective utilization of school specialists in aiding student development; and a greater understanding of the role of the school counselor in the instructional process. While the M.Ed. program is generally chosen as a student's fifth year of teacher preparation, the M.Ed. does not result in certification as a school counselor. Those wishing to be certified for school counseling should apply to the Master of Counseling (M.C.) degree program.

Admission to the M.Ed. in Counseling is based on the applicant's potential for graduate study and completion of an undergraduate degree in education or certification as a teacher in Arizona public schools. To balance student demand with resources available, the program is limited in the number of students admitted each admissions period.

Applicants to the M.Ed. in Counseling must submit all application materials by October 15 or April 15 to be considered for admission for the following semester. Applicants should get the complete program brochure from either the Division of Psychology in Education or from the Web site.

See "Master of Education," page 186, for more information.

RESEARCH ACTIVITY

See "Counseling Psychology," page 165, for research activity.

COUNSELOR EDUCATION (CED)

See "Counseling," page 164, for courses.

Creative Writing

Interdisciplinary Master's Program

Beckian Fritz Goldberg
Director, Executive Committee
(LL 315C) 480/965-3528
enggrad@asu.edu

www.asu.edu/clas/english/creativewriting

English

Regents' Professors: Dubie, Ríos;
Professors: Boyer, Carlson, Rhodes;
Associate Professors: Goldberg, Pritchard, Savard

Theatre

Professors: Bedard, Mason;
Associate Professor: Edwards;
Assistant Professor: Reyes

Faculty of the Creative Writing Committee offer an interdisciplinary Master of Fine Arts degree in Creative Writing. The program is offered jointly by the Department of English in the College of Liberal Arts and Sciences and the Department of Theatre in the Herberger College of Fine Arts.

MASTER OF FINE ARTS

One of the unique features of this interdisciplinary program is that, because it utilizes faculty research, creative activity, and teaching interests of two academic units, a student may tailor a course of study to fit individual needs, talents, and goals. The Department of English administers the program and reviews the applications for admission. In the English Department, the studio/academic program requires poets and prose writers to divide work equally between writing workshops and literature courses. This flexible curriculum allows candidates time to study with several gifted writers and scholars in a stimulating atmosphere, time to get quality advice on writing, and time to explore and develop their talents. In the Department of Theatre, the studio/academic program emphasizes the collaborative process of playwriting. Working with actors and directors, playwrights' workshops include informal readings, staged readings and workshop production of students' plays.

Admission. In addition to meeting the general requirements of the Graduate College, applicants must have an undergraduate major in English or Theatre, with a GPA of 3.00 or above. Applicants who do not have an undergraduate major in English or Theatre may be admitted provisionally, on the condition that they make up deficiencies in course work. Deficiencies in undergraduate preparation may be removed while pursuing the M.F.A. degree; courses taken to remove deficiencies may not be counted toward the degree. Applicants must also submit the following:

1. an acceptable score on the Miller Analogies Test or the Graduate Record Examination (GRE);

2. three letters of recommendation;
3. a professional résumé; and
4. a statement of career goals, including the designation of an area of specialization (options include fiction, poetry, and playwriting) and a manuscript sample of one of the following: 30 pages of drama; 20 pages of poetry; 30 pages of prose fiction or creative nonfiction; or 40 total pages of work in two of these literary forms.



Students discuss their studies at one of the many fountains on the ASU campus.

Jean Laaninen photo

Selection Procedures. Completed application forms should be sent directly to the Graduate College. All other materials and manuscripts, including the teaching assistant application form, should be submitted to the Department of English by February 1. The Creative Writing Committee reviews the materials and manuscripts and makes recommendations for admission by March 15. Guidelines for admission recommendations used by the committee include the following: applicant's academic record and capabilities for successful graduate study; talent and promise demonstrated in the manuscript sample; strength of letters of recommendation; quality of applicant's undergraduate background; and compatibility of the applicant's career goals with the purpose of the degree program.

Program of Study. In poetry and fiction, the program of study requires a minimum of 48 semester hours of graduate credit approved by the student's supervisory committee, the director of the Creative Writing Committee, and the dean of the Graduate College. Of these, 24 semester hours must be creative writing courses and must include nine hours of ENG 580, and nine hours of any combination of ENG 455, 594, and 598. The course 594 Conference and Workshop may be taken twice to varied offerings. The literature component of 24 hours must include ENG 591 and two of the following courses: ENG 441, 443, 454, 457, and 458. In playwriting, the program of study requires a minimum of 60 hours of graduate credit approved by the student's supervisory committee, the director of the Creative Writing Committee, and the dean of the Graduate College. The program of study must include the following: THP 519 (6 hours), 560 (15 hours), 561 (3 hours), 598 (3 hours), and 693 (9 hours). The literature component of 30 hours must include THE 500, 504, 505, 520, and 521.

Credit Before Admission. Subject to the recommendation of the supervisory committee, students with a completed M.A. or Ph.D. degree in English or Theatre may have up to 15 hours of literature credit applied to the M.F.A. program of study. A maximum of nine hours taken before admission and not as part of a completed degree at ASU and/or another institution may be used to fulfill degree requirements. All course work for the degree must be completed within the six-year time limit.

Comprehensive Examinations. A final written comprehensive examination is required and is scheduled once each semester and once during the summer. Upon completion of course work, the student is required to take the written examination. Official application is made through the Graduate College. The student is also required to notify the Creative Writing Committee of intent to take the examination at least 30 days in advance. A student is not eligible to apply for the written examination until a program of study has been filed. If the candidate fails the examination, a reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Permission for reexamination must be obtained from the student's supervisory committee, the director of the Creative Writing Committee, and the dean of the Graduate College. Only one reexamination is permitted. Students are examined in the following areas:

1. 20th-Century American Writers: Modern Period;
2. 20th-Century Writers: Contemporary Period; and
3. 20th-Century Critical Theory.

Playwrights are examined in the following areas: (1) European and American Drama and (2) Dramatic Theory and Criticism. The examination is constructed and graded by members of the Creative Writing Examination Committee.

Practicum and Performance Requirements. ENG 580 Practicum or THP 693 Applied Project is required of all students in the program. For nine semester hours of credit, the student creates a book-length volume of poetry, short stories, novel, drama, translation, or creative nonfiction (except literary criticism). This project must be approved in advance by the student's supervisory committee on the basis of sam-

ple pages and a summary of the proposal. The supervisory committee must evaluate and approve the final project. As the last requirement for the degree, the candidate must read or perform from the practicum or applied project before students and members of the faculty.

RESEARCH AND SCHOLARLY ACTIVITY

Research and scholarly endeavors inform the creative work of the faculty, which includes publication of poetry, fiction, and drama; collaborative production with musicians, fine printers, and visual artists. Special research courses are offered on contemporary perspectives emphasizing such topics as “Magical Realism,” “The Long Poem,” “Pedagogy Forum for Creative Writers,” “The Literature of Obsession,” “Sexing the Modern,” “Internship for Community Outreach,” and “Literary Management for Theatre.”

Research and creative activity is enhanced by vigorous faculty and student involvement in producing a national literary magazine, *Hayden’s Ferry Review*, an ASU student publication. Creative writing faculty and graduate students participate in public outreach programs, including workshops at ASU for adults and high school students in rural and metropolitan areas of the region. Public lectures and readings by faculty members, original play productions and reader’s theatre, and a regular series of public readings, lectures and conferences featuring writers of national renown provide a forum for exchange among artist, audience, scholar, and student. Recent conferences, with support from the National Endowment for the Arts and other agencies, have brought together writers, editors, and publishers, focusing attention on issues in publishing creative work.

COURSES

For courses, see “English (ENG),” page 203, “Theatre (THE),” page 338, and “Theatre Performance and Production (THP),” page 339.

Criminal Justice

Master’s Program

ASU West offers a Master of Arts degree in Criminal Justice. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Curriculum and Instruction

Master’s and Doctoral Programs

Nicholas Appleton
Director

Robert B. Rutherford Jr.
Graduate Director
(ED 426) 480/965-1644
coe.asu.edu/coe/candi

PROFESSORS

BAKER, BARONE, BITTER, CHRISTIE, EDELSKY, ERICKSON, FALTIS, FLORES, GRyder, GUZZETTI, HUDELSON, McGOWAN, McISAAC, PIBURN, RUTHERFORD, SEARFOSS, STAHL, STALEY, STOKROCKI, B. YOUNG, ZUCKER

ASSOCIATE PROFESSORS

ARIAS, BENAVIDES, BLUMENFELD-JONES, COHEN, COHN, DI GANGI, GOMEZ, McCOY, MIDDLETON, NELSON, RADER, ROBERTS, SMITH, SURBECK, VALLEJO

ASSISTANT PROFESSORS

ANIJAR, FISCHMAN, LAMOREY, MacSWAN, McQUILLAN, ROLSTAD, TRUJILLO, TSE, J. YOUNG

The faculty of the Division of Curriculum and Instruction offer the Master of Arts, Master of Education, and Doctor of Education degree programs in Curriculum and Instruction.

The Ph.D. degree in Curriculum and Instruction is offered by the Interdisciplinary Committee on Curriculum and Instruction. See “Interdisciplinary Doctoral Program,” page 174, for information regarding the Ph.D. curriculum.

Graduate-level endorsement programs in bilingual education, English as a second language, and reading are available and may be completed in conjunction with a M.Ed. or the Postbaccalaureate Program for Teacher Certification.

M.A. and M.Ed. students majoring in Curriculum and Instruction complete requirements by choosing one of the following concentrations: bilingual education, communication arts, early childhood education, elementary education, English as a second language, Indian education, mathematics education, multicultural education (currently applications are not being accepted), professional studies, reading education, science education, secondary education, and social studies education. The Ed.D. degree in Curriculum and Instruction offers areas of concentration in bilingual education, communication arts, curriculum studies, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, secondary education, and social studies education.

Admission. Applicants for admission to the M.Ed. and M.A. degrees are required to

1. meet Graduate College requirements for admission,

2. provide letter of intent that includes a statement of purpose and a summary of the applicant's professional teaching experience,
3. provide proof of teacher certification (photocopy of the certificate[s] held), and
4. provide three letters of recommendation.

Applicants who have junior-senior GPAs of 3.00 or higher, have an acceptable application package, and have proof of teacher certification are not required to take the Graduate Record Examination or Miller Analogies Test. Applicants who do not meet this minimum GPA requirement should contact the Division of Curriculum and Instruction graduate programs office for more information.

For admission to the Ed.D. degree program, contact the Division of Curriculum and Instruction graduate programs secretary for information regarding specific test scores and materials that need to be submitted with applications.

Applicants should note that meeting minimal admissions requirements does not guarantee admission. In addition, international students are required to submit the Test of English as a Foreign Language scores.

Programs of Study. The M.Ed. degree requires 30 semester hours of graduate course work and completion of a culminating activity. Students have two options for a culminating activity: either an applied project and an oral defense or a written comprehensive exam. Students should meet with their advisor early in their program to discuss the culminating activity.

The M.A. degree requires a minimum of 30 semester hours of graduate course work, including a thesis. An oral examination in defense of the thesis is required.

Candidates for the Ed.D. degree are required to complete at least 90 hours of graduate course work and research and dissertation credit.

Endorsements. The Arizona Reading endorsement requires 15 semester hours of upper-division or graduate-level course work in reading. The teaching endorsements in bilingual education and English as a second language require 21 semester hours. Middle school endorsement requirements include six semester hours of upper-division or graduate course work in middle-level education along with student teaching within fifth through ninth grades or one year of verifiable, full-time teaching experience within fifth through ninth grades. A valid Arizona teaching certificate is required to secure each of the above endorsements. Those interested in qualifying for one of these endorsements should seek advising from a faculty member in the program area.

Postbaccalaureate Program for Teacher Certification.

The postbaccalaureate initial teacher certification program offers, to those who have completed baccalaureate degrees outside the College of Education, course work needed to qualify for Arizona teacher certification. Postbaccalaureate programs are offered in bilingual education, early childhood education, elementary education, secondary education, and special education. Concurrent postbaccalaureate teacher certification and admission to the M.Ed. program in special education is required for those seeking certification by the State of Arizona. This requirement is waived for Postbaccalaureate Program for Teacher Certification applicants in special education who have already completed a master's degree.

A maximum of nine semester hours completed after receiving a bachelor's degree and before formal admission to a graduate program may be applied to an M.Ed. or M.A. degree. The maximum time limit for the program of study is six years.

Prospective Postbaccalaureate Program for Teacher Certification students should contact the Office of Student Affairs (EDB LI-13) for information about specific admission requirements.

MASTER OF ARTS

See "Master's Degrees," page 100, for general requirements.

MASTER OF EDUCATION

M.Ed. students in the secondary education concentration who are certified teachers may select a general or academic specialization option. Those selecting the academic specialization option complete 15 semester hours of core and secondary education course work and 15 hours in their academic specialization. The 15 hours of course work in the academic area must be selected in consultation with a faculty member involved in the area of study. This person serves as cochair of the student's supervisory committee.

DOCTOR OF EDUCATION

The Doctor of Education program is designed to provide an opportunity for practitioner-scholars to expand their skills and knowledge related to curriculum and instruction. The program produces practitioner-scholars for leadership roles in curriculum, program evaluation, or teacher education and professional development in school. Students will choose one of the curriculum and instruction concentration areas. The program prepares students for comprehending, interpreting, and applying theories, models, and research methods that have application to curriculum and instruction.

See "Doctor of Education," page 187, for information on the Doctor of Education degree.

RESEARCH ACTIVITY

Current faculty research activities include the E-Learning network: learning anytime anywhere; family-centered early identification of children with learning disabilities and behavior disorders; bilingual/English as a second language/special education; Arizona behavior initiative: creating school environments that support high academic standards for all students; relationship-based practice in early intervention settings; explaining low achievement in limited English proficient students; and extending and sustaining use of reforms in mathematics classrooms.

BILINGUAL EDUCATION (BLE)

BLE 511 Introduction to Language Minority Education. (3)
once a year

Historical, philosophical, theoretical, and pedagogical foundations of language minority education in the United States.

BLE 514 Bilingual/Multicultural Aspects of Special Education. (3)
spring

Theories and issues related to the education of bilingual and culturally diverse exceptional children.

BLE 515 Instructional Methods for Bilingual Students. (3)*fall*

Introduction to general dual language teaching approaches and assessment strategies. Focuses on the effective teaching of limited-English-proficient populations. Prerequisite: BLE 511.

BLE 520 ESL for Children. (3)*spring*

Examines approaches to second language development and assessment for children congruent with recent research in second language acquisition in children. Prerequisite: BLE 511.

BLE 521 Primary/Elementary Communication Arts in Bilingual Education. (3)*spring*

Examination of bilingual/biliterate development of elementary school children, bringing together native and second language, oral language, and literacy development findings with educational practices. Prerequisite: BLE 511.

BLE 522 Literacy/Biliteracy Development. (3)*fall*

Acquaints teachers with first- and second-language literacy research, practice, and assessment in elementary school settings (Spanish-English emphasis). Lecture, discussion. Cross-listed as RDG 522. Credit is allowed for only BLE 522 or RDG 522. Prerequisite: BLE 511.

BLE 524 Secondary Sheltered ESL Content Teaching. (3)*fall*

Teaching and assessing ESL adolescents in the content areas with an emphasis on integrating language acquisition principles with content learning. Lecture, small group work. Corequisite: BLE 541.

BLE 528 Social Studies for Bilingual/ESL Teachers. (3)*spring*

Provides language and instructional methodologies and assessment strategies relevant to bilingual/multicultural students in social studies content delivered in Spanish and English. Prerequisite: BLE 511.

BLE 533 Literacy in Secondary BLE/ESL Settings. (3)*spring*

Examines first- and second-language literacy research, practice, and assessment across content areas in secondary school settings. Lecture, discussion. Cross-listed as RDG 533. Credit is allowed for only BLE 533 or RDG 533. Prerequisite: BLE 511.

BLE 535 Sociolinguistic Issues in Bilingual Education. (3)*fall*

Survey of major theoretical issues (e.g., language situations, communicative competence, language attitudes) interrelating language, social processes, and bilingual education. Prerequisite: BLE 511.

BLE 541 Nature of Bilingualism/Second Language Acquisition. (3)*once a year*

Bilingual and second language acquisition, with emphasis on children and adolescents. Stresses cognitive, social, and cultural aspects. Prerequisite: BLE 511.

BLE 543 Bilingual Education Models. (3)*once a year*

Bilingual education programs in other countries; analysis of political, social, economic, and educational implications; practice in planning bilingual education curricula. See also offerings under MCE, SED, SPE, and SPF. Prerequisite: BLE 511.

BLE 561 Parent Involvement in Language Minority Education Programs. (3)*fall and spring*

Examines issues, approaches, and strategies for improving parental and community involvement in the schooling of language minority children and youth. Prerequisite: BLE 511.

BLE 565 Literature for Hispanic Youth/Literatura para Jóvenes Hispanoparlantes. (3)*spring*

Selects, analyzes, and utilizes literature for Hispanic and Spanish-speaking children and adolescents. Cross-listed as LIS 565. Credit is allowed for only BLE 565 or LIS 565.

BLE 580 Practicum. (1–6)*fall and spring*

Provides for practical application in school settings of principles of BLE/ESL. Special permission required.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

CURRICULUM AND INSTRUCTION (DCI)**DCI 510 Teacher as Researcher. (3)***fall, spring, summer*

Introduces teacher research as a new research genre; offers teachers guidance on planning and conducting research on their practice. Lecture, workshop.

DCI 591 Seminar. (1–12)*not regularly offered***DCI 701 Curriculum Theory and Practice. (3)***fall and spring*

Curriculum theory and practice as a field of study. Its current orientations and applications, modes of inquiry, and community of scholars and practitioners. Seminar. Corequisite: master's-level curriculum course.

DCI 791 Interdisciplinary Research Seminar. (1–12)*not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

BUSINESS EDUCATION (BUE)**BUE 480 Teaching Business Subjects. (3)***spring*

Organization and presentation of appropriate content for business subjects in the secondary school.

BUE 481 Technology in Business and Vocational Education. (3)*spring in even years*

Emerging curricula and instructional technology in business and vocational education. Lecture, hands-on computer instruction.

BUE 501 Principles of Business Education. (3)*fall*

History, philosophy, principles, and objectives of business and distributive education.

BUE 502 Organization and Management of Cooperative Programs. (3)*fall*

Work-study programs for business occupations in high schools and community colleges.

BUE 503 Competency-Based Business and Vocational Education. (3)*spring*

Development and administration of competency-based individualized programs in business and vocational education.

BUE 505 Current Literature in Business and Vocational Education. (3)*spring*

Critical analyses, generalizations, and trends in business and vocational education.

BUE 506 Information Processing for Business and Vocational Teachers. (3)*summer*

Development of curriculum and strategies for teaching information processing; hardware/software evaluation and equipment acquisition techniques in business and vocational education.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

EARLY CHILDHOOD EDUCATION (ECD)**ECD 501 Interprofessional Collaboration. (3)***fall*

Dispositions, knowledge, experiences, and skills necessary for interprofessional collaboration required of professionals who work with multineed families with young children. Prepares students to implement effective strategies and workable plans to support interprofessional collaboration for providing integrative services to young children and their families.

ECD 521 Primary/Elementary Communication Arts in Bilingual Education. (3)*spring*

Examines bilingual/biliterate development of elementary school children, bringing together native and second language, oral language, and literacy development findings with educational practices. Prerequisite: BLE 511.

ECD 522 Developmental Social Experiences in Early Childhood Education. (3)*fall*

Materials, techniques, aesthetic expression, creative activities, and values in the integrated curriculum.

ECD 525 Emergent Literacy. (3)*spring*

Examines recent research on oral language and literacy development and effective strategies for teaching language and literacy in prekindergarten to grade 3. Lecture, discussion. Cross-listed as RDG 525. Credit is allowed for only ECD 525 or RDG 525.

ECD 527 Mathematics in Early Childhood Education. (3)*fall*

Theory and practice in the use of manipulative materials for teaching mathematics to preschool and primary grade children. Prerequisite: ECD 402 (or its equivalent).

ECD 544 Play Education. (3)*spring and summer*

Theories of play and the educational implications of each. Practical applications at the early childhood level.

ECD 555 Modern Practices in Early Childhood Education. (3)*fall and summer*

Trends and practices, instructional and resource materials, and methods and techniques in early childhood education.

ECD 601 Theories and Issues in Early Childhood Education. (3)*fall and summer*

Current theories and issues in early childhood education. Presents issues of early childhood best practices, policy, theory, research, and evaluation that are of significance to the early childhood professional. Highlights building on the child development conceptual framework as related to theory and practice.

ECD 733 Social and Emotional Development. (3)*once a year*

Inquiry into the social and emotional development dynamics in children, such as peer relationships, self-concept, and parenting processes, with implications for teachers.

ECD 744 Evaluative Procedures: Young Children. (3)*spring*

Critical examination and use of developmentally appropriate evaluative procedures for children from birth through age 8.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

ELEMENTARY EDUCATION (EED)**EED 511 Principles of Curriculum Development. (3)***fall, spring, summer*

Contemporary curriculum theories. Curriculum as an interrelated entity. Principles of conceiving and effecting change.

EED 526 Communication Arts in the Elementary School. (3)*spring and summer*

Critical examination of school language arts teaching, focusing on theoretical assumptions regarding oral- and written-language development.

EED 528 Social Studies in the Elementary School. (3)*fall and summer*

Problems and trends of current programs. Development of a balanced and articulated program of social studies.

EED 529 Science in the Elementary School. (3)*spring*

Problems and trends of current programs. Development of a balanced and articulated science program.

EED 530 Outdoor/Environmental Education. (3)*summer*

Use of various outdoor settings as laboratories for classroom-related experience, study, observation, inquiry, research, and recreation. Includes strategies and materials for developing environmental literacy.

EED 537 Mathematics in the Elementary School. (3)*fall and summer*

Contemporary mathematics teaching. Content, materials, and approaches to instruction.

EED 538 Teaching Social Studies with Literature. (3)*fall and summer*

Develops the rationale, resources, and strategies for adopting a literature-based approach to social studies teaching in grades K–8. Lecture, discussion, cooperative learning. Prerequisite: EED 455 (or its equivalent).

EED 578 Student Teaching in the Elementary School. (3–15)*fall and spring*

Supervised teaching for postbaccalaureate students, synthesized experience in curriculum, instruction, and classroom management. Fee. Prerequisites: completion of 21 hours of identified course work from an approved program of study; GPA of 2.50 (postbaccalaureate nondegree) or 3.00 (postbaccalaureate degree); approval of the Office of Professional Field Experiences.

EED 581 Diagnostic Practices in Mathematics. (3)*fall and spring*

Specific skills in diagnosing and treating children's learning difficulties in mathematics. Includes practicum experiences, both on and off campus, in identifying strengths and weaknesses and initial remediation. Prerequisite: instructor approval.

EED 584 Internship. (1–12)*not regularly offered***EED 598 Special Topics. (1–4)***not regularly offered*

Possible topics:

- (a) Using Math Manipulatives/Elementary Schools
Fee.
- (b) Using Math Manipulatives/Middle Schools
Fee.

EED 720 Language in Education. (3)*once a year*

Sociolinguistic seminar on language issues in education, including language acquisition, classroom interaction, language attitudes, relation language, and class-gender ethnicity.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

INDIAN EDUCATION (IED)**IED 430 Issues in Language and Literacy of Indigenous Peoples. (3)***spring*

Examines issues, policies, theoretical foundations, and practices of indigenous peoples and other language minority communities from a sociolinguistics and language reclamation perspective.

*General Studies: HU/SB, C***IED 444 The Role of Governments in Native Education Policy and Administration. (3)***fall*

Examines the interrelationship of federal Indian policy, federal/state/tribal law, and tribal sovereignty as they have shaped American Indian education. Analyzes administrative practices and personnel, program and fiscal management, and resources as they reflect the historic and present influence of this triad of factors. Credit is allowed for only IED 444 or 544. Lecture, seminar.

*General Studies: SB***IED 460 Yaqui History and Culture. (3)***fall*

Yaqui history and culture ranging from precontact to the present. Larger themes of Yaqui identity, belief systems, family, traditions, community, resistance, dispersion, and survival.

*General Studies: HU/SB, C, H***IED 500 Administration and Management of Indian Education Programs. (3)***fall*

Emphasis on educational leadership research and practice in the schooling of American Indian students. Examines effective practices.

IED 510 History of American Indian Education. (3)*fall and spring*

Philosophical and historical review of the development of American Indian education policies in both traditional and contemporary society.

IED 530 Issues in Language and Literacy of Indigenous Peoples. (3)*spring*

Examines issues, policies, theoretical foundations, and practices of indigenous peoples and other language minority communities from a sociolinguistics and language reclamation perspective.

IED 544 The Role of Governments in Native Education Policy and Administration. (3)*fall*

Examines the interrelationship of federal Indian policy, federal/state/tribal law, and tribal sovereignty as they have shaped American Indian education. Analyzes administrative practices and personnel, program and fiscal management, and resources as they reflect the historic and present influence of this triad of factors. Credit is allowed for only IED 444 or 544. Lecture, seminar.

IED 560 Yaqui History and Culture. (3)*fall*

Yaqui history and culture ranging from precontact to the present. Larger themes of Yaqui identity, belief systems, family, traditions, community, resistance, dispersion, and survival.

IED 594 Workshop in Indian Education. (6)*summer*

Examines curriculum, pedagogy, community involvement, current issues, and research.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

LIBRARY SCIENCE (LIS)**LIS 410 Children's Literature. (3)***fall, spring, summer*

Selects, analyzes, and utilizes modern and classic literature with young readers.

LIS 510 Computers and Technology in the School Library. (3)*fall*

Library uses of technology and computers. Fundamental concepts and issues in library media centers. Prerequisites: both LIS 571 and 581 or only instructor approval.

LIS 533 Current Library Problems. (3)*fall*

Critical analysis of current practices and problems in school librarianship. Prerequisites: a combination of LIS 540 and 561 and 571 and 581 or only instructor approval.

LIS 540 Classification and Cataloging. (3)*fall*

Descriptive cataloging and Dewey Decimal Classification of print and nonprint library materials.

LIS 561 Selection of Library Materials. (3)*fall*

Principles and procedures used in the selection of materials for the school library.

LIS 563 Children's Literature. (3)*fall, spring, summer*

Selects and uses children's literature and related nonprint media to support the elementary school curriculum. Cross-listed as RDG 563. Credit is allowed for only LIS 563 or RDG 563.

LIS 565 Literature for Hispanic Youth/Literatura para Jóvenes Hispanoparlantes. (3)*spring*

Selects, analyzes, and utilizes literature for Hispanic and Spanish-speaking children and adolescents. Cross-listed as BLE 565. Credit is allowed for only BLE 565 or LIS 565.

LIS 571 Basic Reference Resources. (3)*spring*

Provides reference service in the school library. Content and use of basic resources.

LIS 581 School Library Administration. (3)*spring*

Administration of K–12 libraries and media centers.

LIS 584 School Library Internship. (1–6)*fall and spring*

Prerequisites: LIS 410, 540, 561, 571, 581; instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

READING EDUCATION (RDG)**RDG 481 Reading Practicum. (3)***fall, spring, summer*

Applies concepts from RDG 414 in classroom settings. Students demonstrate teaching strategies under supervision. Required for Elementary Education candidates. Prerequisite: PTPP admission.

RDG 505 Developmental Reading. (3)*fall, spring, summer*

For classroom and special reading teachers. Specific professional skills in decoding, comprehension, and evaluation. Required for Special Reading Endorsement. Prerequisite: teaching certificate.

RDG 507 Content Area Literacy. (3)*fall, spring, summer*

Theory, teaching strategies, and practical application concerning learning from text across subject matter disciplines.

RDG 522 Literacy/Biliteracy Development. (3)*fall*

Acquaints teachers with first- and second-language literacy research, practice, and assessment in elementary school settings (Spanish-English emphasis). Lecture, discussion. Cross-listed as BLE 522. Credit is allowed for only BLE 522 or RDG 522. Prerequisite: BLE 511.

RDG 525 Emergent Literacy. (3)*spring*

Examines recent research on oral language and literacy development and effective strategies for teaching language and literacy in prekindergarten to grade 3. Lecture, discussion. Cross-listed as ECD 525. Credit is allowed for only ECD 525 or RDG 525.

RDG 530 Research Issues in Literacy. (3)*spring in odd years*

For graduate students interested in research on major issues related to literacy instruction. Seminar activities include reviewing quantitative and qualitative methods and analyzing literacy research. Prerequisite: COE 501 or DCI 510 or EDP 502.

RDG 533 Literacy in Secondary BLE/ESL Settings. (3)*spring*

Examines first- and second-language literacy research, practice, and assessment across content areas in secondary school settings. Lecture, discussion. Cross-listed as BLE 533. Credit is allowed for only BLE 533 or RDG 533. Prerequisite: BLE 511.

RDG 544 Adolescent Literacy Programs for New Times. (3)*not regularly offered*

Theories, strategies, and issues in developing, implementing, and assessing approaches to literacy instruction for today's diverse adolescent students (grades 7–12). Prerequisite: RDG 507 or instructor approval.

RDG 550 Practicum Experiences in Elementary and Secondary Reading. (3)*spring and summer*

Practicum experience utilizing assessment and instructional techniques for classroom settings. (See RDG 557 for State of Arizona reading endorsement.) Lab. Prerequisite: RDG 505 (or its equivalent).

RDG 556 Assessment and Procedures in Elementary and Secondary Reading. (3)*fall*

Techniques for classroom and clinical reading assessment and instruction. Emphasis on continuous assessment. May be taken concurrently with RDG 557. Recommended for State of Arizona reading endorsement. Lecture, lab. Prerequisite: RDG 505.

RDG 557 Advanced Elementary and Secondary Reading Practicum. (3)*spring and summer*

Advanced practicum experience utilizing specialized reading and other assessment and instruction techniques for classroom and clinic settings. Lab sections. Recommended for State of Arizona reading endorsement. May be taken concurrently with RDG 556. Lab. Prerequisites: RDG 505; instructor approval.

RDG 563 Children's Literature. (3)*fall, spring, summer*

Selects and uses children's literature and related nonprint media to support the elementary school curriculum. Cross-listed as LIS 563. Credit is allowed for only LIS 563 or RDG 563.

RDG 581 Literature-Based Reading Programs. (3)*fall, spring, summer*

For classroom and special reading teachers. The role of literature in the acquisition and development of literacy. Specific suggestions for helping students learn to read and/or expand their reading ability with literature. Introduction to literature studies. Prerequisite: teaching certificate.

RDG 582 Practicum: Literature Studies. (3)*spring*

Practical application of literature study group principles in field sites or through on-campus simulations. Lecture, supervised practice. Prerequisite: RDG 581 or instructor approval.

RDG 596 Gender, Culture, and Literacies. (3)*spring*

Influence of gender and culture on written, oral, and post-typographical texts. Seminar.

RDG 630 Research in Literacy. (3)*not regularly offered*

For advanced graduate students interested in applied research problems, literature of literacy instruction, and major issues related to literacy research. Prerequisite: instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

SECONDARY EDUCATION (SED)**SED 400 Principles of Effective Instruction in Secondary Education. (3)***fall, spring, summer*

Examines different models of education. Develops and applies appropriate teaching practices for each model to secondary school classrooms. Lecture, discussion. Prerequisite: PTPP admission.

SED 480 Special Methods of Teaching Social Studies. (3)*fall and spring*

Interdisciplinary approaches; production and collection of materials. Prerequisite: PTPP admission.

SED 501 Introduction to Effective Instruction. (6)*fall, spring, summer*

Introductory course for postbaccalaureate certification program in secondary education. Emphasis on developing basic classroom management, instruction, and evaluation. Includes a field assignment of at least 120 hours. Prerequisite: admission to postbaccalaureate certification program.

SED 522 Secondary School Curriculum Development. (3)*fall, spring, summer*

Social processes, issues, principles, patterns, and procedures in curriculum development.

SED 533 Improving Instruction in Secondary Schools. (3)*fall, spring, summer*

Analyses of procedures, methods, techniques, and experiments in teaching in secondary schools. Prerequisites: SED 478, 578.

SED 577 Issues and Trends in Secondary Education. (3)*not regularly offered*

Analyses of lay and professional reports; problems and issues in American secondary education. Prerequisites: SED 478, 578.

SED 578 Student Teaching in the Secondary Schools. (3–12)*fall and spring*

Practice of teaching. Relationship of theory and practice in teaching. Postbaccalaureate students only. Fee. Prerequisites: completion of approved postbaccalaureate program; minimum 2.50 GPA; approval of the Office of Professional Field Experiences.

SED 588 Human Relations in the Secondary Schools. (3)*once a year*

Problems in human relations inherent in the interaction of pupils, teachers, administrators, nonprofessional staff, and laymen. Prerequisites: SED 478, 578.

SED 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Using Math Manipulatives/Middle Schools
Fee.

SED 711 Secondary Curriculum Development. (3)*spring and summer*

Theories and processes of developing curriculum; evaluation of research. Prerequisites: SED 478, 522 (or its equivalent), 578.

SED 722 Improvement of Instruction in the Secondary School. (3)*fall*

Evaluates the research; issues and theories related to the improvement of instruction. Prerequisite: SED 533.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Curriculum and Instruction**Interdisciplinary Doctoral Program****Robert B. Rutherford Jr.***Program Director***(ED 434) 480/965-4602****rutherford@asu.edu****coe.asu.edu/coe/candi****Art**

Professors: Erickson, Stokrocki, B. Young

Biology

Professor: Lawson

Chemistry and Biochemistry

Professor: Birk

Communication

Professor: Arnold

Curriculum and Instruction

Professors: Baker, Barone, Bitter, Christie, Edelsky, Faltis, Flores, Guzzetti, Hudelson, McGowan, McIsaac, Piburn, Rutherford, Staley, Zucker;

Associate Professors: Arias, Blumenfeld-Jones, Cohn, Di Gangi, Gomez, McCoy, Middleton, Nelson, Surbeck;

Assistant Professors: Anijar, Lamorey, MacSwan

Educational Leadership and Policy Studies

Regents' Professor: Berliner;

Professor: Edelsky;

Assistant Professor: Margolis

English

Professors: Donelson, Nilsen

Exercise and Physical Education

Professors: Arnold, Burkett, Corbin, Darst, Pangrazi, Stone;

Assistant Professors: Phillips, Swan

Mathematics

Professors: Flores, Leonard;

Associate Professors: Carlson, Middleton;

Assistant Professor: Zandieh

Music

Professors: Humphreys, Stauffer

Nutrition

Professors: Manore, Vaughan

The Interdisciplinary Committee on Curriculum and Instruction offers an interdisciplinary graduate program leading to the Ph.D. degree in Curriculum and Instruction. The interdisciplinary committee sets guidelines and supervises programs of study.

Areas of concentration are available in

1. art education;
2. curriculum studies;

3. early childhood education;
4. educational media and computers;
5. elementary education;
6. english education;
7. exercise and wellness education;
8. language and literacy;
9. mathematics education;
10. music education;
11. physical education;
12. science education; and
13. special education.

One of the unique features of this interdisciplinary program is that, because it utilizes faculty research and teaching interests from a number of academic units, students may work in concert with their program committee to tailor a course of study to fit individual needs and goals.

The interdisciplinary Ph.D. committee mentors set guidelines and supervise programs of study, while an executive committee, appointed by the dean of the College of Education and the dean of the Graduate College, has primary responsibility for the operation of the program. It is composed of faculty representing the various concentrations.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Curriculum and Instruction is an individualized interdisciplinary degree that integrates graduate courses from a variety of academic units. This course work provides a substantive knowledge base in the concentration area and a sound foundation for research leading to a dissertation.

See “Doctor of Philosophy,” page 103, for general requirements.

Admission. In addition to meeting minimum Graduate College admission requirements, each applicant must provide the following:

1. a letter of career goals and statement of reasons for seeking the interdisciplinary Ph.D. in Curriculum and Instruction,
2. Graduate Record Examination (GRE) verbal and quantitative test scores,
3. a sample of written work, and
4. three academic letters of recommendation.

One year of full-time teaching experience at the appropriate level, or its equivalent, is strongly recommended. In the absence of prior teaching experience, a teaching internship is required but may not be counted toward the Ph.D. degree.

Admission decisions are based upon the compatibility of the applicant’s career goals with the purpose of the degree program, previous academic training and performance, GRE scores, letters of recommendation, and the availability of a potential mentor in the candidate’s concentration area. It should be noted that, because of enrollment limits, applicants who meet minimum requirements are not automatically admitted.

Program Committee. The student’s program committee, consisting of a chair and at least two other members, oversees the preparation of the initial program of study and the preparation and evaluation of the comprehensive examina-

tion. Though the program committee may consist of only three members for early advising, it must have *at least five members* for the administration and evaluation of the comprehensive examination, three of whom must be members of the interdisciplinary committee and two of whom must be experts in the student’s area of concentration. At least one member of the program committee must be a faculty member of the Division of Curriculum and Instruction. The committee must be approved by the dean of the Graduate College.

The program committee and the student must decide on the area of concentration and cognate area to be included in the student’s comprehensive examination. They also must develop a program of study to establish a professional knowledge base and methods of inquiry and analytical tools for research.

Dissertation Committee. After passing the comprehensive examination, a dissertation committee is formed, upon the approval of the dean of the Graduate College. The basic functions of the dissertation committee are as follows:

1. overseeing the development and approval of a dissertation proposal,
2. providing guidance while the candidate conducts the dissertation study/analysis,
3. reviewing the dissertation manuscript, and
4. conducting an oral defense of the dissertation.

Members of the program committee may also serve as members of the dissertation committee; however, the committees may have different memberships. At least one member of the dissertation committee must be a faculty member of the Division of Curriculum and Instruction. The dissertation committee chair must be a faculty member designated eligible to serve in this capacity by the interdisciplinary committee and the dean of the Graduate College.

Program of Study. The program requires at least 93 semester hours, or the equivalent of four academic years of full-time study, beyond the bachelor’s degree. Students with a master’s degree directly related to the anticipated course of study must complete a minimum of 54 semester hours beyond the master’s degree. At least 30 semester hours in the approved program of study, exclusive of research and dissertation, must be taken at ASU. Each candidate must also register for a minimum of 24 semester hours of research and dissertation credit, with the dissertation directed by a dissertation chair approved by the interdisciplinary committee and the dean of the Graduate College. The program of study is divided into four general areas:

1. Ph.D. core course requirements;
2. professional focus;
3. cognate study; and
4. independent research and dissertation.

Core Course Requirements. All doctoral students are required to complete two designated core courses: DCI 791 Interdisciplinary Research Seminar and DCI 701 Curriculum Theory and Practice.

Professional Focus. With the advice and approval of the student’s program committee, a student must select a sequence of courses and experiences designed to focus subsequent efforts on a particular aspect of curriculum and instruction,

culminating in a dissertation. The professional focus is divided into three areas:

1. methods of inquiry and analytical tools associated with empirical study of curriculum and instruction;
2. a substantive knowledge base in the area of concentration; and
3. internships in research and college teaching.

Semester hours counted under one category may not be counted under another. Courses (42 semester hours) are drawn from program courses in the student's area of concentration.

Cognate Study. Students are expected to choose interrelated courses (12 semester hours minimum) outside their declared area of concentration that have a clear link to their dissertation efforts. Cognate studies can be drawn from a broad range of offerings, both within and outside the College of Education.

Foreign Language Requirements. None.

Annual Report for Ph.D. Candidates. At the end of each school year (before the last day of final exams), the student's Ph.D. mentor prepares a report to be reviewed by the director of the interdisciplinary Ph.D. degree program. Copies of the report are distributed to the members of the student's program or dissertation committee. The report from the mentor, which is accompanied by the student's transcript and an up-to-date *curriculum vitae*, includes the following:

1. a statement concerning the status of the student's program of study (with a copy);
2. a statement of the status of preparation toward the student's comprehensive examination (including a projected date for completion);
3. a statement about the student's performance in course work; and
4. a statement about the student's accomplishments during the academic year (and summer, if appropriate), including research activity, writings, presentations, and professional accomplishments.

Comprehensive Examinations. Upon completion of course work in the Ph.D. program of study and before admission to candidacy and the start of the dissertation research, the student completes an examination in the areas of concentration, cognate study, and methods of inquiry and analytical tools. The examination is designed to test the student's accumulation of interdisciplinary knowledge and ability to communicate across disciplines. The comprehen-

sive examination is developed and administered by the student's five-member program committee.

Dissertation Proposal. The proposal prospectus typically constitutes a draft of the first three chapters of the dissertation, but may vary with the dissertation committee's approval. Following approval of the proposal by the dissertation committee chair, a proposal meeting is scheduled. Approval of the proposal at that meeting indicates that the faculty agree that the rationale, review of the literature, method, and proposed analyses are appropriate and that the study may proceed as planned. If problems are identified in the proposal meeting, the dissertation committee may meet again to hear a revised proposal or arrange a more relevant way to reexamine the proposal.

Research and Dissertation. Twenty-four semester hours of research and dissertation credit are required. Twelve dissertation credits must be reserved for postcandidacy registration. The dissertation is designed to be the student's culminating experience. The dissertation must consist of a fully documented written study demonstrating a high level of expertise in research and scholarship in the student's area of concentration. The dissertation should make an original contribution to inquiry in the area of curriculum and instruction and be worthy of publication by an established press as a book or monograph or as one or more articles in a refereed, scholarly journal. The dissertation should not only demonstrate that the student is able to conduct quality research, but also should be conceived and carried out in such a way that it should make a contribution to advancing scholarship in the field of curriculum and instruction.

Final Examinations. The final oral examination in defense of the dissertation is scheduled and conducted by the student's dissertation committee. A candidate must pass the final examination within five years after completing the comprehensive examination.

RESEARCH ACTIVITY

Current faculty research activities include the E-Learning network: learning anytime anywhere; family-centered early identification of children with learning disabilities and behavior disorders; bilingual/English as a second language/special education; Arizona behavior initiative: creating school environments that support high academic standards for all students; relationship-based practice in early intervention settings; explaining low achievement in limited English proficient students; and extending and sustaining use of reforms in mathematics classrooms.

Dance

Master's Program

Claudia Murphey
Chair
 (PEBE 107A) 480/965-5029
herbergercollege.asu.edu/dance

PROFESSORS

KAPLAN, KEUTER, LUDWIG, MURPHEY

ASSOCIATE PROFESSORS

MATT, MOONEY

ASSISTANT PROFESSORS

JACKSON, LINDHOLM LANE, PARRISH, VISSICARO

ASSOCIATE RESEARCH PROFESSIONAL

MITCHELL

SENIOR LECTURERS

FITZGERALD, TSUKAYAMA

LECTURER

TONGRET

MASTER OF FINE ARTS

The M.F.A. degree in Dance is a 60-semester-hour program. The program is designed to provide opportunities for the student to continue to develop in the areas of dance technique, choreography, performance and production; to gain further understanding of the philosophy, history, theory, and science of dance; and to begin to chart the directions of the future through technology and media opportunities.

Admission. A bachelor's degree with a major in dance or its equivalent is required. Three letters of reference and a résumé must be filed with the Department of Dance for the purpose of assessing the qualifications of the candidate. All applicants must audition for admission to the program. The audition consists of performance of technical phrases in modern dance and ballet as well as the presentation of a solo work of no longer than five minutes, choreographed by the candidate. Videotaped documentation of a group work choreographed by the applicant must also be submitted. For more information, contact the Department of Dance.

Program of Study. A total of 60 semester hours of graduate credit is required, including:

1. 30 hours of dance studio;
2. 12 hours of dance theory;
3. nine hours of electives; and
4. nine hours of individual project (choreography, performance, or other approved project).

In consultation with the graduate director and the student's supervisory committee a program of study may be tailored to meet specific interests, needs, and abilities.

Credit Before Admission. Upon approval of the supervisory committee, a maximum of 24 semester hours of graduate credit completed before admission may be applied to the

program if these courses were part of a completed master's degree in Dance. All course work appearing on the program of study must meet the seven-year time limit requirement.

Foreign Language Requirements. None.

M.F.A. Project. Each candidate submits a prospectus to his or her supervisory committee outlining the nature of the M.F.A. project. This project may be choreography and/or performance, and may be designed to incorporate technology or other approved research components. Supporting documentation of the project may be written and bound, realized with CD-ROM, or completed through other means, which meet format approval from both the student's supervisory committee and the Graduate College.

Final Examinations. An oral defense of the M.F.A. project is required.

DANCE HISTORY (DAH)

DAH 501 Philosophy of Dance. (3)

once a year

Analysis of traditional and contemporary theories of dance with regard to issues of expression, form, and meaning.

DAH 502 Cultural Concepts of Dance. (3)

once a year

Examines the close connection between culture, dance, and movement through writings in cultural theory, dance ethnology, and philosophy.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

DANCE (DAN)

DAN 510 Dance Stagecraft and Production. (1–3)

fall and spring

Theory of costuming, lighting, makeup, scenery, and sound as related to dance performance. May be repeated once for credit. Lecture, studio. Prerequisite: DAN 211 (or its equivalent).

DAN 521 Sound Lab I. (2)

fall

Audio mixing for analog/digital recording and editing. Lecture, lab. Prerequisite: instructor approval.

DAN 522 Sound Lab II. (2)

spring

Continuation of DAN 521. Focus on digital recording/editing of audio compositions for choreographic projects. Lecture, lab. Pre- or corequisite: DAN 423 or 521.

DAN 523 Dance, Computers, and Multimedia. (3)

fall and spring

Introduction to desktop multimedia as it relates to dance creation, production, education, and research. Lecture, lab.

DAN 534 Technique and Theory of Modern Dance. (3)

fall and spring

Preparation in the performance and comprehension of professional-level modern dance for first-year graduate students. 6 hours weekly. May be repeated for credit. Placement audition required.

DAN 535 Technique and Theory of Ballet. (2)

fall and spring

Graduate study of ballet technique. May be repeated for credit. Studio. Placement audition required.

DAN 542 Ideokinesis. (2)

fall

Theoretical examination of ideokinetic methods of facilitating postural change and movement efficiency.

DAN 550 Graduate Dance Pedagogy: Modern. (3)

spring

Overview of the role of modern dance technique and theory in the university curriculum including current pedagogical theory, diversity, gender. May follow or precede internship in practical teaching.

DAN 551 Graduate Dance Pedagogy: Ballet. (3)*fall*

Advanced analysis of teaching techniques for ballet. Prerequisite: instructor approval.

DAN 561 Choreographer/Composer Workshop. (1–3)*not regularly offered*

Analysis of, experimentation with, and practice in working with composers of music for choreography. Open to experienced choreographers and composers. Lecture, studio. Prerequisite: instructor approval.

DAN 564 Solo and Group Choreography I. (3)*fall*

Original choreography created for solo and group performance. Studio. Prerequisites: DAN 364 and 365 (or their equivalents).

DAN 565 Solo and Group Choreography II. (3)*spring*

Continuation of DAN 564. Studio. Prerequisite: DAN 564.

DAN 571 Dance Theatre. (1–3)*fall and spring*

Performance in specially choreographed dance productions. May be repeated for credit. Prerequisite: instructor approval.

DAN 580 Performance Studies Practicum. (1–3)*spring*

Focus on developing rehearsal skills and achieving performance excellence through the preparation of three completed works. Studio, lab.

DAN 591 Seminar. (1–3)*fall and spring*

Seminar focusing on enrichment topics, production aspects of thesis projects, teaching concerns, special lectures, films, or critiques.

DAN 634 Technique and Theory of Modern Dance. (3)*fall and spring*

Preparation in the performance and comprehension of professional-level modern dance for second-year graduate students. 6 hours weekly. May be repeated for credit. Placement audition required.

DAN 640 Advanced Problems in Analysis of Dance Technique. (3)*spring*

Theories and principles of human anatomy, kinesiology, and the psychology of learning applied to analysis of dance movement. Prerequisites: both DAN 340 and 342 or only instructor approval.

DAN 664 Choreography Workshop. (1–3)*fall*

Choreographic study in a seminar context with faculty and guest artists. May be repeated for credit. Studio. Prerequisites: DAN 564, 565.

DAN 671 Dance Arizona Repertory Theatre. (3–4)*fall and spring*

Preprofessional modern dance company, emphasizing outreach and performance. Opportunity to work with guest artists and community schools and organizations. Lecture, studio. Prerequisite: instructor approval.

DAN 693 M.F.A. Project. (1–9)*fall, spring, summer*

Preparation for required M.F.A. project approved by the student's supervisory committee. Work is followed by a final oral examination and documentation appropriate to the project. Prerequisite: committee approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Design

Master's Program**Jacques R. Giard***Director***(AED 154) 480/965-4135****Fax 480/965-9717****linda.n.johnson@asu.edu****www.asu.edu/caed/design****PROFESSORS**

BRANDT, GIARD, KROELINGER

ASSOCIATE PROFESSORS

BERNARDI, CUTLER, DETRIE, JOHNSON, McDERMOTT, PATEL, RATNER, SANFT, WITT

ASSISTANT PROFESSORS

BORADKAR, HARMON-VAUGHAN, HERRING, McCOY, NIEDERHELMAN, RANDALL, ROTHSTEIN, WEED

The faculty in the School of Design, College of Architecture and Environmental Design, offer a postprofessional research degree program leading to the Master of Science in Design degree in Design with concentrations in graphic design, industrial design, and interior design. Course offerings focus on such areas as facilities planning and management, human factors, and methodology, theory and criticism.

The faculty in the school also participate in offering the Ph.D. in Environmental Design and Planning program. See "Environmental Design and Planning," page 207, for information on this interdisciplinary, college-wide Ph.D. degree program.

MASTER OF SCIENCE IN DESIGN

The Master of Science in Design (M.S.D.) degree with a major in Design has three concentrations: graphic design, industrial design, and interior design. There are also two tracks within these concentrations: research and studio.

Graphic Design Concentration

The research track in graphic design is for individuals interested in advanced studies in visual language; history; theory; criticism; and methodology, design processes, and technology. This track develops an understanding of contemporary graphic design issues through specialized research and design skills. It also prepares the graduate student for a career in graphic design education. The studio track educates students in specific graphic design skills and knowledge in a studio environment. It offers the opportunity to pursue applied projects in a special area of graphic design such as brand identity, corporate identity, environmental design, information design, interactive design, museum and exhibition design, new media design, publication design, and typography.

Industrial Design Concentration

The research track in industrial design is for individuals interested in advanced studies in human factors, history, theory, criticism and methodology, design processes, and technology. This track develops an understanding of contemporary industrial design issues through specialized research and design skills. It also prepares the graduate student for a career in industrial design education. The studio track educates students in specific industrial design skills and knowledge in a studio environment. It offers the opportunity to pursue applied projects in a special area of industrial design such as exhibit design, furniture, appliances, electronic equipment, consumer products, and user interface.

Interior Design Concentration

The research track in interior design is for individuals interested in advanced studies in facilities planning and management, or history, theory, criticism and methodology. This track develops an understanding of contemporary interior design issues through specialized research and design skills. It also prepares the graduate student for a career in interior design education. The studio track educates students in specific interior design skills and knowledge in a studio environment. It offers the opportunity to pursue applied projects in a special area of interior design such as contract market, retail environments, healthcare facilities, personal spaces, dwelling interiors, educational environments, and transportation environments.

Research Track

The Master of Science in Design (M.S.D.) degree with a major in Design and concentrations in graphic design, industrial design, and interior design prepares students for leadership positions in industry, research, and teaching. The program has four goals:

1. to provide graduate education for students who have a baccalaureate degree in Graphic Design, Industrial Design, Interior Design, or a related design discipline;
2. to provide the opportunity for the development of specialized research and design skills to support the graphic design, industrial design, and interior design professions;
3. to provide the opportunity for professionals to gain the necessary research and design skills for academic careers; and
4. to develop critical skills which enable the graduate to contribute to the literature of design through articles, essays, and books, or to participate in conferences related to their concentration.

There are three areas of emphasis.

Areas of Study

Design Methodology, Theory and Criticism in Design.

This area of study is available to majors with backgrounds in art, architecture, design history, graphic design, industrial design, interior design, sociology, environmental psychology, or research methods. Students choosing this area of study may focus upon methodology, or theory, or criticism, or they may choose to combine any or all of these three. Courses in this area of study address: selected design methodologies that stimulate creativity; methodologies for criti-

cal analysis; methodologies that lead to development of or application of theories and philosophies; the historical origins of theories and philosophies that form the basis of contemporary design; the implication of theory in design knowledge and its discourse; strategies for recognizing and interpreting emerging design issues and trends; the evolution of the literature of design criticism; definition of design criticism; the qualifications of design critics' application of theories or philosophies in making judgments; and qualities constituting effective critical writing. Applications include design research, design education, design marketing and production decision, and design criticism.

Facilities Planning and Management in Design. This area of study focuses on the coordination of the work place, equipment, and visual (graphic) environment with the people and organizational structure of the institution. The intent is to combine programming and management practices with current professional and technical expertise to provide humane and effective work environments. Facility-related responsibilities to support this concentration cluster into seven functional units: programming; facilities analysis; space management; interior planning and design; human factors; interior codes; public welfare and safety; and interior installation.

Human Factors in Design. This area of study identifies the problems, establishes the strategies, and develops the design solutions needed for issues surrounding the human/product interface. The human/product interface is the focus although the principles have wider application to other systems (such as interactive design) and environments (such as museum and exhibition design). Special emphasis is placed on the relationship between human and test performance factors. Emphases include qualities of function; methods of forming organizational relationships; factors of environmental control systems (acoustics and illumination, wayfinding, etc.); and human factors in graphic, product, and interior design. Subject matter also includes the design of equipment, machines, and spaces; ergonomics and forms of ergonomic documentation; and analysis of relationships between spaces, objects, and people as simulated through computer animation, imaging, and traditional modeling techniques.

Program of Study for the Research Track. The program of study consists of 36 semester hours of course work at the 500-level or above with the following distribution:

DSC 580 Practicum: Methods of Teaching Design	3
Approved courses in the concentration area of interest	12
Approved electives outside the school	9
Approved research methods courses	6
Thesis or Applied Project	6
Total	36

STUDIO TRACK

The Studio Track of the Masters of Science in Design (M.S.D.) degree with a major in Design and a concentration in graphic design, industrial design, and interior design, offers design education for individuals coming from diverse backgrounds. It provides experiential opportunities to

explore the three represented disciplines by way of discipline-specific skills and knowledge in an interdisciplinary studio setting. The program has three goals:

1. to provide graduate design education both for students who hold a degree in an area that is not traditionally related to design, and for those who hold a related degree and who desire specialized exposure to one of the program's concentration areas;
2. to provide discipline specific skills and knowledge in an interdisciplinary studio setting;
3. to provide the opportunity for in-depth applied research in a special area of interest.

The studio track program does not prepare graduates for licensure in the design disciplines, nor for university level teaching, nor as a substitute for a professional degree program in graphic design, industrial design, or interior design.

Program of Study for the Studio Track. The program of study consists of 36 hours of work at the 500-level or above with the following distribution:

DSC 520 Contemporary Design Issues	3
or DSC 525 Design Methodologies (3)	
Approved courses in the studio	10
Approved courses to support the studio	11
Applied elective to support the applied project	3
Professional electives	6
<hr/>	
Total	33

Admission Requirements. Applicants for the research track program of study must hold a baccalaureate degree in Graphic Design, Industrial Design, Interior Design, or a related design discipline to participate in this terminal degree program. Applicants for the studio-based program of study may hold a degree not directly related to the design professions. When applying for admission, applicants must declare one of three concentrations: graphic design, industrial design, or interior design. Additionally, for students in the research-track, the areas of interest must be identified from the following: design methodology, facility planning and management, human factors in design, or theory and criticism. Admission to the M.S.D. program is selective and is done on a space-available basis.

Application Procedures. Applicants must file separate application materials to both the Graduate College and the School of Design.

School of Design Requirements. The following materials should be submitted to

SCHOOL OF DESIGN
 COLLEGE OF ARCHITECTURE AND
 ENVIRONMENTAL DESIGN
 ARIZONA STATE UNIVERSITY
 PO BOX 872105
 TEMPE AZ 85287-2105

1. a statement of intent (maximum 600 words) explaining the applicant's interest in pursuing a post-professional research or studio track degree program with a concentration in graphic design, industrial design, or interior design and the basis for selecting an area of interest (Research track candidates select facilities planning and management; human factors in

design; or design methodology, theory and criticism. Studio track candidates identify target interests with their identified discipline.), the applicant's academic background, and, if appropriate, additional preparation for the selected concentration/area of interest;

2. TOEFL scores of 550 or above for international students whose native language is not English;
3. three letters of recommendation from persons who are qualified to comment on the applicant's potential in the selected concentration;
4. an additional statement from applicants wishing to be considered for teaching or research assistantships outlining areas in which they feel competent to serve as a teaching or research assistant and inexpensive copies of samples of work that will not be returned (international students who wish to be considered for a teaching assistantship and whose first language is not English are required to pass the Test of Spoken English [TSE] administered by the American English and Culture Center at ASU); and
5. an 8.5" x 11" folio documenting papers and imaginative projects that support the intended concentration and demonstrate drawing, rendering, and modeling skills.

The portfolio is returned after final admission procedures, provided sufficient prepaid postage is enclosed, or if the materials are claimed in person within one year of submission. Unclaimed portfolios are retained for only one year. The School of Design assumes no liability for lost or damaged materials.

Application Deadlines. Primary consideration is given to completed applications received by the deadlines. Applications for assistantships and scholarships normally are considered at the same time.

All materials must be received by the Graduate College and the school by January 15 for fall semester. Late applications are accepted until all positions are filled.

Selection Procedures and Notifications. The faculty evaluate the applications and supporting materials and recommend to the Graduate College whether the applicant should be granted regular or provisional admission or if admission should be denied. If admission is provisional, the Graduate College specifies in its letter of admission the provisions to be met to gain regular status. The school informs successful applicants of the procedures for enrollment.

Foreign Language Requirements. None.

Practicum. All students in the research track program must enroll in a three-hour teaching practicum (DSC 580) that focuses on the problems and issues surrounding studio, lecture, and seminar instruction. Emphasis is on the techniques of criticism and individual and group studio teaching.

Thesis or Applied Project. For students in the research track program choosing the thesis option, six semester hours of DSC 599 Thesis and DSC 592 Research apply toward the thesis. Guidelines in the *Format Manual* must be followed. For students choosing the applied project option, six hours of DSC 593 Applied Project apply.

Final Examinations. An oral examination in defense of the thesis or applied project is required for all students in the M.S.D. program.

Web Addresses

Information about the program in Design, and the College of Architecture and Environmental Design in general, may be found on the Web site at www.asu.edu/caed/design.

RESOURCES

Faculty

Faculty in graphic design, industrial design, and interior design are involved in the following areas of research: human factors, material design, computer-assisted design, lighting and acoustical design, design history, material culture studies, exhibit design, furniture design, environmental design, facilities planning and management, methodology, theory and criticism, creative thinking, design evaluation, and wayfinding.

Facilities

The College of Architecture and Environmental Design maintains a high-bay research facility, a lighting laboratory, a human factors laboratory, an extensive shop facility, as well as a state-of-the-art material resource center. The college's Research and Service Foundation provides facilities for basic research and community service activities in energy technology, design, and planning.

DESIGN (DSC)

DSC 500 Research Methods. (1–12)

not regularly offered
Fee.

DSC 520 Contemporary Design Issues. (3)

fall and spring
Projected applications in design production, planning, and decision-making processes. Lecture, seminar. Prerequisites: INT 310 and 311 (or their equivalents).

DSC 524 Illumination and Acoustics. (3)

not regularly offered
Research and laboratory investigation of advanced illumination and acoustics issues of facility design. Emphasis on human factors and performance aspects. Prerequisites: INT 457 and 458 (or their equivalents).

DSC 525 Design Methodologies. (3)

fall
Practical exercises and studies in problem-solving strategies; problem definition and supporting theory for the designer. Lecture, seminar, lab. Fee. Prerequisite: senior or graduate standing.

DSC 527 Modern Design Theory. (3)

spring
Aesthetic, political, economic, and social theories that have shaped modern design; theory as the basis for design philosophies. Lecture, seminar. Prerequisite: DSC 525 (or its equivalent).

DSC 529 Design Criticism. (3)

fall
Critical methods applied to design as material culture and human expression; evaluation of achievement versus intention. Lecture, seminar. Prerequisite: DSC 527 (or its equivalent).

DSC 544 Human Factors Systems and Documentation. (3)

fall
Advanced topics associated with theory and methods of human factors in design. Individual projects stressing problem organization, evaluation, and documentation. Lecture, seminar, lab. Prerequisite: DSC 344 (or its equivalent).

DSC 552 Computer Simulation in Design. (3)

fall
Use of computer graphics as a medium to develop and present images of the environment for analysis and perception. Lecture, lab. Prerequisite: senior or graduate standing.

DSC 553 Computer Imaging and Visual Perception. (3)

spring
Issues and applications of computer simulation as a tool for describing and testing human interface with the environment. Lecture, lab. Prerequisite: senior or graduate standing.

DSC 558 Daylighting. (3)

not regularly offered
Daylighting as a design determinant; concepts, techniques, methodology, experiments, and case studies. Lecture, studio. Prerequisite: senior or graduate standing.

DSC 580 Practicum: Methods of Teaching Design. (3)

fall
Background and development of design education theories. Concepts of studio teaching methods. Comprehensive student project development and evaluation methods. Prerequisite: graduate standing.

DSC 592 Research. (1–12)

not regularly offered

DSC 593 Applied Project. (1–12)

not regularly offered
Fee.

DSC 598 Special Topics. (1–4)

not regularly offered

Possible topics:

- (a) Facilities Planning II
Fee.

DSC 599 Thesis. (1–12)

not regularly offered
Fee.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

GRAPHIC DESIGN (GRA)

GRA 481 Visual Communication V. (3)

fall
Studio problems with emphasis on analysis, problem solving, and professional portfolio preparation. 6 hours a week. Fee. Prerequisites: GRA 385, 387.

GRA 482 Visual Communication VI. (3)

spring
Individual and group projects with outside clients. All projects culminate in an exhibit. 6 hours a week. Fee. Prerequisite: GRA 481.

GRA 485 Graphic Design Workshop. (3)

fall, spring, summer
Preprofessional client/designer situations from concept to printed work. Studio workshop and internships for selected students. 6 hours a week. May be repeated once for credit. Fee. Prerequisite: instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

INDUSTRIAL DESIGN (IND)

IND 460 Design Project I. (5)

fall
Complete analysis of the product unit as an element of mass production, featuring marketing, technology, human factors, and visual design. Emphasis on professional standards. 10 hours studio. Fee. Prerequisites: DSC 484; IND 361.

IND 461 Design Project II. (5)

spring
Product design, with emphasis in systems interaction. Culmination of design process and technique. Encourages individual project direction. 10 hours studio. Fee. Prerequisite: IND 361.

IND 474 Design Seminar. (3)

spring
Manufacturer's liability, statutes, regulations, and common law rules; role of expert witnesses; insurance and product safety programs. Seminar. Prerequisite: senior standing.

IND 494 Special Topics. (3)*not regularly offered*

Applies mechanical drafting knowledge and skills. Manual drafting principles and techniques with transition to computer-aided industrial design.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

INTERIOR DESIGN (INT)**INT 412 History of Decorative Arts in Interiors. (3)***fall*

Design of decorative arts as an expression of cultural influences and as an extension of interior spaces. Prerequisite: INT 311 or instructor approval.

*General Studies: HU***INT 413 History of Textiles in Interior Design. (3)***spring*

Cultural and historical expression of textiles as related to interiors. May include field trips. Prerequisite: INT 412 or instructor approval.

INT 422 Facilities Planning and Management I. (3)*fall*

Facility management process in large-scale organizations. Planning, long-range forecasting, and productivity. Project management methodologies using micro-based software programs. Prerequisite: senior standing.

INT 423 Facilities Planning and Management II. (3)*spring*

Formation of facilities policies, procedures, and standards. Facilities database, space allocations, and management process. Evaluation of programming criteria. Prerequisites: INT 422; senior standing.

INT 442 Specifications and Documents for Interiors. (3)*fall*

Contract specifications, documents, schedules, and bidding procedures for interior design. Prerequisites: INT 341, 365.

*General Studies: L***INT 457 Acoustics for Interior Design. (3)***fall*

Physical properties of sound. Studies pertaining to sound-absorbing materials, constructions, and room acoustics. Prerequisites: MAT 170; PHY 111, 113.

INT 458 Lighting for Interior Design. (3)*spring*

Light as an aspect of interior design. Evaluation of light sources for distribution, color, and cost.

INT 466 Interior Design Studio V. (5)*fall*

Advanced interior design problem solving, design theory, and criticism. Thesis project development based upon the major's concentration. 10 hours studio. Fee. Prerequisite: school approval.

INT 467 Interior Design Studio VI. (5)*spring*

Advanced series of specialized projects or continuation of thesis project based upon the major's concentration. 10 hours studio. Fee. Prerequisite: school approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Information Management**Master's Program****Philip M.J. Reckers***Director***(BA 223) 480/965-3631****asusaim@asu.edu****www.cob.asu.edu/acct/msim.html**

PROFESSORS

J.R. BOATSMAN, BOYD, GOUL, JOHNSON, KAPLAN, PANY, PEI, PHILIPPAKIS, RECKERS, ROY, SCHULTZ, SMITH, STEINBART, VINZE, WYNDELTS

ASSOCIATE PROFESSORS

CHRISTIAN, GOLEN, GUPTA, HWANG, KEIM, KULKARNI, O'DELL, O'LEARY, REGIER, ST. LOUIS, WHITECOTTON

ASSISTANT PROFESSORS

BHATTACHERJEE, CHEN, CHENOWETH, COMPRIX, DAVID, DOWLING, IYER, O'DONNELL, ROBINSON, SANTANAM, SHAO, WEISS

SENIOR LECTURERS

MacCRACKEN, SHREDNICK

LECTURERS

BALOGH, J.L. BOATSMAN, GEIGER, HAYES, TAYLOR

The faculty in the School of Accountancy and Information Management, College of Business, offer specialized professional programs leading to the Master of Science in Information Management, Master of Accountancy and Information Systems (see "Accountancy and Information Systems," page 105), and Master of Taxation (see "Taxation," page 322) degrees.

The faculty also participate in the programs leading to the Master of Business Administration (see "Master of Business Administration," page 137) and Ph.D. degree in Business Administration (see "Doctor of Philosophy," page 137) degrees.

For more information, visit the school's Web site at www.cob.asu.edu/acct.

MASTER OF SCIENCE

The program leading to the M.S. degree in Information Management educates specialists to develop and apply quantitative and computer methods to support business decision making. The program prepares students for careers in professional accounting, accounting and computer information systems/management, business consulting and corporate accounting/finance.

Admission. All applicants are required to submit the supplemental application materials required from the school. A complete advising guide and application packet may be obtained from the school's Web site.

Applicants must also submit scores from either the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE). International applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL) and Test of Spoken English (TSE) exams. Preference in admission is given to those with degrees in accounting and business, although other exceptional candidates are considered.

Prerequisites. Applicants must complete the program prerequisites. Refer to the School of Accountancy and Information Management Web site for a current listing of required course prerequisites for the program.

Program of Study. The program of study consists of a minimum of 30 semester hours and is continually updated. A sample program of study might include:

ACC 533	Application Solutions in the Connected Economy	3
ACC 541	Strategic Innovations in Information and Cost Management.....	3
ACC 591	S: Electronic Commerce	3
CIS 505	Object-Oriented Modeling and Programming	3
CIS 506	Business Database Systems	3
CIS 512	Intelligent Decision Systems and Knowledge Management.....	3
CIS 530	Information Systems Development.....	3
CIS 535	Distributed Information Systems	3
CIS 593	Applied Project	3

Course Load. Students are limited to 12 hours per trimester.

Foreign Language Requirements. None.

Thesis Requirements. An applied project is required.

Final Examinations. A final written examination is required of all candidates and is integrated with the applied project.

RESEARCH ACTIVITY

For current information about research activity, access the School of Accountancy and Information Systems Web site at www.cob.asu.edu/acct and see "Publications and Working Papers."

COURSES

For courses, see "Accountancy (ACC)," page 106, and "Computer Information Systems (CIS)," page 106.

Economics

Master's and Doctoral Programs

Arthur E. Blakemore
Chair

(BAC 659) 480/965-3531
asuecn@asu.edu

www.cob.asu.edu/ecn/programs.cfm

PROFESSORS

BLAKEMORE, BOYES, BRADA, BURDICK, BURGESS,
DeSERPA, FAITH, GOODING, HAPPEL, HOFFMAN,
HOGAN, KINGSTON, LOW, MANELLI, MAYER,
McDOWELL, McPETERS, MELVIN, MÉNDEZ,
ORMISTON, SANTOS, SCHLEE

ASSOCIATE PROFESSORS

AHN, COGLEY, REFFETT, REISER, WILSON, WINKELMAN

ASSISTANT PROFESSORS

CHADE, DATTA, HENDRICKS

SENIOR LECTURER

ROBERTS

The faculty in the Department of Economics, College of Business, offer programs leading to the M.S. and the Ph.D. degrees in Economics.

The faculty also participate in offering the professional program leading to the Master of Business Administration (see "Master of Business Administration," page 137), the program leading to the M.S. in Statistics (see "Master of Science," page 321) and the program leading to the Ph.D. degree in Business Administration (see "Master of Business Administration," page 137). Further information concerning the degree programs in Economics can be obtained from the Director of Graduate Programs, Department of Economics.

Admission. See "Admission to the Graduate College," page 92. In addition, each applicant to either graduate program must submit three letters of recommendation from academic sources and test scores for the general aptitude portion of the Graduate Record Examination (GRE). Submission of scores from the GRE advanced test in economics is recommended. Applications should be received at the Department of Economics by March 1 if the student is seeking a graduate assistantship.

Students are expected to have demonstrated competency in economics at a minimum level through ECN 313 and 314 and in mathematics through MAT 271. Passing grades in the equivalents of these courses taken at other colleges are accepted as a demonstration of competency. Additional courses in calculus, linear algebra, and statistics are recommended before the first semester in the program.

Students with inadequate undergraduate preparation in economics or mathematics may be required to remove deficiencies before enrolling in graduate courses.

FIELDS OF STUDY

Graduate students may choose from several fields of study: econometrics, industrial organization, international economics, labor economics, macroeconomics, and public economics. The goal of the econometrics field is to provide students with the tools needed to empirically assess economic models using data obtained from observation of real world phenomena. Course work emphasizes applications as well as theory. The field of industrial organization is concerned with the theory and empirical evidence concerning the organization of firms and industries. Topics include the “law and economics” of monopoly, collusion, business pricing and marketing practices, corporate control, mergers, and acquisitions. The international economics field examines both the theoretical and empirical literature associated with the determinants of comparative advantage, trade patterns and commercial policy effects on such patterns, the determinants of exchange rates and international financial flows, and effects of international linkages on the domestic economy. The labor economics field includes the study of labor force participation, unemployment, the role and effect of education and other personal variables on earnings, geographical and interfirm earning differentials, the demand for labor, discrimination, the role and economic effects of unions, personnel practices and policies, and similar topics. The intent of the macroeconomic field is to provide the student with tools needed to assess both theoretically and empirically modern macroeconomic models. Public economics is concerned with the positive and normative study of government’s effect on the economy. Course work focuses on evaluating the economic consequences of government policies and on the application of economics to political science. See the *Department of Economics Graduate Student Handbook* for specific field requirements.

MASTER OF SCIENCE

The M.S. program in Economics is designed to give students a broad base understanding of critical analysis of business problems and the quantitative skills necessary for their analysis. Graduates of the program will have distinctive capabilities in quantitative skills and business data analysis applied to markets and firm behavior, customer behavior, business strategies and processes, and global impacts on business.

Program of Study. See “Master’s Degrees,” page 100, for general requirements. See the *Department of Economics Graduate Student Handbook* for specific requirements.

Course Load. Students are limited to 15 semester hours per semester.

Foreign Language Requirements. None.

Thesis Requirements. Students have the option of a non-thesis or thesis track. For the nonthesis track, students are required to conduct an applied research project under the supervision of a faculty member. The applied research project often is conducted in conjunction with an internship, and three hours of credit is granted for the project. For the thesis option, six semester hours of credit is granted for completion of the thesis.

Final Examinations. A final oral examination in defense of the thesis or applied research project is required.

DOCTOR OF PHILOSOPHY

The Ph.D. degree program is designed to provide the student with a more fundamental command of basic economic analysis and of the subject matter in several specialized fields. It is designed to qualify students for teaching at higher education institutions and for research positions in public agencies and private business organizations.

Program of Study. See “Doctor of Philosophy,” page 103, for general requirements. In addition to completing 60 hours of credit beyond the bachelor’s degree (30 hours beyond the master’s degree) and 24 hours research dissertation credit, the Ph.D. student must accomplish five tasks:

1. meet qualification requirement,
2. present at least two fields of study,
3. pass the comprehensive examination,
4. pass the dissertation proposal defense, and
5. complete a dissertation with an oral defense.

See the *Department of Economics Graduate Student Handbook* for details concerning these tasks.

Qualifying Examinations. The student must demonstrate proficiency in economic theory and application by passing both the microeconomic and macroeconomic qualifying examinations. These examinations are given at the beginning of the fall semester of the second year of graduate study. The student must demonstrate proficiency in statistical and econometric analysis by passing ECN 525 and 526.

Fields of Study. Students are required to present at least one primary field and one secondary field for the Ph.D. The primary field must be the one in which the comprehensive examination is taken; usually this is the field in which dissertation work is contemplated.

Comprehensive Examination. The comprehensive examination consists of a written and oral test. The written examination consists of questions designed to test the student’s knowledge of the proposed research area. Examination questions are designed to cause the student to examine the research topic in considerable depth and breadth. The oral examination consists of questions designed to test the student’s knowledge of the proposed research area. Examination questions are designed to expand on the written examination as well as to provide guidance on the dissertation research.

Dissertation Proposal Defense. Students prepare a preliminary draft of the dissertation proposal before taking the comprehensive examination. Upon passing the comprehensive examination, students submit a revised dissertation proposal to their supervisory committee that formalizes the research agenda and incorporates the supervisory committee’s suggestions. The dissertation proposal must be defended orally.

Admission to Candidacy. The student should apply promptly for admission to candidacy after passing the comprehensive field examination, oral examination, and the dissertation proposal defense.

Dissertation Requirements. A dissertation representing original research work of high quality, demonstrating the student’s proficiency in the field, is required.

Foreign Language Requirements. None.

Final Examinations. An oral examination in defense of the dissertation is required.

ECONOMICS (ECN)

ECN 436 International Trade Theory. (3)

once a year

Comparative-advantage doctrine, including practices under varying commercial policy approaches. Economic impact of international disequilibrium. Prerequisite: ECN 314 or instructor approval.

General Studies: SB, G

ECN 438 International Monetary Economics. (3)

once a year

History, theory, and policy of international monetary economics. Balance of payments and exchange rates. International financial markets including Eurocurrency markets. Prerequisite: ECN 313 or instructor approval.

General Studies: SB, G

ECN 441 Public Finance. (3)

once a year

Public goods, externalities, voting models, public expenditures, taxation, and budget formation with emphasis on the federal government. Prerequisite: ECN 314 or instructor approval.

General Studies: L/SB

ECN 453 Government and Business. (3)

once a year

Development of public policies toward business. Antitrust activity. Economic effects of government policies. Prerequisite: ECN 314 or instructor approval.

ECN 480 Introduction to Econometrics. (3)

once a year

Elements of regression analysis: estimation, hypothesis tests, prediction. Emphasizes use of econometric results in assessment of economic theories. Prerequisite: instructor approval.

General Studies: CS

ECN 485 Mathematical Economics. (3)

once a year

Integrates economic analysis and mathematical methods into a comprehensive body of knowledge within contemporary economic theory. Prerequisite: instructor approval.

ECN 498 Pro-Seminar. (3)

once a year

Topic chosen from current area of interest. Prerequisites: both ECN 313 and 314 or only instructor approval.

ECN 502 Managerial Economics. (3)

fall and spring

Application of microeconomic analysis to managerial decision making in areas of demand, production, cost, and pricing. Evaluation of competitive strategies. Prerequisite: M.B.A. degree program student.

ECN 503 Global Economics for Managers. (3)

fall and spring

Macroeconomic analysis of issues related to economic growth, inflation, interest rates behavior, unemployment, exchange rate determination, and global competitiveness. Prerequisite: M.B.A. degree program student.

ECN 504 History of Economic Thought. (3)

spring

Historical development of economic theory. Emphasis on the development of economic analysis from preclassical economics through Keynes. Prerequisite: ECN 510 or instructor approval.

ECN 509 Macroeconomic Theory and Applications. (3)

fall

Theory of income, output, employment, and price level. Influence on business and economic environment. Prerequisites: both ECN 111 and calculus or only instructor approval.

ECN 510 Microeconomic Theory and Applications. (3)

fall

Application of economic theory to production, consumer demand, exchange, and pricing in a market economy. Prerequisites: both ECN 112 and calculus or only instructor approval.

ECN 511 Macroeconomic Analysis I. (3)

fall

Current theories of output, employment, inflation, and asset prices as well as major aggregates. Introduction to dynamic optimization techniques. Prerequisites: both ECN 313 and calculus or only instructor approval.

ECN 512 Microeconomic Analysis I. (3)

fall

Theory of production, consumer demand, resource use, and pricing in a market economy. Prerequisites: both ECN 314 and calculus or only instructor approval.

ECN 513 Macroeconomic Analysis II. (3)

fall

Focuses on growth theory, dynamic general equilibrium models, monetary theory, open-economy issues. Prerequisite: ECN 511 or instructor approval.

ECN 514 Microeconomic Analysis II. (3)

spring

General equilibrium, welfare economics, production, and capital theory. Prerequisite: ECN 512 or instructor approval.

ECN 515 Advanced Macroeconomic Analysis. (3)

fall

Focuses on current research areas in macroeconomics and monetary theory with emphasis on methods in economic dynamics and numerical techniques. Prerequisite: ECN 511 or instructor approval.

ECN 516 Economics of Uncertainty, Information, and Strategic Behavior. (3)

fall

Economic behavior under uncertainty; markets and contracts under asymmetric information; the theory of games with incomplete information and applications. Prerequisite: ECN 512 or instructor approval.

ECN 517 Monetary Theory. (3)

fall

Traditional and post-Keynesian monetary theory, interest rate determination, the demand and supply of money. Prerequisite: ECN 511 or instructor approval.

ECN 521 Labor Economics I. (3)

spring

Development of basic theoretical models for analyzing labor market issues. Prerequisite: ECN 510 or instructor approval.

ECN 522 Labor Economics II. (3)

not regularly offered

Extensions/criticisms of labor market theories. Applications to a variety of policy issues. Prerequisite: ECN 521.

ECN 525 Econometrics I. (3)

spring

Problems in the formulation of econometric models. Emphasizes estimation, hypothesis testing, and forecast of general linear models. Prerequisite: 6 hours in statistics or instructor approval.

ECN 526 Econometrics II. (3)

fall

Estimation and inference of qualitative and limited dependent variable models as well as general multiple equation models. Prerequisite: ECN 525 or instructor approval.

ECN 527 Econometrics III. (3)

spring

Generalized method of moment estimation, estimation with censored and truncated samples, nonlinear models, panel-data models, econometrics of nonstationarities. Prerequisite: ECN 526 or instructor approval.

ECN 531 Comparative Economic Systems. (3)

fall

Philosophical foundations of major economic systems and of properties of principal system models. Comparison of alternative institutions and system components of contemporary economies. Prerequisites: both ECN 509 and 510 or only instructor approval.

ECN 536 International Trade Theory. (3)

spring

Theories of comparative advantage and their empirical verification. Theory and political economy of commercial policy. Resource transfers and the role of the multinational corporation. Prerequisites: both ECN 509 and 510 or only instructor approval.

ECN 538 International Monetary Theory and Policy. (3)*fall*

Foreign exchange market, balance of payments, and international financial institutions and arrangements; theory and applications. Prerequisites: both ECN 509 and 510 or only instructor approval.

ECN 541 Public Economics. (3)*fall*

Economics of collective action, public spending, taxation, and politics. Impact of central governmental activity on resource allocation and income distribution. Prerequisite: ECN 510 or instructor approval.

ECN 553 Industrial Organization. (3)*spring*

Analysis of structure, conduct, and performance in industrial markets; the economics of organizations. Prerequisite: ECN 510 or instructor approval.

ECN 560 Economics of Growth and Development. (3)*fall*

Economic problems, issues, and policy decisions facing the developing nations of the world. Prerequisites: both ECN 509 and 510 or only instructor approval.

ECN 584 Economics Internship. (1–3)*summer*

Academic credit for professional work organized through the Internship Program. Prerequisites: both ECN 510 and 511 or only instructor approval.

ECN 585 Mathematics for Economists. (3)*fall*

Survey of mathematical ideas encountered in economics and econometrics: nonlinear programming, the Kuhn-Tucker theorem, concave programming, optimization over time. Prerequisite: calculus or instructor approval.

ECN 591 Economics Seminar. (1–3)*fall, spring, summer*

Presentations by outside speakers, department faculty, and graduate students of work in progress. Prerequisite: instructor approval.

ECN 593 Applied Projects. (3)*fall*

Preparation of a supervised applied project typically in conjunction with an internship. Prerequisites: ECN 510, 511.

ECN 594 Conference and Workshop in Economics. (1–12)*fall*

Workshops offered include: economic analysis, microeconomic analysis, macroeconomics.

ECN 598 Special Topics. (3)*not regularly offered*

Advanced topics in economics. Consult the *Schedule of Classes* for offerings. Prerequisite: instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

QUANTITATIVE BUSINESS ANALYSIS (QBA)**Department of Economics****QBA 410 Applied Business Forecasting. (3)***not regularly offered*

Applies forecasting techniques in business and institutional environments. Prerequisite: QBA 321.

QBA 421 Applied Quality Analysis II. (3)*once a year*

Applies statistical tools employed in manufacturing and experimental research. Applications focus on design and improvement of processes. Prerequisite: QBA 321.

QBA 502 Managerial Decision Analysis. (3)*fall and spring*

Fundamentals of quantitative analysis to aid management decision making under uncertainty. Prerequisites: MAT 210; computer literacy; graduate degree program student.

QBA 525 Applied Regression Models. (3)*once a year*

Simple linear regression, multiple regression, indicator variables, and logistic regression. Emphasis on business and economic applications. Prerequisite: MAT 210.

QBA 527 Categorical Data Analysis. (3)*once a year*

Discrete data analysis in business research. Multidimensional contingency tables and other discrete models. Prerequisite: QBA 525.

QBA 530 Experimental Design. (3)*once a year*

Experimental designs used in business research. Balanced and unbalanced factorial designs, repeated measures designs, and multivariate analysis of variance. Prerequisite: QBA 525 (or its equivalent).

QBA 535 Multivariate Methods. (3)*once a year*

Advanced statistical methods used in business research. Multivariate analysis of association and interdependence. Prerequisite: QBA 525.

QBA 540 Forecasting. (3)*not regularly offered*

Foundation of statistical forecasts and forecast intervals; applies classical and computer-assisted forecasting methods to business forecasting problems. Prerequisites: MAT 210; QBA 502.

QBA 593 Applied Project. (1–12)*not regularly offered***QBA 599 Thesis. (1–12)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Education

Master's and Doctoral Programs

MASTER OF EDUCATION

Master of Education (M.Ed.) programs in the College of Education prepare scholarly professionals. Programs are available in Counselor Education, Curriculum and Instruction, Educational Administration and Supervision, Educational Psychology, Educational Technology, Higher and Postsecondary Education, and Special Education. Concentrations within the M.Ed. in Curriculum and Instruction include bilingual education, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, professional studies, science education, secondary education, and social studies education. Within Special Education, M.Ed. areas of concentration are education of the gifted, the mildly handicapped, the multicultural exceptional, and severely and multiply handicapped children.

Admission. The College of Education requires above-average performance on the verbal scale of the GRE in addition to the general requirements for admission to the Graduate College. (For some programs the Miller Analogies Test may be substituted for the GRE.) Individual divisions or programs, however, may require superior test scores or GPA for admission. Division admission committees review a variety of evidence presented by applicants for admission consideration. Applicants with lower test scores or grades below minimum levels may be considered for admission recommendation if counterbalancing evidence suggesting the potential for outstanding performance in a master's program is available to division admission committees.

Program of Study. A minimum of 30 to 36 semester hours of course work approved by the student's supervisory committee, division director, and the Graduate College is

required for the Master of Education degree. Candidates for the Master of Education degree should contact the division offering the graduate degree they are seeking for specific core requirements. *A program of study should be filed as early as possible and not later than upon completion of nine semester hours of graduate course work.*

Examinations. All M.Ed. programs require successful completion of a written comprehensive examination or applied project. These examinations focus on the specialized content of the specific M.Ed. program of study. Comprehensive examinations are written and evaluated by program faculty. If the student should fail the written comprehensive examination, a reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Approval of the reexamination must be obtained from the supervisory committee, division director, and the dean of the Graduate College.

DOCTOR OF EDUCATION

The Doctor of Education (Ed.D.) degree is primarily a professional degree, designed for persons who wish to pursue careers as leaders in education or as applied researchers. Emphasis is on application of research and theory in education, and on acquisition of professional skills. Prospective students must demonstrate superior scholarship and leadership in professional education. Each student is expected to acquire broad knowledge in the major field and to produce a dissertation addressing a significant educational issue or problem.

Admission. Applicants must meet the general requirements established by the Graduate College as well as College of Education requirements. Satisfaction of these requirements does not guarantee admission. All divisions require submission of a two-page formal letter of application describing the applicant's prior relevant experience and accomplishments and specifying areas of greatest interest as well as career goals. Individual divisions or programs may have standards higher than these minimums or may require submission of additional materials. Applicants should consult the division director or program coordinator for specific admission requirements.

Program of Study. The program requires a minimum of 60 semester hours beyond the master's degree. Of these, at least six hours must be in internship. College of Education core courses must also be completed. These vary according to the degree sought. See "Courses," page 188 for a listing. The recommendation for the program committee is reviewed simultaneously with the program of study.

The quality of student work is evaluated through written comprehensive examinations, formal oral and written presentation of the dissertation proposal, and a final oral examination in defense of the dissertation. Students must demonstrate competence both in the application of research findings and in conducting research. The dean of the Graduate College, upon recommendation of the division director, appoints the dissertation committee for each Ed.D. student. This committee reviews and evaluates the student's dissertation proposal and conducts the final oral examination.

Residency. The minimum residence requirement for the Ed.D. degree is completion of 30 semester hours within a

period of 18 consecutive months after admission to the doctoral program at ASU. Not more than 10 semester hours of Research (792), Applied Project (793), and Dissertation (799) credit may be included in the course work used to meet the 30-hour residence requirement.

Continuous Enrollment and Reentry. Graduate students in the College of Education who have not been in attendance at ASU for one or more semesters must apply to the Graduate College for reentry and, following approval of the reentry application, must register for a minimum of one semester hour of graduate credit in the degree area during each of the following semesters. Applications for reentry are considered along with all other new applications to the degree program.

Reentry is not an issue for students who maintain continuous enrollment and make satisfactory progress toward their degrees. If a program of study must be interrupted for one or more semesters, the student must apply to the supervisory committee and the division director for leave status, not to exceed one calendar year.

Foreign Language Requirements. None.

Comprehensive Examinations. When students have essentially completed the course work in an approved program of study, they should take the comprehensive examinations. The written and oral examinations are designed to assess the student's mastery of the field of specialization. Failure in the comprehensive examinations is considered final unless the supervisory committee and the director of the division recommend, and the dean of the Graduate College approves, a reexamination. A reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Only one reexamination is permitted.

Candidacy. Doctoral students should apply for admission to candidacy immediately after they have met all requirements for the degree, except the dissertation. These requirements include passing the comprehensive examinations and other requirements specified by the division.

Research and Dissertation Requirements. The dissertation should demonstrate advanced analytic competence and contribute to the understanding and improvement of professional practice. Each candidate must register for a combined total of 24 semester hours credit for 792 Research and 799 Dissertation. The final copy of the dissertation must be reviewed by the supervisory committee and the staff of the Graduate College at least three weeks before the degree conferral date. Copies of the *Format Manual* are available in the Graduate College.

Final Examinations. The final oral examination in defense of the dissertation is mandatory and must be held on the campus of ASU. The oral defense is scheduled by the supervisory committee with the approval of the dean of the Graduate College.

Graduation. The student is eligible for graduation when the Graduate College scholarship requirements have been met, the final oral examination has been passed, and the dissertation has been approved by the supervisory committee and accepted by the director of the division and the dean of the Graduate College.

Applications for graduation should be made no later than the date specified in the Graduate College calendar.

Maximum Time Limit. The candidate must take the final oral examination in defense of the dissertation within five years after passing the comprehensive examinations. Any exception must be approved by the supervisory committee and the dean of the Graduate College and ordinarily involves repetition of the comprehensive examinations.

Courses. The core courses for the College of Education graduate programs carry the prefix "COE." These courses are no longer required for all graduate majors in the College of Education. Contact the appropriate division to obtain specific core requirements.

COLLEGE OF EDUCATION (COE)

COE 501 Introduction to Research and Evaluation in Education. (3)

fall, spring, summer

Overview of educational inquiry from controlled, quantitative to qualitative, naturalistic. Emphasis on locating and critically interpreting published research.

COE 502 Introduction to Quantitative Methods. (3)

fall, spring, summer

Topics in statistical analysis, measurement, and research design. Exploratory data analysis, estimation theory, and statistical inference. Use of computers for data analysis. Cross-listed as EDP 502. Credit is allowed for only COE 502 or EDP 502.

COE 503 Introduction to Qualitative Research. (3)

fall, spring, summer

Terminology, historical development, approaches (including ethnography, ethnomethodology, critical theory, grounded theory, and hermeneutics), and qualitative versus quantitative social sciences; methods of inquiry. Cross-listed as EDP 503. Credit is allowed for only COE 503 or EDP 503.

COE 504 Learning and Instruction. (3)

fall, spring, summer

Introduction to psychology of learning and instruction. Includes the foundations of learning theories and their application to educational practice. Cross-listed as EDP 504. Credit is allowed for only COE 504 or EDP 504.

COE 505 American Education System. (3)

fall, spring, summer

Political, social, historical, and philosophical analyses of American education at all levels. Examination of primary sources, legal findings, and case studies.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Educational Administration and Supervision

Master's and Doctoral Programs

Donna Macey
Program Coordinator
(ED 116D) 480/965-6357
donna.macey@asu.edu
coe.asu.edu/elps

PROFESSORS

APPLETON, GONZÁLEZ, NORTON, VALVERDE, WEBB

ASSOCIATE PROFESSORS

CASANOVA, HARTWELL-HUNNICUTT

ASSISTANT PROFESSORS

MOSES, PEÑA

CLINICAL PROFESSOR

DYER

CLINICAL ASSOCIATE PROFESSOR

MACEY

The faculty in the Division of Educational Leadership and Policy Studies offer graduate programs leading to the Master of Education and Doctor of Education degrees in Educational Administration and Supervision.

ASU West also offers a Master of Educational Administration and Supervision (M.Ed.) degree. For more information about the ASU West program, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Students interested in the Ph.D. degree with a field of study encompassing educational administration should refer to "Educational Leadership and Policy Studies," page 190. See also "Doctor of Philosophy," page 103, for general information on the Ph.D. degree.

For admission to the M.Ed. degree program applicants must submit scores on either the Graduate Record Examination (GRE) or the Miller Analogies Test (MAT); scores on the GRE are preferred. A minimum of 36 hours is required for the M.Ed. degree. Applicants for admission to the doctoral degree programs must submit scores on the GRE.

Candidates for all degrees must pass a written comprehensive examination. An oral examination over the written portion of the comprehensive examination may be required of Ed.D. candidates at the discretion of the student's program committee. In addition, candidates for the Ed.D. must pass a final oral examination in defense of the dissertation. Candidates for the M.Ed. and Ed.D. programs may be required to take certain College of Education core courses depending upon previous experience and education. Pre-approval by an advisor is required. The core courses are COE 501, 502, 503, 504, and 505. A set of research courses is required for the Ed.D. degree.

MASTER OF EDUCATION

See “Master of Education,” page 186, for information on the Master of Education degree.

DOCTOR OF EDUCATION

See “Doctor of Education,” page 187, for information on the Doctor of Education degree.

RESEARCH ACTIVITY

Current faculty research activities include legal issues in educational administration, school violence prevention, sexual harassment, school administration policies, including human resource policy, and urban education policy.

EDUCATIONAL ADMINISTRATION AND SUPERVISION (EDA)**EDA 501 Competency/Performance in Educational Administration. (3)**

fall and summer

Nature of educational administration and the concept of competency as it applies to educational administration.

EDA 507 Computers in Educational Administration. (3)

fall

Survey of computer use and applications in educational administration. Lecture, lab.

EDA 510 Introduction to Organization and Administration of American Public Schools. (3)

fall and spring

Explores organizational structure and administration of public education through the application of legal and ethical concepts and relevant information of the social sciences. Cross-listed as SPF 510. Credit is allowed for only EDA 510 or SPF 510.

EDA 511 School Law. (3)

spring

Constitutional, statutory, and case law that relates to all school personnel, pupils, the school district, and other governmental units. Contracts, dismissals, tenure, retirement, pupil injuries, liability of personnel and district, school district boundary changes, and bonding.

EDA 521 Evaluation of Teaching Performance. (3)

fall

In-depth analysis of legal basis of teacher appraisal, teacher competency, measurement of teacher performance, and application of performance appraisal systems. Prerequisite: COE 504.

EDA 524 Theory and Application of Educational Administration. (3)

fall and summer

History and development of public school administration in the United States; current organizational patterns for public education at local, intermediate, state, and national levels; current theoretical positions in educational administration.

EDA 525 Human Relations and Societal Factors in Education. (3)

not regularly offered

Interrelations between problems of educational administration and interdisciplinary social sciences. Communications skills, morale, authority, and perception. Concepts from political science, economics, and social-psychology useful to the administrator.

EDA 526 Instructional Supervision. (3)

fall, spring, summer

Administering curriculum improvement, in-service education, evaluating, and improving teaching competence; administrative instructional responsibilities.

EDA 527 Managerial Functions in School Administration. (3)

not regularly offered

Relates to the work of the central district office staff and the school principal. Use of human resources, educational planning, and organization and management of time.

EDA 544 Public School Finance. (3)

fall

Measures of ability, efforts, and educational need; capital outlay funding; tax revenues; federal, state, and local financing alternatives; major issues and trends in the financing of public education.

EDA 548 Community Relations in Education. (3)

not regularly offered

Administrative factors of primary importance in developing community involvement in public schools. Emphasis on theory and skill of school system and individual communication.

EDA 555 Educational Facility Planning. (3)

not regularly offered

School building needs, educational planning for facilities, responsibilities of architects, duties of contractors, and equipping and furnishing of school buildings.

EDA 571 School Business Management. (3)

fall, spring, summer

Purchasing, budgeting, accounting, payroll management, auditing, financial reporting, insurance, and administration of nonteaching personnel and services.

EDA 573 School Personnel Administration. (3)

spring

Organization for personnel services; development of policy to govern selection, orientation, placement, remuneration, transfers, separations, and development of morale among instructional and noninstructional personnel.

EDA 576 The School Principalship. (3)

fall

Problem and laboratory approaches used to provide application of administrative activities of elementary and secondary schools. Prerequisites: EDA 501, 526.

EDA 634 Instructional Leadership. (3)

not regularly offered

Curricular practices and processes used by instructional leaders who plan, organize, and coordinate the professional activities in elementary and secondary schools. Prerequisite: EDA 526.

EDA 675 Politics of Education. (3)

spring

Social science theory and research are used to consider the political context of educational policy making. Prerequisite: COE 505.

EDA 676 The School Superintendency. (3)

spring

Critical examination of the school superintendency and the primary functions of this educational position. Includes duties, responsibilities, activities, and problems of the school superintendent. Examines the unique leadership role of the school superintendent. Prerequisite: instructor approval.

EDA 679 Administration of Special Programs in Education. (1–3)

not regularly offered

For personnel administering special educational services; responsibilities of superintendents, principals, supervisors, and directors for special education, student personnel, audiovisual, library science, and others.

EDA 711 Administrative Leadership. (3)

fall

Emphasis on research in leadership; application of research findings to administrative and supervisory functions in educational endeavors. Prerequisites: EDA 524; 30 semester hours in educational administration; admission to doctoral program.

EDA 722 Administration of Instructional Improvement. (3)

spring

Recent research relating to administrative and supervisory responsibilities for the improvement of the educational program. Effective processes by administrators, supervisors, consultants, and coordinators. Prerequisites: 30 semester hours in educational administration; admission to doctoral program.

EDA 733 Administrative Management. (3)

spring

Recent research relating to school management. School finance, law, buildings, transportation, food services, and supply management. Prerequisites: EDA 527, 544, 571; 30 semester hours in educational administration; admission to doctoral program.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Educational Leadership and Policy Studies

Doctoral Program

Mary Lee Smith
Program Coordinator
(ED 134C) 480/965-6357
www.ed.asu.edu/elps

REGENTS' PROFESSOR BERLINER

PROFESSORS

APPLETON, BARONE, FENSKE, GLASS, GONZÁLEZ,
HANSON, NORTON, SMITH, TURNER, VALVERDE,
WEBB, WILEY

ASSOCIATE PROFESSORS

CASANOVA, HARTWELL-HUNNICUTT

ASSISTANT PROFESSORS

MARGOLIS, MOSES, PEÑA

The faculty in the Division of Educational Leadership and Policy Studies offer a Ph.D. degree with an interdisciplinary approach to complex problems of educational policy and leadership. It brings together scholarly interests found in educational administration, higher education, and social and philosophical foundations of education. Emphasis is placed upon critical thought, theories and practice within political, demographic, historical, sociocultural, and intellectual contexts in the United States and other nations. The purpose of the program is to develop educational researchers, policy analysts, and leaders for careers in schools, colleges, universities, and government and private agencies.

DOCTOR OF PHILOSOPHY

See "Doctor of Philosophy," page 103, for general requirements.

Admission. In addition to meeting Graduate College minimum requirements, applicants must submit scores on the Graduate Record Examination, a statement of intent, a résumé, and three letters of recommendation. Application materials are available from the division and are submitted to the division (ED 120). The admission committee meets in early February. All required materials must be in the division office in early January to assure review. Students entering the program must have a bachelor's or master's degree in either education or an appropriate subject field (e.g., anthropology, economics, history, philosophy, or sociology), or additional courses are required in the areas of deficiency before admission to the program. Contact the division office for the appropriate admissions application. In selecting applicants, the program looks for background and career aspirations consistent with program goals and willingness to devote primary attention to courses and experiences on campus.

Program Committee. The program committee (chair and at least two other members) advises in the preparation of the

program of study and administers the comprehensive examinations. The committee must be approved by the dean of the Graduate College.

Dissertation Committee. After passing the comprehensive examination, a dissertation committee is formed upon the approval of the dean of the Graduate College. The dissertation committee approves the subject and title of the dissertation. Members of the program committee may also serve as members of the dissertation committee; however, the committees may have different memberships. The dissertation chair must be a faculty member designated eligible to serve in this capacity by the dean of the Graduate College.

Program of Study. Students entering the Ph.D. program are expected to meet the requirement of an 84-semester-hour program of study (including the semester hours transferred from the master's degree in a related discipline). The following represents components of a program of study.

Policy Studies Foundation. At the heart of the Ph.D. program are 27 semester hours of course work on the foundations of policy studies. During the students' first year in the program, they take a two-semester sequence, Proseminar I and II (six hours). In addition, they take Evaluation Theory (three hours). In the second year, students enroll for Theoretical Issues in Policy Studies (three hours). Other required courses in this category are Foundations of American Education, Politics of Education, Policy Issues in Learning and Instruction, Theory of Educational Organization, and Social and Historical (three hours each). To understand the economic and financial aspects of educational policy, students take one of the following three courses (three hours each): Higher Education Finance and Budgeting, Political Economy, or Public School Finance.

Advanced Research Methods. Students must complete a minimum of nine semester hours of research methods plus Introduction to Qualitative Research. Advanced Quantitative Research is required of all students and presumes an introductory course in statistics has been taken successfully. If not, COE 502 must be taken for no credit. Courses satisfying this requirement can be taken outside the College of Education curricula with the committee chair's approval. The courses taken deepen the student's research emphasis, whether it is qualitative or quantitative.

Specialty Studies. Each student completes 12 semester hours of course work in an area of special interest. This course work represents added depth in the specialty in which the student plans to practice as a scholar, administrator, or policy analyst. The speciality areas are policy analysis, economics, finance, K-12 education, social and philosophical foundations, and research and evaluation methodology.

Practicum. Students must earn three semester hours of credit for a supervised practicum. This work is planned in conjunction with the student's committee chair and involves applied work in a practical setting relating to the student's intended postdoctoral position.

Research and Dissertation. Each Ph.D. candidate is required to complete a minimum of 24 semester hours of research and dissertation.

Foreign Language Requirements. None.

Comprehensive Examinations. The examination centers on the professional focus and the cognate study and must be passed before admission to candidacy. A written examination is required; an oral examination over the written portion may be required by the student's program committee.

Dissertation Precis and Proposal. The precis is a 15-page summary of the dissertation research proposed by the student. Upon approval of the precis by the dissertation committee, the student proceeds with developing a dissertation proposal.

Research and Dissertation. Twenty-four semester hours of research and dissertation credit are required. The dissertation must consist of a fully documented written study demonstrating a high level of research competence and scholarship in the student's area of professional focus. The dissertation should make an original contribution to knowledge in the area of educational leadership and policy studies and be worthy of publication by an established press as a book or monograph or as one or more articles in a refereed, scholarly journal.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

Current research activities include issues on the relationship between poverty and educational achievement, the efficacy of educational policies for diverse groups, including educational language policies.

COURSES

For courses, see "Educational Administration and Supervision (EDA)," page 189, "Higher and Postsecondary Education (HED)," page 232, and "Social and Philosophical Foundations (SPF)," page 309.

Educational Psychology

Master's and Doctoral Programs

Elsie Moore

Director

(EDB 302) 480/965-3384

dpe@asu.edu

seamonkey.ed.asu.edu/~gail/division/divintro.htm

REGENTS' PROFESSORS

BERLINER, KULHAVY

PROFESSORS

BARONA, BLANCHARD, FREEMAN, GLASS, GREEN, HARRIS, KRUS, NELSEN, SANTOS de BARONA, SMITH, STROM, ZIMILIES

ASSOCIATE PROFESSORS

BEHRENS, MOORE, ROBERTS, STAFFORD

ASSISTANT PROFESSORS

BREM, NAKAGAWA, THOMPSON

CLINICAL ASSISTANT PROFESSOR

STAMM

The faculty in the Division of Psychology in Education offer graduate programs leading to the M.A., Master of Education, and Ph.D. degrees in Educational Psychology. In the Ph.D. program, concentrations are available in learning; lifespan developmental psychology; measurement, methodological studies, and statistics; and school psychology.

Students applying for admission to any of these programs are required to submit scores on the Graduate Record Examination (GRE).

MASTER OF EDUCATION

The Master of Education degree program requires 36 semester hours of graduate course work. The M.Ed. program is intended for persons who wish to further prepare themselves as classroom teachers or other positions related to instruction. A written evaluation is required as the culminating experience for the degree. Students completing this program are not expected to continue for a Ph.D. degree in Educational Psychology at ASU. For more information, access the program Web site at seamonkey.ed.asu.edu/~gail/division/divintro.htm.

See "Master of Education," page 186, for more information on the Master of Education degree.

MASTER OF ARTS

The M.A. degree program requires 30 semester hours of graduate course work, which includes a thesis. The M.A. program leads to the Ph.D. and offers areas of study in learning; lifespan developmental psychology; and measurement, methodological studies, and statistics. All applicants must submit scores on the GRE. These M.A. areas of Educational Psychology have deadlines of October 15 and February 15 for receiving all application materials, including test scores, to be considered for admission for the following semester. These M.A. programs require written

comprehensive examinations. Additional information on these degree programs may be obtained from the Division of Psychology in Education and from the program Web site, seamonkey.ed.asu.edu/~gail/division/divintro.htm.

See "Master's Degrees," page 100, for general requirements.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Educational Psychology offers areas of study in learning; lifespan developmental psychology; measurement, methodological studies, and statistics; and school psychology. Complete descriptions of each area are available from the Division of Psychology in Education and from the program Web site, seamonkey.ed.asu.edu/~gail/division/divintro.htm. The school psychology concentration is accredited by the American Psychological Association and approved by the National Association of School Psychologists.

School Psychology. The faculty specializing in school psychology offer a scientist-practitioner program leading to the Ph.D. degree. The program provides preparation in academic and professional areas through course work, research, practica, and internship. Graduates are employed in school districts, behavioral health settings serving children and adolescents, and universities. All application materials, including test scores, must be received by January 15 to be considered for admission the following academic year. For more information on the faculty, the programs of study, and admission requirements, applicants should contact the Division of Psychology in Education and request the *School Psychology Program* brochure. The same information is available at the program Web site, seamonkey.ed.asu.edu/~gail/division/divintro.htm.

See "Doctor of Philosophy," page 103, for general information on the Ph.D. degree.

RESEARCH ACTIVITY

Research in learning includes teacher education, argumentation and discourse, reading, spatial cognition, and neuropsychological development in early childhood. Research in lifespan development includes studies of pre-school and family literacy programs, social and moral development, social environment of schools, and intergenerational relationships. Research in methodology includes quantitative and qualitative methodology, personnel and program evaluation, and the use of computers for instruction and testing.

School psychology research involves assessment of cognitive and academic skills, classroom processes, interventions with high-risk children and youth, informed consent, substance abuse prevention, and assessment of minority individuals, as well as ethnic and gender issues.

EDUCATIONAL PSYCHOLOGY (EDP)

EDP 502 Introduction to Quantitative Methods. (3)

fall, spring, summer

Topics in statistical analysis, measurement, and research design. Exploratory data analysis, estimation theory, and statistical inference. Use of computers for data analysis. Cross-listed as COE 502. Credit is allowed for only COE 502 or EDP 502.

EDP 503 Introduction to Qualitative Research. (3)

fall, spring, summer

Terminology, historical development, approaches (including ethnography, ethnomethodology, critical theory, grounded theory, and hermeneutics), and qualitative versus quantitative social sciences; methods of inquiry. Cross-listed as COE 503. Credit is allowed for only COE 503 or EDP 503.

EDP 504 Learning and Instruction. (3)

fall, spring, summer

Introduction to psychology of learning and instruction. Includes the foundations of learning theories and their application to educational practice. Cross-listed as COE 504. Credit is allowed for only COE 504 or EDP 504.

EDP 510 Essentials of Classroom Learning. (3)

fall, spring, summer

Theoretical and empirical foundations of learning in the classroom milieu. Critical exposure to research and method in instructional psychology.

EDP 513 Child Development. (3)

fall, spring, summer

Examines problems and achievements experienced by children growing up in a technological society. Emphasis on discovering the child's perspective.

EDP 514 Psychology of the Adolescent. (3)

fall, spring, summer

Cognitive, physical, and social development of adolescents in contemporary society. Impact of family, school, and workplace on adolescent development. Prerequisite: EDP 310 or PGS 101 (or its equivalent).

EDP 530 Theoretical Issues and Research in Human Development. (3)

fall

Psychological theories, research, and methods relevant to human development, emphasizing the relations between early development and later performance.

EDP 535 Applied Behavior Analysis. (3)

fall

Principles of conditioning as applied to behavior. Current research on the experimental analysis of behavior in educational psychology.

EDP 536 Physiology of Behavioral Disorders. (3)

fall

Critical study of nervous system, brain function for fundamental behaviors, and system dysfunctions in mental/neurological disorders. Prerequisite: instructor approval.

EDP 540 Theoretical Views of Learning. (3)

fall and spring

Classical and cognitive theories of learning, plus recent orientations. Illustrative experimental and rational foundations; implications for educational practice.

EDP 542 The Psychology of Learning and Instruction. (3)

spring

Critical review and evaluation of research on learning variables relevant to acquisition and retention of instructional materials. Lab.

EDP 544 Psychology of Reading. (3)

fall

Alternate analyses of the reading process; designs and procedures for investigating instructional and noninstructional variables related to reading achievement.

EDP 545 Foundational Studies in Language and Learning. (3)

spring

Historical developments in research relating cognitive models to the instructional process in language learning. Prerequisites: both EDP 540 and 552 or only instructor approval.

EDP 550 Introduction to Measurement in Education. (3)

fall and spring

Nature and types of educational measures. Critiquing and selecting appropriate measuring devices. Constructing measuring devices. Social controversies about tests. Lecture, lab. Prerequisite: EDP 502 or instructor approval.

EDP 552 Quantitative Data Analysis in Education I. (3)

fall, spring, summer

Continued treatment of statistical estimation, testing, and research synthesis. Inferential techniques including ANOVA and multiple regression with computers. Lecture, lab. Prerequisite: EDP 502 or instructor approval.

EDP 554 Quantitative Data Analysis in Education II. (3)*fall, spring, summer*

Advanced issues in applied multiple regression and ANOVA. Introduction to ANCOVA. Use of computers for data analysis. Lecture, lab. Prerequisite: EDP 552 or instructor approval.

EDP 556 Data Processing Techniques in Measurement and Research. (3)*once a year*

Use of statistical packages for data analysis. Emphasis on data management, data structures, and related statistical procedures. Lecture, lab. Prerequisite: EDP 552. Pre- or corequisite: EDP 554 or instructor approval.

EDP 560 Individual Intellectual Assessment. (3)*fall and spring*

Issues in administration and interpretation of individual intelligence tests. Theoretical basis, ethical considerations, and diagnostic use of test results. Fee. Prerequisite: admission to a program in professional psychology or instructor approval.

EDP 561 Lab in Psychological Assessment. (3)*spring*

Lab experience in administration, scoring, and interpretation of individual intelligence tests. Lab. Prerequisite: admission to a program in professional psychology or instructor approval. Corequisite: EDP 560.

EDP 562 School Psychology: Theory and Practice. (3)*fall*

Development and present status of school psychology, including an overview of assessment and intervention strategies and professional issues.

EDP 563 Interventions in School Psychology. (3)*fall*

Examines case-based consultation and consultation research relevant to school psychology practice. Field experience. Prerequisite: school psychology program or instructor approval.

EDP 564 Curriculum-Based Assessment and Academic Interventions. (3)*spring*

Constructing, administering, and scoring outcome-based measures. Use of measures for using the various educational decisions.

EDP 566 Diagnosis of Learning Difficulties. (3)*spring*

Clinical diagnosis of learning difficulties, emphasizing specific academic problems. Use and interpretation of diagnostic instruments in practical school situations. Prerequisites: EDP 560 and 562 (or their equivalents); instructor approval.

EDP 567 School Psychological Services to Minority Students. (3)*spring*

Historical perspectives and major issues in psychological and academic assessment and interventions with minority school children.

EDP 568 Diagnosis and Interventions for Children and Adolescents with Emotional Handicaps. (3)*fall*

Clinical diagnosis of emotional handicaps in children and adolescents with emphasis on interpretation of diagnostic instruments and designing appropriate interventions in school settings. Lecture, lab. Prerequisites: EDP 566; PSY 578 (or its equivalent).

EDP 651 Methods and Practices of Qualitative Research. (3)*spring*

Advanced course for students familiar with theory and extant work. Topics include data collection, analysis, reporting, and an extensive fieldwork project. Prerequisite: COE 503.

EDP 652 Multivariate Procedures in Data Analysis I. (3)*fall*

Introduction to matrix algebra. Application of MANOVA, MANCOVA, power analysis, effect size, discriminant and repeated measures analysis with computers. Lecture, lab. Prerequisite: EDP 554 or instructor approval.

EDP 654 Multivariate Procedures in Data Analysis II. (3)*spring*

Treatment of applied multivariate multiple regression, canonical correlation, factor analysis, log-linear models, and structural equation models with computers. Lecture, lab. Prerequisite: EDP 652 or instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Educational Technology

Master's and Doctoral Programs

Elsie Moore

Director

(EDB 302) 480/965-3384

dpe@asu.edu

seamonkey.ed.asu.edu/~gail/division/divintro.htm

PROFESSORS

BITTER, KLEIN, McISAAC, SULLIVAN

ASSOCIATE PROFESSOR

SAVENYE

ASSISTANT PROFESSORS

BRUSH, JULIAN

CLINICAL ASSISTANT PROFESSOR

IGOE

The faculty in the Division of Psychology in Education offer graduate programs leading to the Master of Education (M.Ed.) and Doctor of Philosophy (Ph.D.) degrees in Educational Technology. The focus of these programs is on design, development, and evaluation of instructional systems and on educational technology applications to support learning. The doctoral program emphasizes research using educational technology in applied settings.

The graduate programs leading to a degree in Educational Technology prepare students for a variety of positions consistent with their professional goals. Most doctoral graduates of the program accept appointments as university faculty members; educational technologists in universities, community colleges, and schools; or as training managers in corporate settings. Potential employment opportunities for master's degree graduates include positions as educational technologists in schools, community colleges, and universities; or as training specialists in corporate settings.

Applicants for admission to the Ph.D. degree program in Educational Technology must submit scores for the Graduate Record Examination (GRE). Master of Education program applicants must submit scores for either the GRE or the Miller Analogies Test. All application materials should be received at least three months prior to the semester in which the applicant wishes to begin study.

MASTER OF EDUCATION

The M.Ed. degree in Educational Technology requires the completion of a minimum of 30 semester hours beyond a bachelor's degree. Eighteen semester hours of prescribed course work is required for all students in the Master of Educational Technology program. In addition, students select a minimum of 12 semester hours from a variety of specialty areas such as instructional design technology, media development, technology integration, and distance education. For a complete description of the M.Ed. program in Educational Technology, access the Web site at seamonkey.ed.asu.edu/~gail/division/divintro.htm. For more information, see "Master of Education," page 186, for general requirements.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Educational Technology requires a minimum of 84 semester hours beyond the bachelor's degree. At least 54 of these hours must be taken at ASU. Each Ph.D. student in Educational Technology is required to complete 54 to 60 semester hours of prescribed course work and a minimum of 24 semester hours of elective courses. In addition, each Ph.D. student in Educational Technology must satisfy a publication requirement prior to beginning work on their dissertation. For a complete description of the Ph.D. in Educational Technology, access the Web site at seamonkey.ed.asu.edu/~gail/division/divintro.htm. For more information, see "Doctor of Philosophy," page 103.

RESEARCH ACTIVITY

Research activity includes design, development, and evaluation of instructional environments and educational technology applications, emerging technologies, and instructional effectiveness. Students participate in research activities and course work that lead to conference participation and journal publication.

EDUCATIONAL TECHNOLOGY (EDT)

EDT 455 Authoring Tools. (3)

fall, spring, summer

Use of current authoring tools to design and deliver computer-based instructional materials.

EDT 501 Foundations and Issues in Educational Technology. (3)

fall and spring

Introduction to educational technology. Examines accomplishments and issues in the field.

EDT 502 Design and Development of Instruction. (3)

fall and spring

Design, development, and formative evaluation of objectives-based instructional materials.

EDT 503 Instructional Media Design. (3)

fall and spring

Uses media selection, design, and production principles to prepare design specifications for solutions to instructional messages and products. Pre- or corequisite: EDT 502.

EDT 504 Development of Computer-Based Instruction. (3)

fall and spring

Systematic design, development, and formative evaluation of computer-based instruction. Prerequisites: EDT 455 (or instructor approval), 502.

EDT 505 Multimedia Presentation Technologies. (3)

fall

Explores the design of multimedia presentations and the utilization of tools and resources to effectively deliver those presentations. Lecture, lab.

EDT 506 Educational Evaluation. (3)

spring

Procedures for evaluating educational programs, training systems, and new-technology applications. Prerequisite: EDT 502.

EDT 511 Technology Applications in Education. (3)

fall and summer

Integration and evaluation of emerging technologies into K-12 and adult teaching and learning. Online and lecture.

EDT 520 Educational Technology and Training. (3)

spring

Applications of educational technology to training and human performance systems in business, industry, and government; emphasizing trends and project management. Lecture, lab. Prerequisites: EDT 501, 502.

EDT 523 Distance Education Theory and Practice. (3)

fall

Explores development of distance learning principles by examining national and international systems and applications. Online and lecture.

EDT 525 Web Resources for Educators. (3)

spring

Explores Web-based and distance learning applications for educators. Online and lecture.

EDT 527 Instructional Video Production. (3)

spring

Design and production of instructional video. Lecture, lab. Prerequisite: EDT 503 or instructor approval.

EDT 528 Development of Web-Based Instruction. (3)

fall

Design and development of online instruction using advanced technologies. Prerequisite: EDT 502.

EDT 531 Hypermedia. (3)

spring

Design, development, and evaluation of open-ended, nonlinear computer-based tools and applications. Lecture, lab. Prerequisites: EDT 455 (or instructor approval), 502.

EDT 701 Research in Educational Technology. (3)

spring

Review and analysis of research studies in educational technology. Methodology for designing, conducting, and reporting educational technology research. Prerequisites: EDT 501, 502; instructor approval.

EDT 702 Research in Technology-Based Education. (3)

fall

Critical exposure to theories, research, and methods in technology-based education.

EDT 703 Research in Distance Education. (3)

spring

Seminar with emphasis on research in telecommunications and distance education.

EDT 704 Emerging Technologies in Education. (3)

spring

Examines the role and impact of emerging technologies in education.

EDT 780 Advanced Instructional Development. (3)

spring

Conducting and documenting selected instructional development activities. Prerequisites: EDT 502; instructor approval.

EDT 792 Advanced Educational Technology Research. (3)

fall and spring

Design and execution of educational technology research on selected topics. Prerequisites: EDT 701; instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Electrical Engineering

Master's and Doctoral Programs

Joseph C. Palais
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 eeinfo@asu.edu
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REGENTS' PROFESSORS

BALANIS, FERRY

PROFESSORS

BACKUS, CROUCH, EL-GHAZALY, GOODNICK, GORUR,
 HEYDT, HIGGINS, HOPPENSTEADT, HUI, KARADY,
 KOZICKI, PALAIS, PAN, ROEDEL, SCHRODER, SI,
 SPANIAS, THORNTON, Y. ZHANG

ASSOCIATE PROFESSORS

ABERLE, ALLEE, BIRD, CHAKRABARTI, COCHRAN,
 EL-SHARAWY, GREENEICH, GRONDIN, HOLBERT, KIM,
 LAI, MORRELL, RODRIGUEZ, SHEN, SKROMME,
 TSAKALIS, TYLAVSKY

ASSISTANT PROFESSORS

AYYANAR, CAPONE, DUMAN, KARAM,
 PAPANDREOU-SUPPAPPOLA, REISSLEIN, VASILESKA,
 YAZDI, J. ZHANG

The faculty in the Department of Electrical Engineering offer graduate programs leading to the M.S., the Master of Science in Engineering, and the Ph.D. degrees in Electrical Engineering.

The faculty also participate in offering the Tri-university Master of Engineering program and the interdisciplinary program leading to the Ph.D. degree in the Science and Engineering of Materials. See "Science and Engineering of Materials," page 307, for program description.

Admission. See "Admission to the Graduate College," page 92. In addition, a student whose undergraduate degree is not based on an ABET-accredited program must submit scores on the Graduate Record Exam and must have earned the equivalent of a 3.50 GPA in the last two years of study. All applicants must submit a short statement of purpose to the department. This statement must include the desired area of study within electrical engineering. Refer to the department's Web site cited above for further information on programs, faculty, financial aid, and for admission and statement of purpose forms.

Internship. An internship program is available to full-time, on-campus, graduate students. Students spend a semester or a summer session at an engineering company. Up to three hours of credit are allowed under courses EEE 584, 684, or 784.

MASTER OF SCIENCE

See "Master's Degrees," page 100, for general information.

MASTER OF ENGINEERING

The Master of Engineering requires 30 hours of course work. It is a practice-oriented degree. Included in the 30 hours are three hours of applied mathematics and three hours of engineering management. Up to six hours of credit can be obtained for a practice-oriented project. A final examination is also required. Courses may be taken at any of Arizona's three state universities. Courses are offered by distance delivery whenever practical. For more information access the Web site at TriUniv.engr.arizona.edu.

MASTER OF SCIENCE IN ENGINEERING

See "Master of Science in Engineering," page 200, for information on the Master of Science in Engineering degree.

A final written comprehensive exam is required for Option two in this program. Most master's degree students are admitted to the M.S.E. program, Option two. Those who are offered financial support or who are outstanding students showing research potential are admitted to the M.S. program. A tentative program of study must be filed during the first semester enrolled for classes.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Electrical Engineering is awarded based upon evidence of excellence in research leading to a scholarly dissertation that is a contribution to knowledge.

See "Doctor of Philosophy," page 103, for general requirements.

Program of Study. The official program of study must be filed no later than the semester before all degree requirements are met.

Foreign Language Requirements. None.

Qualifying Examinations. Every student must pass a qualifying examination consisting of a short research paper and an oral presentation of the research. The exam must take place before the end of the second semester in attendance at ASU.

Comprehensive Examinations. Written and oral comprehensive examinations are required before the student is admitted to candidacy. The examinations are administered by the supervisory committee.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

Opportunities at the level of the master's or doctoral degree are offered to students whose goals are research, development, design, manufacturing, systems, engineering management, teaching, or other professional activities in electrical engineering or related disciplines.

Research opportunities in the Department of Electrical Engineering are available in a broad spectrum of subjects encompassing traditional as well as new specialties. Significant research activity exists in coherent optics, communications, control systems, electromagnetics, power systems,

signal processing, and solid-state electronics, reflecting the continuing strong interest and cooperation of local industry in these disciplines. Engineering education, low-power electronics, power systems, solid-state electronics, telecommunications, and system science and engineering have been selected for support as part of a program establishing excellence centers at ASU.

The list that follows provides an indication of the breadth of subjects available for research in the department. A research project may embrace more than one of the topics listed and may involve cooperative activity with local industry. The list is not meant to be exhaustive; topics other than those shown may also be suitable.

Antennas, Microwaves, Computational Electromagnetics, and Radar. Antennas: antenna analysis, design, and measurements; electromagnetic wave radiation, propagation, scattering, and reception; slotted waveguides; patch antennas; antenna broadbanding techniques. Microwaves: microwave circuits, devices, and systems; microwave, millimeter wave, and optical integrated circuits and transmission lines; transient analysis of striplines and microstrips; printed lines on anisotropy substrates; microwave solid-state circuits and devices and measurement techniques. Packaging of microwave integrated circuits. Computational electromagnetics: Geometrical and physical theories of diffraction; moment method; finite-difference time-domain; finite element. Radar: wideband radar techniques, radar cross section, radar multipath, and tracking

Communications. Communication theory. Information theory. Modulation. Coding: source coding, channel coding, turbo codes, coding for digital storage systems. Wireless communications: coding for wireless systems, channel equalization, multiple access and diversity systems. Communication networks: switching, wireless networks, network performance analysis, ad hoc networks, quality of service, integrated services.

Control systems. Nonlinear systems analysis and control; adaptive control; robust control; sampled-data and real-time digital control, virtual instrumentation; neural networks; system identification and model validation; control of distributed parameter systems; robust multivariable control system design; control of systems with multiple hard nonlinearities; modeling, simulation, and graphical visualization of dynamical systems. Applications to aerospace systems, robotics and autonomous vehicles, semiconductor processes, manufacturing systems, and power systems.

Lasers and Coherent Optics. Fiber optics: communications, active and passive components, and networks.

Power Engineering. Research efforts in power engineering are coordinated through the NSF-sponsored center for Advanced Control of Energy and Power Systems. Power systems: operation analysis, transient stability and reliability analysis, generation and transmission planning, system protection, application of expert systems, and short-term load forecasting using neural networks. Transmission and distribution: electric power quality, distribution system design, load management, and automation. Power electronics: rectifiers and inverters, high power switching devices, power supplies for fusion devices, accelerators, and power conditioning. High-voltage techniques: electrical strength of

dielectrics, insulation coordination, aging of non-ceramic insulators, electric field calculation, remote data gathering, status assessment, and high-voltage effects on fiber-optic cables. Computer applications: software development, real-time control, large network techniques, and neural networks. Power generation: power plant dynamics, modeling, diagnostics, and advanced instrumentation.

Signal Processing. Digital signal processing (DSP) algorithms; signal processing architectures; DSP chips; detection and estimation; statistical decision theory; sensor management; spectral estimation; array signal processing; sampling theory; wavelet analysis; time-frequency representations; sonar and radar applications; signal processing in communication systems; image processing and compression; speech coding and recognition; multimedia signal processing; audio coding algorithms; adaptive signal processing; adaptive noise cancellation.

Solid-State Electronics. Semiconductor crystal growth: epitaxial, and thin films. Processing: oxidation, diffusion, ion-implantation, rapid thermal processing low pressure CVD, reactive ion etching, evaporation, and optical and electron beam lithography. Devices: quantum functional devices, neural network circuits, discrete and integrated circuits, thin film devices, lasers, microwave devices, and integrated optical circuits. Characterization: electrical, optical, physical, and chemical measurements, SEM, STM/AFM, Auger surface analysis, low temperature magneto-transport. Modeling: three-dimensional modeling of heterostructures and Si-based MOSFETs, bipolar transistor modeling, charge carrier ballistics, ensemble Monte Carlo simulations of particle transport in devices and in optically probed material characterization, quantum device modeling, quantum transport, theory of optical processes and effects. Circuit design: analog and mixed signal design, A/D converters, rf communication circuits, integrated microsystems and sensors, low-power electronics, VLSI design and novel architectures.

In addition, students are encouraged to undertake interdisciplinary research projects encompassing several technical areas in electrical engineering, as well as other areas of engineering, science and mathematics.

ELECTRICAL ENGINEERING (EEE)

EEE 405 Filter Design. (3)

fall

Principles of active and passive analog filter design, frequency domain approximations, sensitivity and synthesis of filters. Prerequisite: EEE 303.

EEE 407 Digital Signal Processing. (4)

fall

Time and frequency domain analysis, difference equations, z-transform, FIR and IIR digital filter design, discrete Fourier transform, FFT, and random sequences. Lecture, lab. Prerequisites: EEE 303; MAT 342.

EEE 425 Digital Systems and Circuits. (4)

fall and spring

Digital logic gate analysis and design. Propagation delay times, fan out, power dissipation, noise margins. Design of MOS and bipolar logic families, including NMOS, CMOS, standard and advanced TTL, ECL, and BiCMOS. Inverter, combinational and sequential logic circuit design, MOS memories, VLSI circuits. Computer simulations using PSPICE. Lecture, lab. Prerequisite: ECE 334.

EEE 433 Analog Integrated Circuits. (3)*spring*

Analysis, design, and applications of modern analog circuits using integrated bipolar and field effect transistor technologies. Prerequisite: ECE 334.

EEE 434 Quantum Mechanics for Engineers. (3)*fall*

Angular momentum, wave packets, Schrodinger wave equation, probability, problems in one dimension, principles of wave mechanics, scattering, tunneling, central forces, angular momentum, hydrogen atom, perturbation theory, variational techniques. Prerequisites: ECE 352; EEE 340.

EEE 435 Microelectronics. (3)*spring*

Practice of solid-state device fabrication techniques, including thin film and integrated circuit fabrication principles. Lecture, lab. Fee. Pre- or corequisite: EEE 436.

EEE 436 Fundamentals of Solid-State Devices. (3)*fall and spring*

Semiconductor fundamentals, pn junctions, metal-semiconductor contacts, metal-oxide-semiconductor capacitors and field-effect transistors, bipolar junction transistors. Prerequisite: ECE 352.

EEE 437 Optoelectronics. (3)*not regularly offered*

Basic operating principles of various types of optoelectronic devices which play important roles in commercial and communication electronics; light-emitting diodes, injection lasers, and photodetectors. Prerequisite: EEE 436.

EEE 439 Semiconductor Facilities and Cleanroom Practices. (3)*fall*

Microcontamination, controlled environments, cleanroom layout and systems, modeling, codes and legislation, ultrapure water, production materials, personnel and operations, hazard management, advanced concepts. Prerequisite: EEE 435 or instructor approval.

EEE 440 Electromagnetic Engineering II. (4)*fall and spring*

Second half of an introductory course in electromagnetic theory and its application in electrical engineering. Analytical and numerical solution of boundary value problems. Advanced transmission lines; waveguides; antennas; radiation and scattering. Lecture, lab. Prerequisite: EEE 340 (or its equivalent).

EEE 443 Antennas for Wireless Communications. (3)*spring*

Fundamental parameters; radiation integrals; wireless systems; wire, loop, and microstrip antennas; antenna arrays; smart antennas; ground effects; multipath. Prerequisite: EEE 340 (or its equivalent).

EEE 445 Microwaves. (4)*fall*

Waveguides; circuit theory for waveguiding systems; microwave devices, systems, and energy sources; striplines and microstrips; impedance matching transformers; measurements. Lecture, lab. Prerequisite: EEE 340 (or its equivalent).

EEE 448 Fiber Optics. (4)*fall*

Principles of fiber-optic communications. Lecture, lab. Prerequisites: EEE 303, 340.

EEE 455 Communication Systems. (4)*fall and spring*

Signal analysis techniques applied to the operation of electrical communication systems. Introduction to and overview of modern digital and analog communications. Lecture, lab. Prerequisite: EEE 350.

EEE 459 Communication Networks. (3)*spring*

Fundamentals of communication networks. Study of Seven-Layer OSI model. Focus on functionality and performance of protocols used in communication networks. Prerequisite: EEE 350.

EEE 460 Nuclear Concepts for the 21st Century. (3)*not regularly offered*

Radiation interactions, damage, dose, and instrumentation. Cosmic rays, satellite effects; soft errors; transmutation doping. Fission reactors, nuclear power. TMI, Chernobyl. Radioactive waste. Prerequisite: PHY 241 or 361.

EEE 463 Electrical Power Plant. (3)*fall*

Nuclear, fossil, and solar energy sources. Analysis and design of steam supply systems, electrical generating systems, and auxiliary systems. Power plant efficiency and operation. Prerequisites: ECE 201, 340 (or PHY 241).

EEE 470 Electric Power Devices. (3)*fall*

Analysis of devices used for short circuit protection, including circuit breakers, relays, and current and voltage transducers. Protection against switching and lightning over voltages. Insulation coordination. Prerequisite: EEE 360.

EEE 471 Power System Analysis. (3)*spring*

Review of transmission line parameter calculation. Zero sequence impedance, symmetrical components for fault analysis, short circuit calculation, review of power flow analysis, power system stability, and power system control concepts. Prerequisite: EEE 360.

EEE 473 Electrical Machinery. (3)*fall*

Operating principles, constructional details, and design aspects of conventional DC and AC machines, transformers and machines used in computer disc drives, printers, wrist watches, and automobiles. Prerequisite: EEE 360.

EEE 480 Feedback Systems. (4)*fall and spring*

Analysis and design of linear feedback systems. Frequency response and root locus techniques, series compensation, and state variable feedback. Lecture, lab. Prerequisite: EEE 303.

EEE 482 Introduction to State Space Methods. (3)*fall*

Discrete and continuous systems in state space form controllability, stability, and pole placement. Observability and observers. Pre- or corequisite: EEE 480.

EEE 490 Senior Design Laboratory. (3)*fall and spring*

Project-oriented laboratory. Each student must complete one or more design projects during the semester. Lecture, lab. Prerequisites: ECE 300, 334; EEE 303; senior status.

*General Studies: L***EEE 506 Digital Spectral Analysis. (3)***spring*

Principles and applications of digital spectral analysis, least squares, random sequences, parametric, and nonparametric methods for spectral estimation. Prerequisites: EEE 407, 554.

EEE 507 Multidimensional Signal Processing. (3)*fall*

Processing and representation of multidimensional signals. Design of systems for processing multidimensional data. Introduction to image and array processing issues. Prerequisite: EEE 407 or instructor approval.

EEE 508 Digital Image Processing and Compression. (3)*spring*

Fundamentals of digital image perception, representation, processing, and compression. Emphasis on image coding techniques. Signals include still pictures and motion video. Prerequisites: EEE 350 and 407 (or their equivalents).

EEE 511 Artificial Neural Computation Systems. (3)*fall*

Networks for computation, learning function representations from data, learning algorithms and analysis, function approximation and information representation by networks, applications in control systems and signal analysis. Prerequisite: instructor approval.

EEE 523 Advanced Analog Integrated Circuits. (3)*fall*

Analysis and design of analog integrated circuits: analog circuit blocks, reference circuits, operational-amplifier circuits, feedback, and nonlinear circuits. Prerequisite: EEE 433 (or its equivalent).

EEE 525 VLSI Design. (3)*fall and spring*

Analysis and design of Very Large Scale Integrated (VLSI) circuits. Physics of small devices, fabrication, regular structures, and system timing. Open only to graduate students.

EEE 526 VLSI Architectures. (3)*fall*

Special-purpose architectures for signal processing. Design of array processor systems at the system level and processor level. High-level synthesis. Prerequisite: CSE 330 or EEE 407 or instructor approval.

EEE 527 Analog to Digital Converters. (3)*fall*

Detailed introduction to the design of Nyquist rate, CMOS analog to digital converters. Prerequisite: EEE 523.

EEE 530 Advanced Silicon Processing. (3)*spring*

Thin films, CVD, oxidation, diffusion, ion-implantation for VLSI, metallization, silicides, advanced lithography, dry etching, rapid thermal processing. Pre- or corequisite: EEE 435.

EEE 531 Semiconductor Device Theory I. (3)*fall*

Transport and recombination theory, pn and Schottky barrier diodes, bipolar and junction field-effect transistors, and MOS capacitors and transistors. Prerequisite: EEE 436 (or its equivalent).

EEE 532 Semiconductor Device Theory II. (3)*spring*

Advanced MOSFETs, charge-coupled devices, solar cells, photodetectors, light-emitting diodes, microwave devices, and modulation-doped structures. Prerequisite: EEE 531.

EEE 533 Semiconductor Process/Device Simulation. (3)*fall*

Process simulation concepts, oxidation, ion implantation, diffusion, device simulation concepts, pn junctions, MOS devices, bipolar transistors. Prerequisite: EEE 436 (or its equivalent).

EEE 534 Semiconductor Transport. (3)*spring*

Carrier transport in semiconductors. Hall effect, high electric field, Boltzmann equation, correlation functions, and carrier-carrier interactions. Prerequisites: EEE 434, 436 (or 531).

EEE 536 Semiconductor Characterization. (3)*spring*

Measurement techniques for semiconductor materials and devices. Electrical, optical, physical, and chemical characterization methods. Prerequisite: EEE 436 (or its equivalent).

EEE 537 Semiconductor Optoelectronics I. (3)*fall*

Electronic states in semiconductors, quantum theory of radiation, absorption processes, radiative processes, nonradiative processes, photoluminescence, and photonic devices. Prerequisites: EEE 434, 436 (or 531).

EEE 538 Semiconductor Optoelectronics II. (3)*spring*

Material and device physics of semiconductor lasers, light-emitting diodes, and photodetectors. Emerging material and device technology in III-V semiconductors. Prerequisite: EEE 537.

EEE 539 Introduction to Solid-State Electronics. (3)*fall*

Crystal lattices, reciprocal lattices, quantum statistics, lattice dynamics, equilibrium, and nonequilibrium processes in semiconductors. Prerequisite: EEE 434.

EEE 541 Electromagnetic Fields and Guided Waves. (3)*not regularly offered*

Polarization and magnetization; dielectric, conducting, anisotropic, and semiconducting media; duality, uniqueness, and image theory; plane wave functions, waveguides, resonators, and surface guided waves. Prerequisite: EEE 440 (or its equivalent).

EEE 543 Antenna Analysis and Design. (3)*fall*

Impedances, broadband antennas, frequency independent antennas, miniaturization, aperture antennas, horns, reflectors, lens antennas, and continuous sources design techniques. Prerequisite: EEE 443 (or its equivalent).

EEE 544 High-Resolution Radar. (3)*not regularly offered*

Fundamentals; wideband coherent design, waveforms, and processing; stepped frequency; synthetic aperture radar (SAR); inverse synthetic aperture radar (ISAR); imaging. Prerequisites: EEE 303 and 340 (or their equivalents).

EEE 545 Microwave Circuit Design. (3)*spring*

Analysis and design of microwave attenuators, in-phase and quadrature-phase power dividers, magic tee's, directional couplers, phase shifters, DC blocks, and equalizers. Prerequisite: EEE 445 or instructor approval.

EEE 546 Advanced Fiber Optics. (3)*not regularly offered*

Theory of propagation in fibers, couplers and connectors, distribution networks, modulation, noise and detection, system design, and fiber sensors. Prerequisite: EEE 448 or instructor approval.

EEE 547 Microwave Solid-State Circuit Design I. (3)*spring*

Application of semiconductor characteristics to practical design of microwave mixers, detectors, limiters, switches, attenuators, multipliers, phase shifters, and amplifiers. Prerequisite: EEE 545 or instructor approval.

EEE 548 Coherent Optics. (3)*not regularly offered*

Diffraction, lenses, optical processing, holography, electro-optics, and lasers. Prerequisite: EEE 440 (or its equivalent).

EEE 549 Lasers. (3)*not regularly offered*

Theory and design of gas, solid, and semiconductor lasers. Prerequisite: EEE 448 or instructor approval.

EEE 550 Transform Theory and Applications. (3)*not regularly offered*

Introduction to abstract integration, function spaces, and complex analysis in the context of integral transform theory. Applications to signal analysis, communication theory, and system theory. Prerequisite: EEE 303.

EEE 551 Information Theory. (3)*not regularly offered*

Entropy and mutual information, source and channel coding theorems, applications for communication and signal processing. Prerequisite: EEE 554.

EEE 552 Digital Communications. (3)*spring*

Complex signal theory, digital modulation, optimal coherent and incoherent receivers, channel codes, coded modulation, Viterbi algorithm. Prerequisite: EEE 554.

EEE 553 Coding and Cryptography. (3)*spring*

Introduction to algebra, block and convolutional codes, decoding algorithms, turbo codes, coded modulation, private and public key cryptography. Prerequisite: EEE 554.

EEE 554 Random Signal Theory. (3)*fall*

Application of statistical techniques to the representation and analysis of electrical signals and to communications systems analysis. Prerequisite: EEE 350 or instructor approval.

EEE 555 Modeling and Performance Analysis. (3)*not regularly offered*

Modeling and performance analysis of stochastic systems and processes such as network traffic queueing systems and communication channels. Prerequisite: EEE 554.

EEE 556 Detection and Estimation Theory. (3)*spring*

Combination of the classical techniques of statistical inference and the random process characterization of communication, radar, and other modern data processing systems. Prerequisites: EEE 455, 554.

EEE 558 Wireless Communications. (3)*fall*

Cellular systems, path loss, multipath fading channels, modulation and signaling for wireless, diversity, equalization coding, spread spectrum, TDMA/FDMA/CDMA. Prerequisite: EEE 552.

EEE 571 Power System Transients. (3)*not regularly offered*

Simple switching transients. Transient analysis by deduction. Damping of transients. Capacitor and reactor switching. Transient recovery voltage. Travelling waves on transmission lines. Lightning. Protection of equipment against transient overvoltages. Introduction to computer analysis of transients. Prerequisite: EEE 471.

EEE 572 Advanced Power Electronics. (3)*not regularly offered*

Analysis of device operation, including thyristors, gate-turn-off thyristors, and transistors. Design of rectifier and inverter circuits. Applications such as variable speed drives, HVDC, motor control, and uninterruptible power supplies. Prerequisite: EEE 470.

EEE 573 Electric Power Quality. (3)*spring*

Sinusoidal waveshape maintenance; study of momentary events, power system harmonics, instrumentation, filters, power conditioners, and other power quality enhancement methods. Prerequisite: EEE 360 (or its equivalent).

EEE 574 Computer Solution of Power Systems. (3)*not regularly offered*

Algorithms for digital computation for power flow, fault, and stability analysis. Sparse matrix and vector programming methods, numerical integration techniques, stochastic methods, solution of the least squares problem. Prerequisite: EEE 471.

EEE 577 Power Engineering Operations and Planning. (3)*fall*

Economic dispatch, unit commitment, dynamic programming, power system planning and operation, control, generation modeling, AGC, and power production. Prerequisite: EEE 471 or graduate standing.

EEE 579 Power Transmission and Distribution. (3)*spring*

High-voltage transmission line electric design; conductors, corona, RI and TV noise, insulators, clearances. DC characteristic, feeders voltage drop, and capacitors. Prerequisite: EEE 470.

EEE 581 Filtering of Stochastic Processes. (3)*not regularly offered*

Modeling, estimation, and filtering of stochastic processes, with emphasis on the Kalman filter and its applications in signal processing and control. Prerequisites: EEE 482, 550, 554.

EEE 582 Linear System Theory. (3)*spring*

Controllability, observability, and realization theory for multivariable continuous time systems. Stabilization and asymptotic state estimation. Disturbance decoupling, noninteracting control. Prerequisite: EEE 482.

EEE 584 Internship. (3)*fall, spring, summer*

Work performed in an industrial setting that provides practical experience and adds value to the classroom and research learning processes.

EEE 585 Digital Control Systems. (3)*fall*

Analysis and design of digital and sampled data control systems, including sampling theory, z-transforms, the state transition method, stability, design, and synthesis. Prerequisites: EEE 482, 550.

EEE 586 Nonlinear Control Systems. (3)*not regularly offered*

Stability theory, including phase-plane, describing function, Liapunov's method, and frequency domain criteria for continuous and discrete, nonlinear, and time-varying systems. Prerequisite: EEE 482.

EEE 587 Optimal Control. (3)*fall*

Optimal control of systems. Calculus of variations, dynamic programming, linear quadratic regulator, numerical methods, and Pontryagin's principle. Cross-listed as MAE 507. Credit is allowed for only EEE 587 or MAE 507. Prerequisite: EEE 482 or MAE 506.

EEE 588 Design of Multivariable Control Systems. (3)*spring*

Practical tools for designing robust MIMO controllers. State feedback and estimation, model-based compensators, MIMO design methodologies, CAD, real-world applications. Prerequisite: EEE 480 (or its equivalent).

EEE 606 Adaptive Signal Processing. (3)*fall*

Principles/applications of adaptive signal processing, adaptive linear combiner, Wiener least-squares solution, gradient search, performance surfaces, LMS/RLS algorithms, block time/frequency domain LMS. Prerequisites: EEE 506, 554.

EEE 607 Speech Coding for Multimedia Communications. (3)*spring*

Speech and audio coding algorithms for applications in wireless communications and multimedia computing. Prerequisite: EEE 407. Pre- or corequisite: EEE 506.

EEE 631 Heterojunctions and Superlattices. (3)*fall*

Principles of heterojunctions and quantum well structures, band line-ups, optical, and electrical properties. Introduction to heterojunction devices. Prerequisites: EEE 436, 531.

EEE 632 Heterojunction Devices. (3)*not regularly offered*

Applications of heterostructures, quantum wells, and superlattice to modulation-doped FETs, heterostructure bipolar transistors, lasers, detectors, and modulators. Prerequisites: EEE 434, 631 (or 537).

EEE 641 Advanced Electromagnetic Field Theory. (3)*not regularly offered*

Cylindrical wave functions, waveguides, and resonators; spherical wave functions and resonators; scattering from planar, cylindrical, and spherical surfaces; Green's functions. Prerequisite: EEE 541 (or its equivalent).

EEE 643 Advanced Topics in Electromagnetic Radiation. (3)*spring*

High-frequency asymptotic techniques, geometrical and physical theories of diffraction (GTD and PTD), moment method (MM), radar cross section (RCS) prediction, Fourier transforms in radiation, and synthesis methods. Prerequisite: EEE 543.

EEE 647 Microwave Solid-State Circuit Design II. (3)*fall*

Practical design of microwave free-running and voltage-controlled oscillators using Gunn and Impatt diodes and transistors; analysis of noise characteristics of the oscillator. Prerequisites: EEE 545, 547.

EEE 684 Internship. (1-2)*fall, spring, summer*

Work performed in an industrial setting that provides practical experience and adds value to the classroom and research learning processes.

EEE 686 Adaptive Control. (3)*not regularly offered*

Main topics covered: adaptive identification, convergence, parametric models, performance and robustness properties of adaptive controllers, persistence of excitation, and stability. Prerequisites: both EEE 582 and 586 or only instructor approval.

EEE 731 Advanced MOS Devices. (3)*spring*

Threshold voltage, subthreshold current, scaling, small geometry effects, hot electrons, and alternative structures. Prerequisite: EEE 531.

EEE 770 Advanced Topics in Power Systems. (3)*not regularly offered*

Power system problems of current interest, approached at an advanced technical level, for mature students. Prerequisites: EEE 577 and 579 (or their equivalents); instructor approval.

EEE 784 Internship. (3)*fall, spring, summer*

Work performed in an industrial setting that provides practical experience and adds value to the classroom and research learning processes.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Elementary Education

Master's Program

ASU West offers a Master of Education (M.Ed.) degree in Elementary Education. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Engineering

Master's and Doctoral Programs

MASTER OF ENGINEERING

Arizona's three state universities—Arizona State University, Northern Arizona University, and the University of Arizona—are cooperating in offering a tri-university degree program: the Master of Engineering.

The Master of Engineering program is intended to meet the educational needs of Arizona's practicing engineers. With input from industry professionals, the three universities are developing courses that address the enhancement and development of skills, knowledge, and understanding that are critical to today's practicing engineer. These courses are offered through a variety of distance-delivery methods and in flexible formats. Students enrolled in the program are able to take advantage of course offerings at any of the three universities. These offerings reflect the diversity of strengths across the state.

The Master of Engineering program offers the practicing engineer the opportunity to design, in conjunction with an advisory committee, a program of study that can reflect the increasingly interdisciplinary nature of engineering practice.

Admission. For application materials, students may visit the program's Web site at TriUniv.engr.arizona.edu, contact the College of Engineering and Applied Sciences at 480/965-1726, or address e-mail to m.eng@asu.edu.

Applicants who have graduated from accredited U.S. institutions and who have a suitable background for the desired field of study must have a minimum grade point average of 3.00 (on a 4.00 scale) for the last 60 units of the undergraduate transcript (or for the last 12 units of the post-baccalaureate transcript). The Graduate Record Exam (GRE) may be required for a particular area of study or concentration by the tri-university coordinating board for the program. Graduates of non-U.S. institutions must satisfy admission requirements, in addition to those specified above.

Individuals not meeting the above conditions may be recommended for either provisional admission or admission to a nondegree status at the discretion of the campus director. After completing suitable undergraduate deficiencies or recommended graduate courses, the individual may apply again for admission to the Master of Engineering program.

Program of Study. Graduate College requirements of the home institution must be followed. All programs of study will require the completion of at least 30 hours of graduate credit. Each program of study will require three semester hours of course work in each of the following subject areas: engineering management/business and applied engineering mathematics.

At the discretion of an academic unit or academic working group, a practice-oriented project may constitute a limited part of the program of study not to exceed six semester hours. Students must maintain a minimum GPA of 3.00 in courses taken as part of their program of study and maintain

a 3.00 or higher for all graduate courses (500-level or above).

Foreign Language Requirements. None.

Thesis Requirements. None.

Final Examination. A final examination (or its equivalent demonstrating mastery of the program of study) is required. The structure of the examination is determined by the student's advisory committee. The inclusion of practicing engineers from outside academia in the examination process is desirable.

Time Limit. The time limit for completing the Master of Engineering degree is six years from the time of admission.

MASTER OF SCIENCE IN ENGINEERING

The faculty in the College of Engineering and Applied Sciences offer professional programs leading to the Master of Science in Engineering (M.S.E.) degree with majors in Aerospace Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Engineering Science, Industrial Engineering, and Mechanical Engineering. The programs are designed to bridge the gap between knowledge of engineering sciences and creative engineering practice while at the same time increasing the depth and breadth of knowledge in selected areas of emphasis. The pattern of course work applicable to the degree is potentially unique for each student, although it must conform to the general guidelines for subject matter content for the degree as authorized in the *Graduate Catalog*.

Two options are available within the M.S.E. degree program. Option one requires a thesis and is designed primarily for full-time students. Option two is designed for full-time students not intending to write a thesis and for students who hold full-time jobs and must attend university classes on a part-time basis. A thesis or equivalent is not required of students who elect this option.

Admission. Applicants are expected to satisfy all requirements for admission to the Graduate College. Entry into this program normally requires a bachelor's degree with a major in engineering or in a closely related bachelor's degree program.

Deficiencies for admission to the graduate degree programs are specified at the time of admission. The verbal, quantitative, and analytical components of the Graduate Record Examination (GRE) are recommended but not required unless specified by the respective academic unit in which the major is offered. TOEFL scores must be submitted by international applicants before admission is considered. Applicants with TOEFL scores of 550 or higher may be regularly admitted without requiring further language study. Applicants with scores below 550 may be regularly admitted but must complete study in ASU's American English and Culture Program (AECPP) before enrolling in course work in the academic program.

Program of Study. In general, all candidates for the M.S.E. degree program are required to complete 30 semester hours. Additional courses may be assigned by the supervisory committee depending on the background of the candidate.

Option 1. A minimum of six semester hours of research and thesis credit must be included in the 30 hours.

Option 2. A minimum of 30 semester hours and a comprehensive examination are required.

Foreign Language Requirements. None.

Thesis Requirements. Only students who elect Option one are required to write a thesis.

Final Examinations. A final oral examination in defense of the thesis is required for students who choose Option one. A final comprehensive examination is required for students in Option two. Examination format and times should be obtained from the academic unit.

COURSES

For courses, refer to the catalog section for the major.

Engineering Science

Master's and Doctoral Programs

The faculty of the School of Engineering offer graduate programs leading to the M.S., the M.S.E., and the Ph.D. degrees in Engineering Science. Faculty offer programs of a special and interdisciplinary nature. An area of study also is available in materials science and engineering. Contact the Department of Chemical and Materials Engineering.

See "Master's Degrees," page 100, and "Doctor of Philosophy," page 103, for information.

Graduate Record Examination. A student whose undergraduate degree program is not ABET accredited must submit scores on the Graduate Record Examination (GRE) General Test as part of the admission process. Certain disciplines also require GRE scores for application to the M.S., M.S.E., and Ph.D. programs in Engineering Science.

MATERIALS SCIENCE AND ENGINEERING

Faculty members who advise students in this area of study are located within the Department of Chemical and Materials Engineering. Courses offered carry the MSE prefix and are listed on page 145.

For more information contact Professor Nik Chawla by phone at 480/965-3190, by e-mail at cbmrec@enpop2.eas.asu.edu, or in person at ECG 202.

Each student admitted as a regular degree candidate is required to complete an approved program of study. Stu-

dents who have an undergraduate degree in an area other than materials science, or a similarly named program, may qualify for admission to a transition program and may be required to take one or more undergraduate courses in preparation for enrollment in graduate courses in materials science and engineering. The program of study of transition students is determined by the student's supervisory committee after review of the student's academic record.

Research activities in materials science and engineering include programs in semiconductor processing and characterization, polymeric and ceramic composites, cuprates for high critical temperature superconductor applications, ferritic thin films for capacitor and memory applications, high temperature materials for space applications, mechanical behavior of high strength Al-Li alloys, environmentally influenced mechanical effects, and microbiologically influenced corrosion reactions.

Courses

Graduate courses offered by the College of Engineering and Applied Sciences that apply to degree requirements are listed under degree majors in this catalog. Basic courses that may be required, or taken as electives, are shown below.

ANALYSIS AND SYSTEMS (ASE)

ASE 485 Engineering Statistics. (3)

fall, spring, summer

Designing statistical studies for solutions to engineering problems. Methods include regression, design and analysis of experiments, and other statistical topics. Prerequisite: ECE 380.

General Studies: CS

ASE 496 Professional Seminar. (0)

fall and spring

Topics of interest to students in the engineering special and interdisciplinary studies.

ASE 500 Research Methods: Engineering Statistics. (3)

fall, spring, summer

Designing statistical studies for solutions to engineering problems. Methods include regression, design and analysis of experiments, and other statistical topics. Prerequisite: ECE 380.

ASE 582 Linear Algebra in Engineering. (3)

fall

Development and solution of systems of linear algebraic equations. Applications from mechanical, structural, and electrical fields of engineering. Prerequisite: MAT 242 (or its equivalent).

ASE 586 Partial Differential Equations in Engineering. (3)

spring

Development and solution of partial differential equations in engineering. Applications in solid mechanics, vibrations, and heat transfer. Prerequisites: MAT 242, 274.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

English

Master's and Doctoral Programs

Daniel Bivona

Chair

(LL 542) 480/965-3168

enggrad@asu.edu

www.asu.edu/clas/english/gradstudies/enggrad.htm

REGENTS' PROFESSORS

DUBIE, RÍOS

PROFESSORS

ADAMS, BENDER, BJORK, BOYER, BRACK, BRINK, CANDELARIA, CARLSON, CROWLEY, DONELSON, GUTIERREZ, HELMS, KEHL, LESTER, LIGHTFOOT, MAJOR, A. NILSEN, D. NILSEN, RHODES, RICHARD, ROEN, SANDS, SENSIBAR

ASSOCIATE PROFESSORS

BATES, BIVONA, CASTLE, CHANCY, CORSE, DeLAMOTTE, GOGGIN, GOLDBERG, HORAN, LUSSIER, MAHONEY, McNALLY, MILLER, NELSON, PERRY, PRITCHARD, RAMAGE, SAVARD, SCHWALM, TOHE, VAN GELDEREN

ASSISTANT PROFESSORS

BLASINGAME, FUSE, HARRIS, JOHNSON, MILUN, STEVENS, VOADEN, WEBB PETERSON

SENIOR LECTURERS

COOK, COOPER, DUGAN, OBERMEIER, SUDOL

LECTURERS

DUERDEN, DWYER, HEENAN, NORTON, RAY, WHEELER

ACADEMIC PROFESSIONALS

GLAU, McNEIL

The faculty in the Department of English offer the M.A. degree in English, the Master of Teaching English as a Second Language degree, and the Ph.D. degree in English.

Students admitted to the Master of Education degree program with a major in Secondary Education may also elect English as the subject matter field. For information on the Master of Education degree, see "Master of Education," page 186.

Students may also pursue an interdisciplinary program leading to the Master of Fine Arts degree in Creative Writing, offered by the faculties in the Departments of English and Theater. See "Master of Fine Arts," page 167.

MASTER OF ARTS

This degree is designed to provide further cultural and professional advancement for students of English.

Admission Requirements. The department requires that applicants have an undergraduate major in English and a 3.00 GPA in courses taken in the major field. Those who do not have a major in English are encouraged to register as nondegree students while they take courses in areas of deficiency as identified by the advisor.

Deadline for admission applications and requests for financial assistance, including teaching assistantships, is February 1. Incomplete files are not considered.

Applicants for the M.A. program in English with concentrations in literature and language and rhetoric and composition are required to submit Graduate Record Examination (GRE) General Test scores, three letters of recommendation, a personal statement of aims and purposes, and an academic writing sample.

Applicants for the M.A. program with a concentration in English linguistics must show completion of one upper-division course in a linguistics-related field, and must submit a personal statement of aims and purposes and three letters of recommendation. GRE scores are not required.

Applicants for the M.A. program in English with a concentration in comparative literature must prove fluency in a foreign language to a level sufficient for graduate study.

Program of Study. A student may pursue a concentration in comparative literature, English linguistics, literature and language, or rhetoric and composition.

For the concentration in comparative literature, a candidate must complete 36 semester hours of graduate courses, with a minimum of 12 hours being taken in the Department of Languages and Literatures. Included in the 36 hours must be ENG 500 Research Methods, ENG 501 Introduction to Comparative Literature, and ENG 599 Thesis.

For the concentration in English linguistics, a candidate must complete a minimum of 30 semester hours of graduate courses. The 30 semester hours must include LIN 500 Research Methods, LIN 511 Phonetics and Phonology, LIN 514 Syntax, one LIN 591 Seminar, or their equivalents chosen in consultation with the advisor, and LIN 599 Thesis. Electives are chosen in consultation with the advisor.

For the concentration in literature and language, a candidate must complete a minimum of 30 semester hours. The 30 semester hours must include ENG 500 Research Methods; a course in Literary Theory; ENG 599 Thesis, a 12-hour distribution requirement; and six hours of other electives. Two courses selected must carry ENG 591 Seminar credit.

For the concentration in rhetoric and composition, a candidate must complete a minimum of 30 hours of graduate courses, including a 12-hour core, a six-hour thesis, and 12 elective hours that must include six hours of ENG 591 Seminar and may include nine hours of appropriate graduate courses outside the English department.

Foreign Language Requirements. A reading knowledge of French, German, Spanish, or another natural language is required. The choice of language must be approved by the student's supervisory committee.

Comprehensive Examinations. A comprehensive examination is required for students in the comparative literature concentration. (A detailed description of its scope is available in the Department of English.)

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

M.TESL

The Master of Teaching English as a Second Language degree is designed for students who seek a professionally oriented graduate education. For information, see “Teaching English as a Second Language,” page 322.

DOCTOR OF PHILOSOPHY

See “Doctor of Philosophy,” page 103, for general requirements.

Admission Requirements. Applicants for the Ph.D. degree in English are required to submit scores on the GRE (verbal and advanced literature sections), three letters of recommendation, a personal statement of aims and purposes, and an academic writing sample. Deadline for admission applications and requests for financial aid, including teaching assistantships, is February 1. Incomplete files are not considered.

Areas of Concentration. The Ph.D. degree in English offers concentrations in the following areas:

Literature. A minimum of 60 hours of graduate courses (exclusive of dissertation) beyond the bachelor’s degree constitutes the formal course preparation. Specifically required are three hours in history of the English language (for example, ENG 507 Old English, ENG 508 Old English Literature, ENG 509 Middle English, LIN 505 American English, and LIN 548 Studies in English Language); six hours in theory courses; and the following distribution requirement: English literature before 1660 (including one course in each of the following: Chaucer, Shakespeare, and Milton); English literature 1660–1900; British literature since 1900; American literature before 1900; and American literature since 1900. Students must take a minimum of five graduate seminars en route to the Ph.D. degree, at least three of which must be taken in the doctoral program at ASU. Up to 12 hours of course work taken outside the department may be counted toward the degree.

Rhetoric/Composition and Linguistics. A minimum of 60 hours of graduate courses (exclusive of dissertation) beyond the bachelor’s degree constitutes the formal course preparation. Specifically required are three hours of language (for example, ENG 507 Old English, ENG 508 Old English Literature, ENG 509 Middle English, LIN 505 American English, LIN 548 Studies in English Language); six hours in theory courses; and the following distribution requirements: Syntax/Semantics; Rhetorical Theory; Composition Theory and Method; Philosophy and Theories of Pedagogy; Pragmatics/Sociolinguistics. Students must take a minimum of five graduate seminars en route to the Ph.D. degree, at least three of which must be taken in the doctoral program at ASU. Up to 12 hours of course work taken outside the department may be counted toward the degree.

Foreign Language Requirements. A competent reading knowledge of a language other than modern English is required. The requirement can be met by

1. earning a grade of “B” or higher in a 400- or 500-level course in an appropriate language;
2. demonstrating proficiency by taking a language examination approved by the supervisory committee; and

3. showing native speaker proficiency in a language approved by the supervisory committee.

Ph.D. Examinations. The Ph.D. examination consists of three parts. Part I is a portfolio of three essays, representing different historical periods or fields of concentration and employing more than one critical approach. After successful completion of Part I, the student may advance to Part II, a three-hour written exam in the student’s area of specialization based on a bibliography compiled by the student and approved by the student’s supervisory committee. Part III is a colloquy, based on a written prospectus, defining the topic, scope, and significance of the dissertation.

Dissertation Requirements. (See “Research and Dissertation Requirements,” page 104.) The subject of the dissertation is decided in consultation with the chair of the student’s supervisory committee, subject to approval of the director of the Ph.D. program.

Final Examinations. A final examination in defense of the dissertation, arguing for its method and conclusions, is required.

RESEARCH ACTIVITY

Research in English and its various subdisciplines fall into three broad areas of inquiry:

1. Historical/Textual Studies;
2. Comparative/Interdisciplinary Studies; and
3. Pedagogical/Theoretical Studies.

The first category (Historical/Textual Studies) concerns the production, preparation, and publication of texts and explores the historical context of publication. Work in this area encompasses the writing of the creative writing faculty as well as the historical/material criticism of rhetoricians, linguists, and literary historians.

Research in the second category (Comparative/Interdisciplinary Studies) analyzes the dynamic play of language across cultures and disciplines and seeks to establish critical difference and similitude as the vehicle for comprehending the function of language and texts in a broadened context that includes all literatures and disciplines.

The third category (Pedagogical/Theoretical Studies) involves the theory and practice of those subdisciplines currently defining “English Studies.” A concern for operative theories and efficacious practices involves every component of the department, encouraging the exploration of how language and literature interact in the subdisciplines and within wider spheres of cultural authority. For more information about faculty publications and specializations, access the Web site at www.asu.edu/clas/english/who/facspecial.html.

ENGLISH (ENG)

ENG Note 1. Completion of the First-Year Composition requirement (ENG 101 and 102 [or 105] or ENG 107 and 108 with a grade of “C” or higher) is a prerequisite for all English courses above the 100 level.

ENG Note 2. A term paper or equivalent out-of-class written work is required in all upper-division (300- and 400-level) ENG courses.

ENG Note 3. English majors and minors are expected to have completed ENG 200 before taking 400-level literature courses.

ENG 400 History of Literary Criticism. (3)*not regularly offered*

Major critics and critical traditions in the Western world. Prerequisite: 6 hours in literature or instructor approval. See ENG Notes 1, 2.

*General Studies: L, HU***ENG 405 Style and Stylistics. (3)***not regularly offered*

Linguistic, rhetorical, and literary approaches to the analysis of style in poetry, fiction, and other forms of written discourse. See ENG Notes 1, 2.

ENG 409 Advanced Screenwriting. (3)*not regularly offered*

Application of the principles taught in a complete feature-length screenplay. See ENG Notes 1, 2.

ENG 411 Advanced Creative Writing. (3)*fall and spring*

Separate poetry and fiction workshops for experienced writers, emphasizing individual style. May be taken once for poetry, once for fiction.

See ENG Notes 1, 2. Prerequisite: ENG 310 or instructor approval.

ENG 412 Professional Writing. (3)*not regularly offered*

Lectures and conferences concerning techniques of writing for publication. See ENG Notes 1, 2. Prerequisite: ENG 310 or instructor approval.

ENG 413 History of the English Language. (3)*once a year*

Development of English from the earliest times to the modern period. See ENG Notes 1, 2. Prerequisite: junior standing or instructor approval.

*General Studies: HU***ENG 415 Medieval Literature. (3)***not regularly offered*

Medieval English literature in translation, from Beowulf to Malory (excluding Chaucer), emphasizing cultural and intellectual backgrounds; includes continental works. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

*General Studies: HU***ENG 416 Chaucer: *Canterbury Tales*. (3)***once a year*

Chaucer's language, his last work, and its relationship to continental and insular traditions. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

*General Studies: HU***ENG 417 Chaucer: *Troilus and Criseyde* and the Minor Works. (3)***not regularly offered*

Chaucer's language, his major poem, and his early works in their medieval context. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

*General Studies: HU***ENG 418 Renaissance Literature. (3)***once a year*

Topics, authors, and themes in English literature, 1485–1603. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

*General Studies: L/HU***ENG 419 English Literature in the Early 17th Century. (3)***once a year*

Topics, authors, and themes in English literature, 1603–1660. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

*General Studies: L/HU***ENG 423 Renaissance Drama. (3)***spring*

Topics, authors, and themes in the drama of the Tudor and early Stuart periods. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

*General Studies: L/HU***ENG 424 Milton. (3)***once a year*

Selected prose and poetry, emphasizing *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

*General Studies: HU***ENG 425 Studies in English Romanticism. (3)***fall*

All genres of Romantic literature in cultural contexts, Blake to the death of Wordsworth. May be repeated for credit. See ENG Notes 1, 2, 3.

*General Studies: HU***ENG 426 Victorian Poetry. (3)***fall*

Poetry of the second half of the 19th century. May include such poets as Tennyson, Browning, and Arnold. See ENG Notes 1, 2, 3. Prerequisite: ENG 222 or instructor approval.

*General Studies: L/HU***ENG 427 Restoration and Early 18th Century. (3)***not regularly offered*

Writers and movements in the nondramatic literature of the Restoration and early 18th century. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

*General Studies: HU***ENG 428 The Later 18th Century. (3)***not regularly offered*

Writers, movements, and books during the second half of the 18th century. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

*General Studies: HU***ENG 430 Victorian Cultural Backgrounds. (3)***not regularly offered*

Social, religious, and other cultural issues of the period. May include Carlyle, Ruskin, Darwin, Arnold, Pater, and Morris. See ENG Notes 1, 2, 3. Prerequisite: ENG 222 or instructor approval.

*General Studies: L/HU***ENG 435 19th-Century American Poetry. (3)***not regularly offered*

Themes and developments in American poetry to 1900, including Poe, Whitman, and Dickinson. See ENG Notes 1, 2, 3.

*General Studies: HU***ENG 439 Restoration and 18th-Century Drama. (3)***spring*

English drama 1600–1800. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

*General Studies: HU***ENG 440 Studies in American Literature to 1815. (3)***not regularly offered*

Thought and expression from the time of first contact to 1815. May be repeated for credit. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or instructor approval.

*General Studies: HU***ENG 441 20th-Century American Drama. (3)***not regularly offered*

American drama since World War I, especially experimental techniques. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or 242 or instructor approval.

*General Studies: HU***ENG 442 20th-Century British and Irish Poetry. (3)***not regularly offered*

Theory and practice of poetry since 1900. See ENG Notes 1, 2, 3. Prerequisite: ENG 222 or instructor approval.

ENG 443 American Poetry, 1900–1945. (3)*not regularly offered*

Developments in theory and practice of major poets. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or 242 or instructor approval.

*General Studies: HU***ENG 444 Studies in American Romanticism, 1830–1860. (3)***fall*

Cultural expression in works of representative writers. May be repeated for credit. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or instructor approval.

*General Studies: HU***ENG 445 Studies in American Realism, 1870–1910. (3)***spring*

Writers and influences that shaped the development of literary realism. May be repeated for credit. See ENG Notes 1, 2, 3. Prerequisite: ENG 242 or instructor approval.

*General Studies: L/HU***ENG 448 20th-Century British and Irish Novel. (3)***not regularly offered*

Theory and practice of the novel since 1900. See ENG Notes 1, 2, 3. Prerequisite: ENG 222 or instructor approval.

General Studies: HU

ENG 451 The Novel to Jane Austen. (3)*not regularly offered*

From origins of prose fiction through the 18th century. See ENG Notes 1, 2, 3.

General Studies: HU, H

ENG 452 The 19th-Century Novel. (3)*spring*

May include such novelists as Austen, Dickens, Eliot, and Conrad.

See ENG Notes 1, 2, 3.

General Studies: HU

ENG 453 The American Novel to 1900. (3)*not regularly offered*

Rise and development of the novel to Dreiser. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or instructor approval.

General Studies: HU

ENG 454 The American Novel, 1900–1945. (3)*not regularly offered*

Developments in theory and practice of major novelists. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or 242 or instructor approval.

General Studies: HU

ENG 455 The Form of Verse: Theory and Practice. (3)*not regularly offered*

Types, history, criticism, and schools of theory of metrical form. Analysis of lyric, narrative, and dramatic poetry. See ENG Notes 1, 2.

ENG 457 American Poetry Since 1945. (3)*once a year*

Major American poets of the period. Developments in theory and practice. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or instructor approval.

General Studies: HU

ENG 458 American Novel Since 1945. (3)*not regularly offered*

Major novelists of the period. Developments in theory and practice. See ENG Notes 1, 2, 3. Prerequisite: ENG 242 or instructor approval.

General Studies: L/HU

ENG 459 Studies in African American/Caribbean Literatures. (3)*not regularly offered*

Studies in African American or Caribbean literatures according to genre, period, theory, or selected authors. May be repeated for credit when topics vary. Cross-listed as AFH 459. Credit is allowed for only AFH 459 or ENG 459. See ENG Notes 1, 2, 3.

ENG 460 Western American Literature. (3)*once a year*

Critical examination of ideas and traditions of the literature of the western United States, including the novel. See ENG Notes 1, 2, 3.

General Studies: L/HU

ENG 461 Women and Literature. (3)*not regularly offered*

Selected topics in literature by or about women. May be repeated for credit when topics vary. See ENG Notes 1, 2, 3.

General Studies: HU

ENG 462 20th-Century Women Authors. (3)*not regularly offered*

Critical examination of literature by 20th-century women writers. May be repeated for credit when topics vary. See ENG Notes 1, 2, 3.

General Studies: HU

ENG 463 European Drama from Ibsen to 1914. (3)*not regularly offered*

Chief continental and British dramatists of the period, emphasizing the beginnings and development of realism. See ENG Notes 1, 2, 3.

General Studies: HU

ENG 464 European Drama from 1914 to the Present. (3)*not regularly offered*

Chief continental and British dramatists of the period, emphasizing experimental techniques. See ENG Notes 1, 2, 3.

General Studies: HU

ENG 471 Literature for Adolescents. (3)*fall and spring*

Prose and poetry that meet the interests and capabilities of junior high and high school students. Recent literature stressed. A passing grade of at least "C" required before students are permitted to student teach in English. See ENG Notes 1, 2, 3.

General Studies: HU

ENG 480 Methods of Teaching English: Composition. (3)*fall or spring and summer*

Methods of instruction, organization, and presentation of appropriate content in the teaching of composition and other writing skills. See ENG Notes 1, 2.

General Studies: L

ENG 482 Methods of Teaching English: Language. (3)*fall or spring and summer*

Methods of instruction, organization, and presentation of appropriate content in language and usage for junior and senior high schools. Lecture, discussion, lab. See ENG Notes 1, 2.

ENG 500 Research Methods. (3)*once a year*

Methodology and resource materials for research. Analysis of criticism and scholarship, including evaluation of sources.

ENG 501 Introduction to Comparative Literature. (3)*not regularly offered*

Problems, methods, and principles, illustrated by selected critical essays and literary texts.

ENG 502 Contemporary Critical Theory. (3)*once a year*

Advanced survey of major schools of 20th-century literary and critical theory. Lecture, discussion. Cross-listed as HUM 549. Credit is allowed for only ENG 502 or HUM 549.

ENG 507 Old English. (3)*not regularly offered*

Elements of Old English grammar, with selected readings.

ENG 508 Old English Literature. (3)*not regularly offered*

Intensive literary, linguistic, and cultural study of Old English literature. May be repeated for credit when topics vary. Prerequisite: ENG 507.

ENG 509 Middle English. (3)*not regularly offered*

Study of the principal dialects of the language, with selected readings. Prerequisite: graduate standing.

ENG 512 The Teaching of Composition. (3)*not regularly offered*

Theory and practice of teaching writing at all levels. Emphasis on current research. Prerequisites: teaching experience; instructor approval.

ENG 515 Middle English Literature. (3)*not regularly offered*

English literature from the 12th through the 15th centuries, exclusive of Chaucer. Prerequisite: ENG 509 or instructor approval.



Members of the ASU community get their refreshments on a shady morning.

John Phillips photo

ENG 517 Contemporary Rhetorical Theory. (3)*once a year*

Investigation of the work of such important rhetorical theorists as Burke, Toulmin, Perelman, Gates, and Cixous.

ENG 520 Renaissance Literature. (3)*not regularly offered*

Poetry and prose of the English Renaissance, excluding drama.

ENG 521 Shakespeare. (3)*once a year*

Selection of comedies, histories, and tragedies presented in the context of literary history and critical theories, with an emphasis on classical and medieval backgrounds.

ENG 525 American Literary Criticism. (3)*not regularly offered*

Analysis and discussion of leading historical and critical interpretations of American literature from the beginnings to the present.

ENG 530 Classical Rhetoric and Written Composition. (3)*fall*

Relationship of major texts in classical rhetoric to developments in composition theory, literary theory, and practice through the 19th century.

ENG 531 Rhetorical Theory and Literary Criticism. (3)*spring*

Intensive study of major rhetorical theorists of the 20th century in such areas as literary criticism, discourse theory, and composition theory.

ENG 532 Composition Theory. (3)*not regularly offered*

Intensive study in the rhetorical categories of invention, arrangement, style, aims, modes, and forms of written discourse.

ENG 545 Studies in English Literature. (3)*not regularly offered*

Selected authors or issues. May be repeated for credit.

ENG 547 Studies in American Literature. (3)*not regularly offered*

Selected authors or issues. May be repeated for credit.

ENG 549 Studies in Comparative Literature. (3)*not regularly offered*

Selected authors or issues. May be repeated for credit.

ENG 550 Contemporary Comparative Literature. (3)*not regularly offered*

Comparative studies in modern literature in English and other literatures in translation. May be repeated for credit when topics vary.

ENG 559 Advanced Study in African American/Caribbean Literatures. (3)*not regularly offered*

Advanced study in African American or Caribbean literatures, theory, and criticism. May be repeated for credit when topics vary.

ENG 560 Studies in Dramatic Forms. (3)*not regularly offered*

Selected topics in dramatic and cinematic literature, history, criticism, theory, and crossdisciplinary study. May be repeated for credit when topics vary. Lecture, studio.

ENG 571 Advanced Study in Literature for Adolescents. (3)*not regularly offered*

History and criticism of adolescent literature. Prerequisite: ENG 471 or instructor approval.

ENG 573 Censorship and Literature. (3)*not regularly offered*

History of censorship, primarily in the United States, and significant court decisions that affected writers and books.

ENG 580 Practicum. (1–2)*not regularly offered***ENG 591 Seminar. (3)***fall and spring*

Selected topics regularly offered in the various areas of English studies.

ENG 594 Conference and Workshop. (1–12)*not regularly offered***ENG 598 Special Topics. (1–4)***not regularly offered***ENG 599 Thesis. (1–12)***not regularly offered***Omnibus Graduate Courses.** See page 50 for omnibus graduate courses that may be offered.**LINGUISTICS (LIN)****LIN 500 Research Methods. (3)***fall*

Methodology and resource materials for research. Analysis of criticism and scholarship, including evaluation of sources.

LIN 505 American English. (3)*spring*

Development of the English language in America, including a survey of geographical and social dialects.

LIN 510 English Linguistics. (3)*fall*

Current approaches to the study of the English language.

LIN 511 Phonetics and Phonology. (3)*spring*

Current trends in phonological theory and its basis in acoustic and articulatory phonetics. Prerequisite: LIN 510 (or its equivalent) or instructor approval.

LIN 513 Semantics. (3)*fall in even years*

Current approaches to linguistic meaning with particular attention to English. Prerequisite: LIN 510 (or its equivalent) or instructor approval.

LIN 514 Syntax. (3)*spring*

Analysis of syntactic structure by contemporary theoretical models with a focus on English. Prerequisite: LIN 510 (or its equivalent) or instructor approval.

LIN 516 Pragmatics and Discourse Theory. (3)*fall in odd years*

Study of language use in context and of language structures in conversation and written text. Lecture, discussion. Prerequisite: LIN 510 (or its equivalent) or instructor approval.

LIN 548 Studies in English Language. (3)*not regularly offered*

Selected authors or issues. May be repeated for credit.

LIN 572 Theories Underlying the Acquisition of English as a Second Language. (3)*fall*

Theories of second language acquisition including the linguistic, cognitive, affective, and sociocultural aspects.

LIN 574 The Teaching of English as a Second Language. (3)*spring*

Methods of teaching English as a second language, language teaching trends, practical applications, and the teaching of different skills. Prerequisite: LIN 572 or instructor approval.

LIN 575 Advanced Studies in the Teaching of English as a Second Language. (3)*once a year*

Current research issues in the teaching and learning of English as a second language. Prerequisite: LIN 572 or instructor approval.

LIN 576 Sociolinguistic Aspects of Second Language Acquisition. (3)*not regularly offered*

Survey of studies in second language acquisition in the context of recent sociolinguistic theory.

LIN 577 Grammar for TESL. (3)*not regularly offered*

Survey of major grammatical structures in English and how they can be taught to ESL speakers. Lecture, discussion. Prerequisite: LIN 510.

LIN 591 Seminar. (3)*fall and spring*

Selected topics.

LIN 593 Applied Project. (3)*fall and spring*

Preparation of a supervised applied project that is a graduation requirement in the TESL professional major. Independent study with consultation.

LIN 599 Thesis. (1–12)*not regularly offered***Omnibus Graduate Courses.** See page 50 for omnibus graduate courses that may be offered.

Environmental Design and Planning

Interdisciplinary Doctoral Program

K. David Pijawka
Director, Executive Committee
 (ARCH 126) 480/965-4620
 caed.phd@asu.edu
 www.asu.edu/caed/phd_program

Agribusiness and Resource Management

Professors: Brady, Brock;
 Associate Professors: Green, Whysong

Architecture

Regents' Professor: J. Cook;
 Professors: Ozel, Scheatzle;
 Associate Professors: Bryan, Ellin, Zygas

Design

Professors: Brandt, Giard, Kroelinger;
 Assistant Professor: J. McCoy

Planning and Landscape Architecture

Professors: Kihl, Lai, Mushkatel, Pijawka, Steiner;
 Associate Professors: Cameron, E. Cook,
 Guhathakurta, Kim, San Martin, Yabes;
 Assistant Professors: Crewe, Musacchio

The Committee on Environmental Design and Planning offers a collegewide interdisciplinary program leading to the Ph.D. degree in Environmental Design and Planning. Three areas of concentration are available: design; history, theory, and criticism; and planning. The faculty of the Schools of Architecture, Design, and Planning and Landscape Architecture participate in offering the degree. Faculty from disciplines outside of the College of Architecture and Environmental Design may participate in offering the program if appropriate to the interdisciplinary nature of the student's research interest.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Environmental Design and Planning is an individualized collegewide interdisciplinary degree that integrates graduate courses and faculty research expertise from a variety of academic areas: architecture, building design, environmental planning, environmental resources, graphic design, industrial design, and interior design. The program is at the cutting edge of creating new knowledge in environmental design and planning. It complements interdisciplinary research in other disciplines within the university. Broad in scope, the program involves multidisciplinary research interests at both micro- and macro-scale levels of design and planning. The program provides research experience for students wishing to pursue careers in academe and in industry as members of interdisciplinary design and planning teams on environmental and energy issues, as well as for those wishing to teach in the architecture, design, or planning fields.

Areas of Concentration

The Ph.D. degree in Environmental Design and Planning offers concentrations in the following areas based on the research and teaching expertise of participating faculty.

Design. Design—microscale issues in the designed environment—includes the study of architecture, building science, graphic design, industrial design, interior design, and landscape architecture. Research fields include acoustics, affordable housing, climate-responsive building, computer-aided design, energy modeling, exhibit design, facilities planning and management, fire protection, human factors in design, industrialized housing, landscape architecture, lighting, passive solar energy and conservation, and site planning and wayfinding.

History, Theory, and Criticism. History, theory, and criticism—cultural and theoretical issues in the history of the environment—includes the study of architecture, environmental planning, industrial design, interior design, landscape architecture, and urbanism. Research fields include study of the arts and crafts movement, contemporary criticism and analysis, design theories and methods, history of architecture and design, history of building science, history of city planning, and landscape theory and criticism.

Planning. Planning—macroscale issues in the planned environment—includes the study of environmental resource management, landscape architecture, planning, and urban design. Research fields include contemporary urban design, economic development, environmental assessment, environmental planning, ethics in planning, housing and urban development, international development planning, landscape ecology, legal aspects of planning, planning for ethnically diverse populations, the protection of environmentally sensitive areas, public participation, social dimensions of planning, urban design policy, urban planning, and urban and regional development.

Admission Requirements. Students are admitted to the Ph.D. program only upon completion of a master's degree in architecture, environmental resources, design, landscape architecture, or planning or upon the demonstration of equivalent standing.

In addition to meeting Graduate College admission requirements, applicants must submit the following to:

PH.D. PROGRAM IN ENVIRONMENTAL DESIGN
 AND PLANNING
 COLLEGE OF ARCHITECTURE AND
 ENVIRONMENTAL DESIGN
 ARIZONA STATE UNIVERSITY
 PO BOX 871905
 TEMPE AZ 85287-1905

1. a minimum of three letters of reference;
2. a sample of written work and any other evidence relevant to admission to the program;
3. a statement of purpose (summarizing career objectives, the reasons for pursuing a doctoral education, an indication of the proposed area of concentration, and a potential mentor in the College of Architecture and Environmental Design); and
4. Graduate Record Examination (GRE) scores.

A Test of English as a Foreign Language score of at least 600 is required of all applicants whose native language is not English.

Submitted materials are returned after final admission procedures, provided sufficient prepaid postage is enclosed, or if the materials are claimed in person within one year of submission. Unclaimed materials are retained for only one year. The Ph.D. program assumes no liability for lost or damaged materials.

Application Deadlines. All application materials should be received on or before February 15 for fall semester admissions. Applications for associateships and scholarships normally are considered at the same time.

Selection Procedures. The Ph.D. Executive Committee evaluates the applications and supporting materials and recommends to the Graduate College whether the applicant should be granted admission or if admission should be denied. Admission decisions are based on the compatibility of the applicant's career goals with the purpose of the degree program and research interests of faculty, previous academic training and performance, GRE scores, reference letters, and the ability of the potential mentor to devote time to the student.

If admission is provisional, the Graduate College specifies in its letter of admission the provisions to be met to gain regular status. The Ph.D. program informs successful applicants of the procedures for enrollment.

Program of Study. The Ph.D. degree in Environmental Design and Planning is structured as a 54-semester-hour post-master's program, not as an 84-semester-hour postbaccalaureate program. Students must be thoroughly familiar with design and planning and are expected to demonstrate a high level of academic maturity before being admitted to the program.

Of the 54 semester hours, 24 must be research and dissertation credit. At least 30 semester hours of the remainder, exclusive of dissertation and research hours, must be completed after admission to the Ph.D. program at ASU. No transfer credits are allowed to fulfill the 54-semester-hour minimum requirement for the program.

The student is required to take 15 semester hours in the area of concentration and a minimum of nine semester hours of specialized course work outside the area of concentration; a minimum of six semester hours in current research and research methods is required.

Each student entering the Ph.D. program is required to submit a program of study during the first year. The director of the Ph.D. program appoints a program committee composed of a minimum of three faculty from the areas of concentration. This committee includes a prospective mentor and is responsible for approving the student's program of study and monitoring the student's progress in the program.

Preliminary Candidate Evaluation. Before the end of the first academic semester of course work, the student's mentor and the program director conduct a preliminary evaluation of the student. The evaluation is based on the student's program check sheet, a progress evaluation by the mentor, and an informal meeting with the program director. It is directed at the student's selected area of concentration at the time of their admission to the program.

Performance on the preliminary evaluation candidate serves as a guide to the student's program committee as the committee members counsel the student and formulate a program of study.

Academic Standard and Evaluation. Each student in the program receives an annual evaluation. Students submit, to their mentor and the program director, a two-page summation of the academic year. The summation must include proposed research, including progress toward dissertation; a list of goals accomplished during the past academic year; and projected goals for the upcoming academic year. In addition, students present their summation to the CAED core faculty.

Students must meet the minimum Graduate College requirements, but program standards may exceed these requirements. For example, students are expected to

1. have all grades in graduate courses 3.00 GPA or higher,
2. have made sufficient progress in their research projects,
3. have attended or presented papers at seminars/meetings,
4. have accomplished their goals from the previous year, and
5. set realistic goals for the upcoming academic year.

Foreign Language Requirements. None.

Comprehensive Examinations. Upon completion of course work in the Ph.D. program of study and before admission to candidacy and the start of dissertation research, the student must take a written examination on his or her knowledge of the chosen area of concentration and interdisciplinary knowledge, including the ability to communicate across disciplines. The student's program committee conducts an oral examination following the review of the written examination.

Dissertation Requirements. The dissertation must consist of a fully documented written analysis of a problem that is original in nature and extends the knowledge and/or theoretical framework of the field. The research must demonstrate the student's creativity and competence in independent research.

Final Examinations. A final oral examination in defense of the dissertation is required. A candidate must pass the final examination within five years after completing the comprehensive examination.

School of Architecture. Architectural design methodology, solar architecture design, energy performance in buildings, architectural computing and graphics, facilities development and management, environments for aging, housing, urban design, building technology, environmental analysis and programming, passive cooling and heating, ecotechniques, arid region building and systems design, and architectural history.

School of Design. Problem-solving strategies; problem definition; aesthetic, political, economic, and social theories; design history, methodology, theory, and criticism; methods as applied to materials culture and human expression; theories and methods of human factors and ergonomics; design

production, planning, and marketing; acoustics and lighting design; perception and visual performance; computer imaging, visualization, analysis, and perception; human-machine interface design; product semantics, appropriate technology, and environmental issues; environmental graphics; environmental psychology; corporate, institutional, and healthcare design; postoccupancy evaluation; aging and design; public welfare and safety; rehabilitation, restoration, and preservation design; facility management methodology; design education theory; design forecasting; and collaborative learning and design journalism.

School of Planning and Landscape Architecture—Environmental Resources. Research is primarily conducted in the following four areas.

Urban and Regional Development. Housing, economic and community development, citizen participation, policy analysis, transportation, and the politics of planning.

Urban Design. Urban landscape design, planning and land-use law, urban design theory, development controls, and design guidelines.

Landscape Ecological Planning. Public land management, the conservation of renewable and nonrenewable resources, sustainable development, hazards planning, environmental impact assessment, riparian and wetlands protection, and land-use planning.

International Planning. Housing, economic and community development, urban design, landscape ecology, and agroforestry.

Environmental Resources. Through faculty from the Morrison School of Agribusiness and Resource Management research programs include applications of geographic information systems to resource management, monitoring of ecological change, wildlife habitat ecology, vegetation dynamics, fire ecology, soil ecology and ecosystem restoration.

Range ecology studies investigate various problems, from shrub control and hydrologic research in Arizona chaparral to the use of microcomputers in field data acquisition and the effects of power plant emission on vegetation. Other research has considered the relationships between both livestock and wildlife and their environments.

Environmental Design and Planning

In addition to the EPD 700-level courses, refer to the course listing under the following majors for courses that are available to support the collegewide interdisciplinary degree program in Environmental Design and Planning: architecture, building design, environmental planning, environmental resources, industrial design, interior design, and landscape architecture.

RESEARCH ACTIVITY

The list that follows provides an indication of some of the research topics currently being explored by the doctoral students in the program, as well as core faculty within the college. Topics may change during the course of the research, either by expanding or narrowing the focus of the topic. This list is not inclusive of all research. For more information about student and faculty research, access the Web site at www.asu.edu/caed/phd_program.

ENVIRONMENTAL DESIGN AND PLANNING (EPD)

EPD 700 Interdisciplinary Research Methods. (3)

fall

Introduction to the philosophy and methodology of interdisciplinary research in environmental design and planning. Seminar. Fee.

EPD 710 Current Research in Design. (3)

spring

Review and critical evaluation of contemporary literature and method in architecture, building science, interior design, industrial design, and landscape architecture. Seminar. Fee.

EPD 712 Current Research in Planning. (3)

spring

Review and critical evaluation of contemporary literature and method in environmental planning, landscape ecology, urban design, and urban and regional planning. Seminar. Fee.

EPD 714 Current Research in History, Theory, and Criticism. (3)

spring

Review and critical evaluation of contemporary literature and method in the theory and history of architecture, design, and planning. Seminar. Fee.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Environmental Planning

Master's Program

Frederick Steiner

Director

(AED 158) 480/965-7167

brooke.lloyd@asu.edu

www.asu.edu/caed/Landscape_and_Planning/index.html

PROFESSORS

KIHL, LAI, MUSHKATEL, PIJAWKA, STEINER

ASSOCIATE PROFESSORS

CAMERON, COOK, GUHATHAKURTA, KIM, McSHERRY, SAN MARTIN, YABES

ASSISTANT PROFESSORS

CREWE, EWAN, FISH EWAN, LARSEN, MUSACCHIO

The faculty in the School of Planning and Landscape Architecture offer a graduate program leading to the professional Master of Environmental Planning degree. Three areas of concentration are offered: urban and regional development, urban design, and landscape ecological planning.

The faculty in the school also participate in offering the Ph.D. degree in Environmental Design and Planning program. See "Doctor of Philosophy," page 103, for general information on the Ph.D. degree.

MASTER OF ENVIRONMENTAL PLANNING

The faculty in the School of Planning and Landscape Architecture offer a program leading to the professional degree Master of Environmental Planning (M.E.P.). Three areas of concentration are offered: urban and regional development; urban design; and landscape ecological planning. Graduates acquire the knowledge and skills necessary for leadership roles in the planning profession. Students take a core and select additional courses from the area of specialty. *Urban and regional development* prepares students for

employment in areas such as housing, economic and community development, policy analysis, transportation, and the politics of planning. *Urban design* provides a link between the School of Planning and Landscape Architecture and the other disciplines in the College of Architecture and Environmental Design—architecture, graphic design, interior design, and industrial design. Students selecting this area of specialty should have a degree in design or planning or be prepared to take basic design courses as a prerequisite. Students are prepared to work in land-use planning, the design of specific parcels of land, the preparation of development controls, and the drafting of guidelines for development controls and design. *Landscape ecological planning* prepares students for careers in public land management, conservation of renewable and nonrenewable resources, the management of solid and hazardous wastes, environmental impact assessment, and land-use planning. All areas of specialty emphasize environmental and urban planning in rapidly developing metropolitan areas, preparing graduates for advanced careers in either the public or private sector.

A common core of required lecture, seminar, and studio courses provides knowledge of community and environmental planning issues and fundamental theories, practices, and skills in planning. The areas of specialty in urban design and landscape ecological planning offer a series of fundamental and advanced design studios that enhance knowledge of urban form and land planning.

Individual practical experience in planning is provided through an internship program and independent work on a required final thesis. In addition to the planning faculty, the program is enriched by the interdisciplinary participation of faculty from other academic units of the university as well as leading planning and landscape architecture practitioners from the Phoenix area.

Admission Requirements and Procedures. To be considered for the program, the applicant must fulfill all admission requirements of the Graduate College, in addition to meeting admission requirements of the School of Planning and Landscape Architecture. Separate application materials must be submitted.

School of Planning and Landscape Architecture. The following materials should be submitted to

SCHOOL OF PLANNING AND LANDSCAPE
ARCHITECTURE
COLLEGE OF ARCHITECTURE AND
ENVIRONMENTAL DESIGN
ARIZONA STATE UNIVERSITY
PO BOX 872005
TEMPE AZ 85287-2005

1. a statement of intent (maximum 600 words) explaining (a) the applicant's interest in planning; (b) the applicant's academic background, and if appropriate, preparation for the selected area of specialty: urban and regional development, urban design, or landscape ecological planning (these may include written samples or a portfolio); and (c) the applicant's educational objectives;
2. test scores: TOEFL scores from international students whose native language is not English;

3. three letters of recommendation from references who are qualified to comment on the applicant's potential in the selected area of study; and
4. a résumé.

International students who wish to be considered for a teaching assistantship and whose first language is not English are required to pass the TSE administered by the American English and Culture Center at ASU.

Application Deadlines. For fall enrollment, application materials are due in the School of Planning and Landscape Architecture and the Graduate College on March 15.

For spring enrollment, application materials are due in the School of Planning and Landscape Architecture and the Graduate College on October 15.

Selection Procedures and Notifications. School faculty evaluate the applications and supporting materials and recommend to the Graduate College whether the applicant should be granted regular or provisional admission or if admission should be denied. If admission is provisional, the Graduate College specifies in its letter of admission the provisions to be met to gain regular status. The school informs successful applicants of the procedures for enrollment.

Program of Study. An approved program of study is 47 semester hours or 50 with an optional internship. The program has the typical distribution as follows:

Required core courses, including two four-hour studios	28
Specialization courses	15
Optional internship.....	3
Thesis	4
Total	50
Total without internship	47

Students are encouraged to take the required core courses and then to select an area of specialization. The program of study must be approved by the student's supervisory committee and be completed as specified for graduation. Requests for changes in the program must be made in writing. Some graduate courses may require undergraduate-level prerequisites; specifically, all students are expected to have taken introductory courses in planning and statistics. Inquiries regarding the M.E.P. program should be directed to the School of Planning and Landscape Architecture.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

Final Examinations. A comprehensive oral examination based on the student's thesis is required. The oral examination is administered by the supervisory committee.

RESEARCH ACTIVITY

Scholarly activity of the School of Planning and Landscape Architecture can be clustered into eight areas:

1. community-based and urban design studies,
2. environmental planning,
3. historical research and preservation,
4. housing and urban policy,
5. international research,

6. landscape ecology and design,
7. planning theory and education, and
8. urban-environmental modeling.

Community-based and Urban Design Studies. The community-based and urban design studies often relate to growth management and development concerns. Many local communities support this work including Native American groups such as the Hopi nation and the Town of Guadalupe. The National Endowment for the Arts has provided support through the Your Towns Program—focusing on rural communities—and the Mayor’s Institute—focusing on design issues of cities.

Environmental Planning. The faculty have published numerous articles and received funding in such environmental planning areas as siting hazardous facilities, measuring impacts of land uses on biodiversity, analyzing environmental hazards, and designing land evaluation and site assessment systems.

Historical Research and Preservation. Historical research and preservation concerns the study of special places and the people who created them.

Housing and Urban Policy. The housing and urban policy cluster involves social and health concerns, affordable housing, sustainable home design, and transportation planning.

International Research. International research includes funded studies along the U.S. Mexico border as well as work in The Netherlands, Spain, Italy, China, Korea, and the Philippines.

Landscape Ecology and Design. Landscape ecology and design research includes work focused on river corridors, watersheds, riparian areas, wetlands, and environmentally sensitive lands. The landscape ecological research has received significant support from many federal, state, and city agencies.

Planning Theory and Education. The planning theory and education cluster concerns critical urban, landscape, and environmental issues that advance the disciplines in the school: landscape architecture and planning.

Urban-environmental Modeling. Urban-environmental modeling involves long-term urban ecological research and integrated models for large-scale planning.

LANDSCAPE ARCHITECTURE (PLA)

PLA 411 Landscape Architecture Theory and Criticism. (3)

spring

Critically analyzes landscape architecture theories and projects to evaluate validity of design and contribution to society. Prerequisites: PLA 310, 361, 362, 420, 461.

General Studies: L

PLA 461 Landscape Architecture V. (4)

fall

Landscape ecological planning: collection and application of ecological data relevant to planning and design at landscape scale. Studio. Fee. Prerequisite: PLA 362.

PLA 485 International Field Studies in Planning and Landscape Architecture. (1–12)

fall, spring, summer

Organized field study of planning and landscape architecture in specified international locations. May be repeated for credit with school approval. Study abroad. Cross-listed as PUP 485. Credit is allowed for only PLA 485 or PUP 485.

General Studies: G

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

URBAN AND ENVIRONMENTAL PLANNING (PUP)

PUP 412 History of the City. (3)

fall

The city from its ancient origins to the present day. Emphasis on European and American cities during the last five centuries. Cross-listed as APH 414. Credit is allowed for only APH 414 or PUP 412.

General Studies: H

PUP 420 Theory of Urban Design. (3)

spring

Analyzes the visual and cultural aspects of urban design. Theories and techniques applied to selected study models. Prerequisite: junior standing.

General Studies: HU

PUP 433 Zoning Ordinances, Subdivision Regulations, and Building Codes. (3)

fall and spring

Analyzes zoning ordinances, subdivision regulations, building codes, and other planning implementation techniques relative to local development.

PUP 434 Urban Land Economics. (3)

spring

Interaction between space and economic behavior. Examines the use and value of land through economic theories.

PUP 436 City Structure and Planning. (3)

spring

Political structure and organization of government as it relates to planning. Prerequisite: PUP 301.

PUP 442 Environmental Planning. (3)

fall

Environmental planning problems, including floodplains, water quality and quantity, solid and hazardous waste, air quality, landslides, and noise. Field trips. Prerequisite: PUP 301 or instructor approval.

PUP 444 Preservation Planning. (3)

spring

History, theory, and principles of historic preservation. Emphasis on legal framework and methods practiced. Lecture, off-campus field study. Prerequisite: instructor approval.

PUP 445 Women and Environments. (3)

fall

Examines the role women play in shaping the built environment; ways built/natural forms affect women’s lives. Focuses on contemporary U.S. examples. Prerequisite: upper-division or graduate status.

General Studies: C

PUP 452 Ethics and Theory in Planning. (3)

fall

Ethics and theory of professional planning practice in urban and regional communities. Prerequisite: upper-division standing or instructor approval.

General Studies: L

PUP 485 International Field Studies in Planning and Landscape Architecture. (1–12)

fall, spring, summer

Organized field study of planning and landscape architecture in specified international locations. May be repeated for credit with school approval. Study abroad. Cross-listed as PLA 485. Credit is allowed for only PLA 485 or PUP 485.

General Studies: G

PUP 498 Pro-Seminar. (1–7)

fall

Possible topics:

- (a) Senior Pro-Seminar. (1)

PUP 501 The Idea of Planning. (3)*fall*

Comprehensive review of planning profession within a political, governmental, multicultural, and gender framework.

PUP 510 Citizen Participation. (3)*spring*

Theory and practice of citizen participation in planning. Examines and critiques participation techniques and roles of planners. Prerequisite: instructor approval.

PUP 520 Planning Theories and Processes. (3)*fall*

Reviews past and current theoretical developments related to social change perspectives, the role and ethics of planners. Prerequisite: instructor approval.

PUP 524 Planning Methods I: Planning Research Methods. (3)*fall*

Tools useful for urban planning research; emphasis on research design and survey methods. Prerequisite: PUP 301 or instructor approval.

PUP 525 Urban Housing Analysis. (3)*fall*

Nature, dimensions, and problems of urban housing, government policy environment, and underlying economics of the housing market.

PUP 531 Planning and Development Control Law. (3)*spring*

Case studies on police power, eminent domain, zoning, subdivision controls, exclusion, preservation, urban redevelopment, and aesthetic and design regulation.

PUP 532 Advanced Urban Planning Law. (3)*spring*

Advanced study on selected issues in planning law, such as urban design controls, exclusionary practices, compensable regulation, and tax policy. Prerequisite: PUP 432 or instructor approval.

PUP 542 Environmental Administration and Planning. (3)*spring*

Environmental administration of policies and their relationship to environmental planning practices. Prerequisite: PUP 442.

PUP 544 Urban Land Use Planning. (3)*spring*

Theory and methods of urban land use planning, including the rational planning process, comprehensive, functional, and neighborhood plans. Prerequisite: PUP 301 or instructor approval.

PUP 546 Urban Design Policy. (3)*not regularly offered*

Advanced study of local, state, and federal urban design policy. Prerequisite: PLA 420 or PUP 420.

PUP 561 Urban Design Studio. (4)*not regularly offered*

Current urban form and urban landscape design problems within the Phoenix-centered region. Studio. Prerequisite: PLA 420 or PUP 420 or instructor approval.

PUP 572 Planning Studio I: Data Inventory and Analysis. (4)*fall*

Comprehensive planning workshop dealing with real community problems. Focuses on the data gathering and analysis steps of the planning process. Fee. Prerequisite: Master of Environmental Planning major or instructor approval.

PUP 574 Planning Studio II: Options and Implementation. (4)*spring*

Comprehensive planning workshop dealing with real community problems. Focuses on the development of options, plan making, and plan implementation. Studio. Fee. Prerequisite: PUP 572 or instructor approval.

PUP 575 Environmental Impact Assessment. (3)*spring*

Criteria and methods for compliance with environmental laws; develops skills and techniques needed to prepare environmental impact statements/assessments.

PUP 576 GIS Studio. (3)*spring*

GIS as a tool to address large, multifaceted planning problems. Prerequisites: a combination of GPH 373 (or 598) and PAF 591 and PUP 322 or only instructor approval.

PUP 584 Internship. (3)*fall, spring, summer session 1*

Internship under the supervision of practitioners in the Phoenix area or other locales. Credit/no credit.

PUP 599 Thesis. (1–12)*not regularly offered*

Fee.

PUP 622 Planning Methods II: Quantitative Planning Analysis. (3)*spring*

Methods and models used as the basic quantitative techniques of urban, regional, and environmental planning and policy analysis. Prerequisites: PUP 424; statistics; instructor approval.

PUP 642 Land Economics. (3)*fall*

Land use and locational impact of economic activity and the urban real property market. Prerequisite: instructor approval.

PUP 644 Public Sector Planning. (3)*spring*

Urban fiscal problems and public goods provision in state and local governments. Prerequisites: 1 course in microeconomics; instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Environmental Resources

Master's Program

Raymond Marquardt
Dean

Morrison School of Agribusiness
and Resource Management
(CNTR 20) 480/727-1585
cactus.east.asu.edu

PROFESSORS

BRADY, BROCK

ASSOCIATE PROFESSORS

GREEN, MILLER, WHYSONG

The faculty of the Morrison School of Agribusiness and Resource Management, at ASU East, offer a program leading to the M.S. degree in Environmental Resources. Areas of concentration are offered in natural resource management, GIS/remote sensing, and range ecology. The faculty in this program also participate in offering the Ph.D. in Environmental Design and Planning program. See "Doctor of Philosophy," page 103, for general information on the Ph.D. degree.

MASTER OF SCIENCE

Admission. Applicants to the program are expected to meet the minimum requirements for admission to the Graduate College. In addition, scores from the Graduate Record Examination or Miller Analogies Test are required. Applicants are expected to have completed 18 semester hours in environmental sciences or closely related courses. Applicants not meeting these requirements may be considered for admission with deficiencies.

Submit the following separate application materials to:

ENVIRONMENTAL RESOURCES PROGRAM
MORRISON SCHOOL OF AGRIBUSINESS
AND RESOURCE MANAGEMENT
ARIZONA STATE UNIVERSITY EAST
7001 E WILLIAMS FIELD ROAD
MESA AZ 85212-6032

1. a statement of intent (maximum 600 words) explaining
 - (a) the applicant's interest in environmental resources,
 - (b) the applicant's academic background, and
 - (c) the applicant's educational objectives;
2. three letters of recommendation from references who are qualified to comment on the applicant's potential in the selected area of study; and
3. a résumé.

Application Deadlines. For fall enrollment, application materials are due in the Morrison School of Agrribusiness and Resource Management and the Graduate College on March 15.

For spring enrollment, application materials are due in the Morrison School of Agrribusiness and Resource Management and the Graduate College on October 15.

Selection Procedures and Notifications. School faculty evaluate the applications and supporting materials and recommend to the Graduate College whether the applicant should be granted regular or provisional admission or if admission should be denied. If admission is provisional, the Graduate College specifies in its letter of admission the provisions to be met to gain regular status. The school informs successful applicants of the procedures for enrollment.

Program of Study. A minimum of 30 semester hours of approved graduate course work is required. All students are required to complete a 13-semester-hour core curriculum. A minimum grade of "B" is required in all core courses. First-year students are expected to complete ERS 550 Vegetation Dynamics, ERS 591 Environmental Resources Seminar, and ERS 551 Advanced Environmental Statistics. Second-year students are required to complete ERS 691 Seminar in the fall semester. Students can complete ERS 485 GIS in Natural Resources or ERS 486 Remote Sensing in Environmental Resources (or an approved substitute if the student has previously taken both ERS 485 and 486) at any time during their residence. All students are also expected to complete a minimum of three semester hours of research and three semester hours of thesis. The remaining hours (11 semester hours) are chosen to support the student's educational objectives.

Foreign Language Requirements. None.

Comprehensive Examinations. None.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination covering the thesis and related subject matter is required.

RESEARCH ACTIVITY

The faculty of environmental resources is engaged in a number of research projects of global, national, regional, or state importance. Scholarship in service to community is the hallmark of a state-supported university and continues to be in the Morrison School of Agrribusiness and Resource Management.

A few examples of this scholarship are: a project involved in "The Adaptation of Sonoran Desert Vegetation to Wildfire on the Tonto National Forest;" a "Wildlife Vegetation Inventory for Northern Phoenix;" an extensive program in "Transborder Watershed Resources;" and an investigation into the "Effects of Livestock Use Levels on Riparian Trees on the Verde River."

ENVIRONMENTAL RESOURCES (ERS)

ERS 402 Vegetation Measurement. (4)

spring

Vegetation sampling and inventory as related to animal-habitat relations. Lecture, lab, 1 weekend field trip. Prerequisites: a combination of ERS 301 and 307 and 350 and program major or only instructor approval.

ERS 415 Wildlife Life Histories. (4)

spring

Life histories of the major mammal, reptile/amphibian, and avian species found in the Southwest, with emphasis on management. Lecture, lab. Prerequisites: BIO 370 (or 385); ERS 360.

ERS 420 Ecological Restoration. (3)

spring

Techniques of ecological restoration applied for the improvement of arid and semiarid land and sensitive habitats. Weekend field trips. Prerequisite: ERS 360.

ERS 425 Soil Classification and Management. (3)

not regularly offered

Principles of soil genesis, morphology, and classification. Presents management and conservation practices. Prerequisite: ERS 225.

ERS 433 Riparian Ecosystem Management. (3)

not regularly offered

Examines the functions and components that make up riparian ecosystems and the management of these ecosystems. Lecture, field trip. Prerequisite: ERS 225 or instructor approval.

ERS 434 Wetland Ecosystems and Soils. (3)

not regularly offered

Wetland ecosystems structure and function including hydrology and biogeochemistry with special emphasis on soils. Lecture, weekend field trip. Prerequisite: ERS 225 or instructor approval.

ERS 448 Soil Ecology. (3)

not regularly offered

Soils viewed in an ecosystem context, soil-plant relationships, nutrient budgets, and abiotic factors that influence soil processes. Prerequisites: a combination of BIO 320 and ERS 225 and 226 or only instructor approval.

ERS 449 Landscape Ecology. (3)

not regularly offered

Causes and ecological consequences of spatial and temporal patterns in the environment. Prerequisite: ERS 301.

ERS 460 Applied Systems Ecology. (3)

not regularly offered

Systems approach applied to analysis and management of natural resource ecosystems. Use of simulation models. 2 hours lecture, 3 hours lab. Prerequisites: ERS 350 (or its equivalent); 1 course in ecology.

ERS 465 Surface Water Quality. (3)

spring in odd years

Examines factors that impact water quality. Surface water sampling and analysis with interpretation for wildlife, humans, and other users. Prerequisites: ERS 364, 365.

ERS 474 Wildlife Ecology. (3)

not regularly offered

Integrates ecological concepts as applied to wildlife populations and their interaction with the habitat and other species. Lecture, lab, 1 weekend field trip. Prerequisite: ERS 360.

ERS 475 Wildlife Management. (4)*spring*

Principles and techniques of applied ecology for the management and wildlife populations. Lecture, lab. Prerequisites: ERS 311 and 474 (or their equivalents).

ERS 480 Ecosystem Management and Planning. (3)*spring*

Planning for management and conservation of wildland ecosystems. Ecological, economic, and social constraints on long-term sustainable resource development. Computer tools for resource planning. Lecture, 1 weekend field trip. Prerequisites: ERS 402 (or its equivalent); senior standing.

*General Studies: L***ERS 485 GIS in Natural Resources. (3)***fall*

Principles of Geographic Information Systems (GIS) utilized in natural resource management. Use of computers for spatial analysis of natural resources. Lecture, lab. Prerequisite: CSE 180 (or its equivalent).

ERS 486 Remote Sensing in Environmental Resources. (4)*spring*

Principles and application of remote sensing technologies in natural resource management. Integration of computerized data from aerial photography and Landsat imagery in resource management. Lecture, lab. Prerequisite: ERS 485 (or its equivalent).

ERS 490 Recent Advances in Environmental Resources. (1)*fall and spring*

Current literature and significant developments involving environmental resources. May be repeated for credit.

ERS 500 Research Methods. (1–12)*not regularly offered***ERS 533 Riparian Ecology. (3)***not regularly offered*

Review of recent literature, developments, and methods related to riparian ecology. Applications of soil and landscape ecology to riparian systems. Lecture, discussion, field trips.

ERS 540 Plant Responses to Environmental Stresses. (3)*not regularly offered*

Reaction of plants to environmental stresses; aerial pollutants, fire, herbivores, mechanical treatments, pesticides, and soil amendments. 1 weekend field trip. Prerequisite: ERS 360 or instructor approval.

ERS 550 Vegetation Dynamics. (4)*fall*

Dynamics of vegetation emphasizing ecological succession, applications of landscape ecology and GIS, and analysis of vegetation data. Field trips, studio. Prerequisite: introductory statistics course.

ERS 551 Advanced Environmental Statistics. (4)*spring*

Advanced statistical procedures for environmental resources. Techniques for analyzing research data that do not meet assumptions. Studio. Prerequisite: ERS 350 (or its equivalent).

ERS 553 Advanced Animal Nutrition. (4)*not regularly offered*

Metabolic and physiological interactions of nutrients in wild and domesticated animals consuming natural feeds. Lecture, lab.

ERS 560 Systems Ecology. (3)*not regularly offered*

Quantitative description and mathematical modeling of ecosystem structure and function. Techniques for model construction and simulation. Lecture, lab. Prerequisites: ERS 350 (or its equivalent); computer programming; 6 hours in ecological studies.

ERS 561 Spatial Statistics and GIS. (3)*fall*

Dependent spatial data, analysis and description, semivariograms, variograms, kriging, and GIS analysis. Lecture, lab. Prerequisites: ERS 350 and 485 (or their equivalents).

ERS 580 Practicum. (1–12)*not regularly offered***ERS 584 Internship. (1–12)***not regularly offered***ERS 585 Spatial Modeling with GIS. (3)***fall*

GIS technology for spatial modeling of natural resources. Practical application of GIS technology for problem solving. Lecture, lab. Prerequisite: ERS 485 (or its equivalent) or instructor approval.

ERS 590 Reading and Conference. (1–12)*not regularly offered***ERS 591 Environmental Resources Seminar. (1–12)***not regularly offered***ERS 592 Research. (1–12)***not regularly offered***ERS 593 Applied Project. (1–12)***not regularly offered***ERS 594 Conference and Workshop. (1–12)***not regularly offered***ERS 595 Continuing Registration. (1)***not regularly offered***ERS 598 Special Topics. (1–4)***not regularly offered***ERS 599 Thesis. (1–12)***not regularly offered***ERS 691 Seminar. (1–12)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Exercise and Wellness

Master's Program

William J. Stone
Chair
mattingl@asu.edu

PROFESSORS
CORBIN, STONE

ASSOCIATE PROFESSOR
SWAN

ASSISTANT PROFESSOR
PHILLIPS

LECTURERS
JONES, WOODRUFF

The faculty of Exercise and Wellness at ASU East offer a graduate program leading to the M.S. degree in Exercise and Wellness. Faculty also participate in an interdisciplinary Ph.D. program in Curriculum and Instruction with a concentration in exercise and wellness. For more information, see "Curriculum and Instruction," page 174.

MASTER OF SCIENCE

All applicants for the M.S. degree program in Exercise and Wellness are required to submit scores from the Graduate Record Examination (GRE). Admission decisions are based upon previous academic training and performance, GRE scores, recommendations, and the ability of potential mentors to devote time to an additional student. International applicants whose native language is not English must also submit a Test of English as a Foreign Language score. Applications are reviewed by faculty only once a year. Priority is given to applications completed by January 1. The program requires a minimum of 30 semester hours, at least 21 of which must be EXW courses. Required courses with corresponding semester hours include EXW 500 (three), 501 (three), 591 (three), and 599 (six). Remaining course work is selected by the student in consultation with an advisor and supervisory committee.

Deficiencies. Applicant transcripts are evaluated to assure competency in the following areas: health behavior change (health psychology), use of computers, basic nutrition, basic wellness, exercise prescription, and exercise testing. Competency in areas considered to be prerequisite to each of the listed competencies are also evaluated. Deficiencies are noted at the time of admission and may be satisfied by completing undergraduate or graduate courses that correct the deficiencies.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

RESEARCH ACTIVITY

Research in Exercise and Wellness is enhanced by the existence of laboratories. Extensive research is conducted in the field (work site, community, school). The research of Exercise and Wellness faculty and graduate students focuses on the fitness, health and wellness benefits of healthy lifestyles; such as regular physical activity, sound nutrition, and effective stress management. The focus is also on disease prevention and fitness. All groups in the developmental spectrum (children to senior adults) are studied. Among the areas of current interest to faculty and graduate students are physical activity and fitness program effectiveness (strength, cardiovascular fitness, flexibility, and body composition), women's health issues, motivation to adhere to healthy lifestyles, physical activity and fitness assessment, and environmental health and wellness issues.

EXERCISE AND WELLNESS (EXW)

EXW 420 Exercise Testing. (3)

fall and spring

Theoretical basis and practical application of pre-exercise screening, exercise testing, estimates of energy expenditure, and interpretation of results. Lecture, lab. Fee. Prerequisites: EXW 315; current CPR certification.

EXW 425 Exercise Prescription. (3)

fall and spring

Theoretical bases for and application of general principles of exercise prescription to various ages, fitness levels, and health states. Prerequisites: EXW 320, 330. Pre- or corequisite: EXW 420.

EXW 442 Physical Activity in Health and Disease. (3)

fall and spring

Examines the role of physical activity and fitness in the development of morbidity and mortality throughout the human life span. Prerequisite: EXW 315.

General Studies: L

EXW 450 Cultural and Social Issues in Exercise and Wellness. (3)

fall and spring

Examines contemporary cultural and social issues in physical activity. Focus on theories of social behavior, racial, ethnic, and cultural differences. Prerequisite: PGS 101.

General Studies: C

EXW 500 Research Methods. (3)

fall

Introduction to the basic aspects of research, including problem selection, literature review, instrumentation, data handling, methodology, and writing the report.

EXW 501 Research Statistics. (3)

spring

Statistical procedures; sampling techniques, hypothesis testing, and experimental designs as they relate to research publications.

EXW 505 Applied Exercise and Wellness Laboratory Techniques. (3)

spring

Investigative techniques used in the applied exercise testing/prescription laboratory. Emphasis on cardiorespiratory assessment, energy balance, body composition, and electrocardiography. Lecture, lab. Fee.

EXW 534 Sports and Fitness Conditioning. (3)

fall

Bases of sports and fitness conditioning, including aerobic and anaerobic power, strength, flexibility, and analysis of conditioning components for sports and fitness.

EXW 536 Physiological Aspects of Physical Activity and Chronic Disease. (3)

fall

Role of physiological mechanisms associated with acute and long-term physical activity and its influence on chronic disease and wellness.

EXW 542 Health Promotion. (3)

spring

Theory and research concerning fitness and wellness programs in nutrition, physical activity, smoking cessation, and stress management.

EXW 544 Fitness/Wellness Management. (3)

spring

Development of the fitness/wellness industry. Planning, organizing, promoting, and managing fitness/wellness programs.

EXW 575 Teaching Lifetime Fitness. (3)

spring

Organizing and implementing physical fitness programs in the schools with emphasis on individual problem solving.

EXW 599 Thesis. (1–12)

not regularly offered

EXW 642 Exercise Epidemiology. (3)

spring

Physical activity, exercise, and physical fitness and the development of chronic disease.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.



Hayden Library

H. Val Peterson photo

Exercise Science

Interdisciplinary Doctoral Program

Kathleen S. Matt

Director, Executive Committee

(PEBE 107B) 480/965-9580

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www.asu.edu/clas/espe/ExScPhD.htm

Anthropology

Professor: Marzke

Bioengineering

Associate Professors: He, Sweeney, Yamaguchi

Biology

Professors: Hazel, Satterlie;
Associate Professor: Harrison

Exercise Science and Physical Education

Regents' Professor: Landers;
Professors: Krahenbuhl, Martin, Stelmach;
Associate Professors: Hinrichs, Matt, Morgan,
Treasure, Willis;
Assistant Professors: Etnier, Robertson, Santello

Nutrition

Professor: Manore

Psychology

Professors: Karoly, Linder;
Assistant Professors: E. Amazeen, P. Amazeen, McBeath

Psychology in Education

Regents' Professor: Kulhavy;
Professor: Glass

The Committee on Exercise Science offers an interdisciplinary graduate program leading to the Ph.D. degree in Exercise Science. The committee functions in setting guidelines and supervising programs of study. One of the unique features of this interdisciplinary program is that, because it utilizes faculty research and teaching interests from a number of academic units, a student may tailor a course of study to fit individual needs and goals. The present committee is composed of members from the following academic units: Anthropology, Bioengineering, Biology, Exercise Science and Physical Education, Family and Human Development, Psychology, and Psychology in Education. Courses, however, are not limited to these academic units. Concentrations are available in biomechanics, motor behavior, physiology of exercise, and sport psychology.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Exercise Science is an individualized interdisciplinary degree that integrates graduate courses from a variety of academic units to provide a sound foundation for research leading to a dissertation in Exercise Science. Topics for these dissertations come from one of four research areas: biomechanics, motor behavior, physiology of exercise, and sport psychology.

Admission. In addition to meeting Graduate College requirements, students must submit a letter designating a

potential area of interest, the name of a potential mentor (from the list of faculty), and a statement of career goals to the director of the Committee on Exercise Science. Graduate Record Examination (GRE) scores (verbal, quantitative, and analytical), a professional résumé, and three letters of recommendation must also be submitted. All applicants whose native language is not English must submit a Test of English as a Foreign Language score. Preference is given to applicants already holding a master's degree, although exceptional students possessing only a baccalaureate degree may apply. Admission decisions are based on the compatibility of the applicant's career goals with the purpose of the degree program, previous academic training and performance, GRE scores, recommendations, and match of research interests with those of available mentors. To be considered for research or teaching assistantships, all application materials should be received before January 15.

Program of Study. The program of study consists of a minimum of 54 semester hours of graduate work beyond the master's degree (84 hours of graduate credit for applicants holding only the baccalaureate degree). Of the 84 semester hours, at least 30 hours (which may include research credit) of the approved Ph.D. program, and 24 research and dissertation hours must be completed after admission to a Ph.D. program at ASU. An individual program of study is selected in consultation with the student's supervisory committee. The program of study reflects the interdisciplinary nature of the degree program. Students are expected to have fulfilled a majority of the foundational course work before admission. Prerequisites that have not been completed must be taken as remedial work in addition to the program of study.

Foreign Language Requirements. None.

Comprehensive Examinations. Upon completion of course work and before commencing dissertation research, the student is given written and oral examinations. After the student has passed the comprehensive examinations, a dissertation committee is appointed by the dean of the Graduate College. After the dissertation committee has approved the dissertation prospectus, the student is eligible to apply for admission to candidacy.

Dissertation Requirements. The dissertation must consist of a fully documented written analysis of a problem that extends the knowledge and/or theoretical framework of the field. The research should demonstrate the student's creativity and competence for independent research.

Final Examinations. A final oral examination in defense of the dissertation is required. The candidate must take the final oral examination in defense of the dissertation within five years after passing the comprehensive examinations. Any exception must be approved by the supervisory committee, the director of the Committee on Exercise Science, and the dean of the Graduate College and ordinarily involves repetition of the comprehensive examinations.

COURSES

For courses, refer to the course listings under the following majors: Anthropology, Bioengineering, Biology, Chemical Engineering, Chemistry, Educational Psychology, Family and Human Development, Exercise Science/Physical Education, and Psychology. A limited number of applicable courses are also available through other departments.

Exercise Science/Physical Education

Master's Programs

Philip E. Martin

Chair

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REGENTS' PROFESSOR LANDERS

PROFESSORS

BURKETT, DARST, KRAHENBUHL, MARTIN,
PANGRAZI, STELMACH

ASSOCIATE PROFESSORS

HINRICHS, MATT, MORGAN, TREASURE, WILLIS

ASSISTANT PROFESSORS

ETNIER, ROBERTSON, SANTELLO

The faculty in the Department of Exercise Science and Physical Education offer graduate programs leading to the M.S. degree in Exercise Science/Physical Education, and the Master of Physical Education. Faculty also participate in two interdisciplinary Ph.D. programs: (1) Exercise Science with concentrations in biomechanics, motor behavior/sport psychology, and physiology of exercise, and (2) Curriculum and Instruction with concentrations in exercise and wellness, and physical education.

The Committee on Exercise Science offers an interdisciplinary graduate program leading to the Ph.D. degree in Exercise Science. The present committee is composed of members from several academic units. For more information about this program, see "Exercise Science," page 216.

The Committee on Curriculum and Instruction offers an interdisciplinary graduate program leading to the Ph.D. degree in Curriculum and Instruction. For more information, see "Curriculum and Instruction," page 169.

MASTER OF SCIENCE

Applicants for the M.S. degree program in Exercise Science/Physical Education may choose from five areas of study: biomechanics, exercise physiology, physical education (elementary, secondary, and adapted), motor behavior (motor learning and control, motor development), and sport and exercise psychology. All applicants are required to submit scores from the Graduate Record Examination (GRE). Admission decisions are based upon previous academic training and performance, GRE scores, recommendations, and the ability of potential mentors to devote time to an additional student. International applicants whose native language is not English must also submit a Test of English as a Foreign Language score. Applications are reviewed by department faculty only once a year. To be considered for admission in the fall semester, all application materials must be received by the department by February 1. The program requires a minimum of 30 semester hours, at least 21 of which must be EPE courses. Required courses with corresponding semester hours include EPE 500 (three), 501

(three), and 599 (six). Remaining course work is selected by the student in consultation with an advisor and supervisory committee.

Deficiencies. All applicants recommended for admission are evaluated for deficiencies in their academic preparation. Deficiencies are divided into two areas: (1) those associated with the discipline of exercise science and physical education (human anatomy and physiology, biomechanics, exercise physiology, motor learning and development, and psychosocial aspects of physical activity) and (2) those associated with the area of study (a maximum of six deficiency semester hours pertinent to study in the area may be specified).

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

MASTER OF PHYSICAL EDUCATION

The faculty in the Department of Exercise Science and Physical Education offer a program leading to the Master of Physical Education (M.P.E.) degree. The M.P.E. degree is designed to prepare scholarly professionals (i.e., teachers of physical education). Emphasis is placed on improving instructional effectiveness and developing a quality physical education curriculum in a school setting. Three areas of study are available: elementary, secondary, and adapted physical education.

Admission. Applicants who hold a bachelor's degree in education and who are certified to teach may apply to the M.P.E. degree directly. Applicants with a bachelor's degree in physical education but who are not certified to teach will apply to the postbaccalaureate/M.P.E. degree. Deficiencies will be assessed where applicable.

Program of Study. A minimum of 33 semester hours of course work is required for the M.P.E. program, with 18 hours of required core courses, six hours of cognate area, and nine hours of recommended electives. A total of 58 semester hours is required of students completing both the postbaccalaureate program and the M.P.E.

Foreign Language Requirements. None.

Final Examinations. A final written comprehensive examination is required.

EXERCISE SCIENCE/PHYSICAL EDUCATION (EPE)

EPE 413 Qualitative Analysis in Sport Biomechanics. (3)

spring

Develops systematic approach for detecting and correcting errors in human performance using anatomical and mechanical principles. Lecture, lab. Prerequisite: EPE 335.

EPE 414 Electromyographic Kinesiology. (3)

fall

Muscular contributions to human movement, muscle mechanics, electrophysiological basis, and practical application of electromyography. Lecture, discussion. Prerequisites: EPE 335, 340; instructor approval. *General Studies: L*

EPE 444 Metabolic Adaptations to Exercise Training. (3)

fall, spring, summer

Examines physiologic adaptations to exercise training as they relate to metabolism and tissue functions. Prerequisite: EPE 340.

EPE 452 Exercise Psychology. (3)*spring*

Contemporary research and theory as related to human behavior and health in an exercise setting. Prerequisite: EPE 352.

General Studies: SB

EPE 460 Theory of Strength Training. (3)*spring*

Research and theories on developing muscular strength; programs for developing muscular strength. Lecture, discussion. Prerequisites: EPE 335, 340.

General Studies: L

EPE 500 Research Methods. (3)*fall*

Introduction to the basic aspects of research, including problem selection, literature review, instrumentation, data handling, methodology, and the writing of research reports and articles.

EPE 501 Research Statistics. (3)*spring*

Statistical procedures; sampling techniques; exercise testing, exercise prescription, hypothesis testing, and experimental designs as they relate to research publications. Prerequisite: EPE 340.

EPE 505 Applied Exercise Physiology Techniques. (3)*fall*

Investigative techniques used in the applied exercise physiology laboratory. Emphasis on pulmonary function, body composition, and cardiorespiratory assessment. Lecture, lab. Fee. Prerequisite: EPE 340.

EPE 510 Introduction to Biomechanics Research Methods. (3)*fall*

Application of mechanics to human movement analysis. Includes consideration of two-dimensional imaging techniques, force measurement, electromyography, and data processing methods. Lecture, discussion, some labs. Prerequisite: EPE 335 or instructor approval.

EPE 520 Sport Psychology. (3)*fall*

Current research in sport psychology with an emphasis on performance enhancement. Includes questionnaire, psychophysiological, and behavioral research methods. Lecture, discussion. Prerequisites: EPE 448, 500.

EPE 521 Motor Development, Control, and Learning. (4)*spring*

Theory and research on motor skill acquisition, including learning/control and development (i.e., growth, children and exercise, and development learning). Lecture, discussion, some labs. Prerequisites: EPE 345, 500, 501.

EPE 522 Exercise Psychology. (3)*spring*

Contemporary research and theory as related to human behavior and health in an exercise setting. Lecture, discussion. Prerequisite: EPE 500.

EPE 530 Exercise Physiology. (3)*fall*

Immediate and long-term adaptations to exercise with special reference to training and the role of exercise in cardiovascular health. Prerequisite: EPE 340.

EPE 531 Physiology of Women in Sport. (3)*spring*

Physiological aspects of women engaging in physical activity. Emphasizes factors affecting performance and health throughout life. Prerequisite: EPE 340.

EPE 561 Administration of Athletics. (3)*not regularly offered*

Managing an athletic program, including financing, budget policies, staging, and promotion of athletic contests, schedules, travel insurance, and current athletic trends.

EPE 570 Programs and Special Topics in Adapted Physical Education. (3)*fall*

Contemporary adapted, developmental, remedial, and corrective physical education programs; understanding of principles, problems, and recent developments in this area.

EPE 572 Trends and Issues in Physical Education. (3)*spring*

Literature, research, and practices in contemporary physical education, including finances, Title IX, teaching and coaching philosophies, school organization, and nonteaching physical education programs.

EPE 573 Curriculum and Instruction in Secondary Physical Education. (3)*fall*

Current curriculum and instruction practices and research in secondary school physical education. Prerequisite: ESPE major or teaching experience.

EPE 574 Analysis of Teaching Behavior in Sport and Physical Education. (3)*not regularly offered*

Use of systematic, direct observation techniques in analyzing and evaluating instruction in sport and physical education. Lecture, lab.

EPE 576 Physical Education for Elementary School Children. (3)*fall*

Current practices and research pertaining to elementary school physical education programs.

EPE 578 Student Teaching in Secondary Schools. (6–12)*fall and spring*

Practice of teaching. Relationship of theory and practice in teaching. Prerequisite: completion of all required coursework (or its equivalent) prior to student teaching.

EPE 599 Thesis. (1–12)*not regularly offered***EPE 610 Advanced Topics in Biomechanics. (3)***spring*

Three-dimensional imaging techniques, data analysis theory, and integration of biomechanics research tools; includes original research project. Lecture, discussion, some labs. Prerequisite: EPE 510 or instructor approval.

EPE 620 Developmental Motor Skill Acquisition. (3)*spring in odd years*

Cognitive-motor theories of learning/performance applied to children's motor skill acquisition. Study of knowledge development and research analysis/techniques. Lecture, discussion. Prerequisite: EPE 521.

EPE 621 Motor Learning/Control. (3)*fall*

Discussion of contemporary research issues in motor learning and control. Includes behavioral and neurophysiological issues. Lecture, discussion. Prerequisite: EPE 521.

Family Nurse Practitioner Post-Master's Certificate

See "Nursing," page 279.

Family and Human Development

Master's Program

Richard A. Fabes
Chair
 (COWDN 106) 480/965-6978
 famchild@mail.com
 www.asu.edu/clas/fhd/graduate/masters.htm

PROFESSORS

CHRISTOPHER, FABES, GRIFFIN, HOOVER,
 MARTIN, ROOSA

ASSOCIATE PROFESSORS

BOULIN JOHNSON, DUMKA, WILSON

ASSISTANT PROFESSORS

ESTRADA, FROSCHE, HANISH, MADDEN-DERDICH,
 SPINRAD, UPDEGRAFF

SENIOR LECTURER

WEIGAND

LECTURER

BODMAN

Students may pursue the M.S. degree in Family and Human Development with a concentration in family studies. Areas of study are available in child development and family relationships.

Students applying to this program are required to submit scores on the Graduate Record Examination (verbal and quantitative sections).

MASTER OF SCIENCE

Admission. Applications for admission, teaching assistantships, and Cowden Fellowships are accepted until January 15 preceding the fall semester to which the applicant is seeking admission.

Program of Study. Courses are selected by the student along guidelines of the specific areas, after consultation with the supervisory committee. The program of study should be completed and approved by the supervisory committee by the end of the second semester of full-time graduate study upon completion of 12 semester hours. A program of study may include more than 30 semester hours, and the exact number will be determined by program requirements and the student's supervisory committee. Acceptance of the proposed program of study must be verified by signature of the student and committee members. After approval within the department or college, the program of study is submitted to the Graduate College for final approval. The following requirements must be met for the concentration.

Family Studies. Within the family relationships area, students may take courses in marriage and family therapy (MFT) sufficient to meet MFT certification requirements for the State of Arizona.

The required courses are CDE 531, FAS 500, and FAS 531; two statistics courses, one basic and one advanced, selected with the approval of the student's advisor; and six

semester hours of thesis/research. A minimum of 34 semester hours is required for this degree program; however, 37 hours are recommended.

Additional requirements must be fulfilled in the chosen area of study.

Child Development. The required courses are CDE 533, six semester hours of CDE electives, and one FAS course selected in consultation with the advisor.

Family Relationships. The required courses are FAS 539, six semester hours of FAS electives, and one CDE course selected in consultation with the advisor.

Within the family relationships area of study, students may take courses in marriage and family therapy to meet certification requirements for the state of Arizona. A separate application and acceptance is required for admission to the MFT specialization, which includes clinical practica and supervision. Typically, the MFT specialization is a three-year program.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

RESEARCH ACTIVITY

The research activities of the faculty and students in the Department of Family and Human Development (FHD) are devoted to understanding and finding solutions to some of the most contemporary and critical problems faced by children and families. These topics include issues related to the effects of social and cultural environments on children and families; such as the effects of poverty, schooling, community violence, and child care.

In addition, FRHD faculty research focuses on topics related to family and marital functioning. Specific areas include marital interaction, parenting and parent-child relationships, sexuality, dating relationships, family diversity, approaches to marital and family therapy, divorce, step families, and public policy. Research topics related to children, adolescents, and infants include the development of emotion, gender-role development, early intervention for children who are biologically or socially at risk, the factors that promote positive infant development, the causes and treatment of childhood autism, sibling and peer relationships, and how family relationships influence childhood development. Strong emphasis is placed on the acquisition of sophisticated theoretical, methodological, and statistical skills necessary to conduct and evaluate basic and applied research.

CHILD DEVELOPMENT (CDE)

CDE 430 Infant/Toddler Development in the Family. (3)

fall and spring

Examination of the development of infants/toddlers, the socialization processes of families, and the interactions of these processes. Prerequisite: CDE 232 (or its equivalent).

General Studies: SB

CDE 437 Observational and Naturalistic Methods of Studying Children. (3)

not regularly offered

In-depth examination of implementing observational and naturalistic studies of children in a variety of settings. 2 hours lecture, 3 hours lab. Prerequisites: CDE 430; 6 hours in psychology.

General Studies: L/SB

CDE 444 Children and Poverty. (3)*fall*

Impact that poverty has on children and their families. 2 hours lecture, 3 hours lab. Prerequisites: CDE 232 (or its equivalent); 6 hours in upper-division social sciences.

CDE 531 Theoretical Issues in Child Development. (3)*spring*

Major developmental theories, related research, and their application to family interaction. Prerequisites: both CDE 430 and 437 (or their equivalents) or only instructor approval.

CDE 533 Research Issues in Child Development. (3)*spring*

In-depth exploration and critique of research focusing on child development in a family setting. Prerequisites: CDE 531; FAS 500.

CDE 534 Applied Child Development. (3)*spring*

Integration of research and theory on child development, risk, and resilience to understand developmental problems and provide a foundation for intervention strategies. Prerequisites: CDE 531; FAS 500.

CDE 634 Advanced Applied Child Development. (3)*spring*

Advanced training in research and theory-based approaches to developing and evaluating prevention programs for children at risk. Prerequisite: CDE 534 or instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

FAMILY STUDIES (FAS)**FAS 431 Parent-Adolescent Relationships. (3)***fall*

Dynamics of the relationships between parents and adolescents. Developmental characteristics of adolescence and the corresponding adult stage. Prerequisites: CDE 232; FAS 331.

*General Studies: SB***FAS 432 Family Development. (3)***not regularly offered*

Normative changes in families over time from formation until dissolution. Emphasis on the marital subsystem in middle and later years. Prerequisites: both CDE 232 and FAS 331 or only instructor approval.

FAS 435 Advanced Marriage and Family Relationships. (3)*fall and spring*

Recent research, issues, and trends relating to marriage and family interaction. Influence of family composition, physical environment, family patterns, and values on family dynamics. Prerequisites: FAS 331, 361.

*General Studies: L/SB***FAS 436 Conceptual Frameworks in Family Studies. (3)***spring*

Approaches to study families focusing on systems, interactional, exchange, conflict, and developmental frameworks. Applications to diverse individual and family situations. Prerequisites: CDE 232; FAS 331, 361.

FAS 440 Fundamentals of Marriage and Family Therapy. (3)*fall and spring*

Introduction to the fundamental orientations of marriage and family therapy.

FAS 500 Research Methods. (4)*fall*

Purposes of research. Experimental design, methods of data collection, and thesis proposal development. Includes practical application research laboratory. 3 hours lecture, 3 hours lab.

FAS 530 Introduction to Marriage and Family Therapy. (3)*fall*

Introduction of major marriage and family therapy orientations. Review history, theory, application, and outcome research for each orientation. Prerequisite: admission to graduate program in FRHD with a concentration in family studies or instructor approval.

FAS 531 Family Theory Development. (3)*spring*

Historical and current approaches to theory development, evaluation, and application in family studies. Prerequisite: FAS 435 or instructor approval.

FAS 536 Dysfunctional Marriage and Family Relationships. (3)*not regularly offered*

Critical review of current theory and empirical evidence connecting marital and family interaction patterns with aberrant behavior. Prerequisite: PGS 466 or PSY 573 (or its equivalent) or instructor approval.

FAS 537 Interpersonal Relationships. (3)*fall*

Critical examination of current theoretical and research developments in the area of interpersonal relationships. Emphasizes applications for research and intervention. Prerequisite: FAS 435 (or its equivalent) or instructor approval.

FAS 538 Advanced Techniques in Marriage and Family Therapy. (3)*not regularly offered*

In-depth review of assumptions and advanced techniques associated with contemporary marriage and family therapy approaches. Prerequisite: a graduate-level course in marriage and family therapy or instructor approval.

FAS 539 Research Issues in Family Interaction. (3)*fall*

Critical review of current and past research in the area of family dynamics. Emphasizes interactional processes within the family. Prerequisite: FAS 435 (or its equivalent) or instructor approval.

FAS 540 Assessment in Marriage and Family Therapy. (3)*spring*

Assessment and outcome evaluation of couples and families involved in marital and family therapy. Lecture, lab. Prerequisites: FAS 500 (or its equivalent); PSY 530; instructor approval.

FAS 580 Marriage and Family Therapy Practicum. (1–12)*fall and spring*

Supervised clinical experience in marriage and family therapy; includes development of assessment and outcome evaluation skills. Lecture, lab. Possible topics:

- (a) First semester. (3)
- (b) Second semester. (3)
- (c) Third semester. (3)

Prerequisite: instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Family Science**Doctoral Program****Richard A. Fabes***Chair***(COWDN 106) 480/965-6978****famchild@mail.com****www.asu.edu/clas/fhd****PROFESSORS**

CHRISTOPHER, FABES, GRIFFIN, HOOVER, MARTIN,
PETERSON, ROOSA

ASSOCIATE PROFESSORS

BOULIN JOHNSON, DUMKA, WILSON

ASSISTANT PROFESSORS

ESTRADA, FROSCH, HANISH,
MADDEN-DERDICH, SPINRAD, UPDEGRAFF

The faculty in the Department of Family and Human Development offer a degree program leading to the Ph.D. degree in Family Science. An area of concentration is available in marriage and family therapy (MFT), with additional programs of study available in the nonclinical aspects of family studies.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Family Science prepares clinicians and researchers in marriage and family therapy, family processes, family relationships, and human development within the context of families. Students receive advanced training in theory, clinical strategies (MFT), research methodology, and several substantive fields that are part of family science.

The program is designed for graduates to assume leadership roles as directors or clinicians in public or privately funded mental health agencies, private practice, or government, or as researchers and academicians in universities. The MFT concentration also prepares students for state certification to practice as certified marriage and family therapists.

A description of the program, along with opportunities for assistantships and fellowships, may be obtained from the director of the program.

Admission. Admission to the Ph.D. in Family Science is determined by the following criteria:

1. official transcripts of all undergraduate and graduate course work;
2. verbal, quantitative, and analytical Graduate Record Examination scores;
3. statement of goals relevant to the Ph.D. program;
4. three letters of recommendation; and
5. an application for admission to the Graduate College.

A Test of English as a Foreign Language score of at least 600 is required of all applicants whose native language is not English.

Program of Study. Each student must prepare and submit a program of study in conjunction with the chair and members of his or her supervisory committee during the first year in the program. The program of study consists of a minimum of 105 semester hours for students entering after the bachelor's degree and 63 semester hours for students entering after the master's degree. Of the 105 semester hours for a postbaccalaureate program, six are thesis credit and 24 are research and dissertation credit. Correspondingly, the 63 semester hours of the postmaster's program include 24 semester hours of research and dissertation credit. The additional hours in both the postbaccalaureate and postmaster's tracks involve

1. family science courses,
2. clinical approaches and clinical supervision courses (MFT),
3. statistics and research methods, and
4. a collateral area of study relating to family science taken outside the Department of Family and Human Development.

Foreign Language Requirements. None.

Evaluation and Comprehensive Examinations. Progress through the program involves (1) annual evaluations of the student's performance and (2) comprehensive written examinations at the end of the student's course work.

Practicum and Internship Requirements. For the MFT concentration, a total of 14 hours (postbaccalaureate) is

required in clinical supervision, practicum, and internship. Practicum is for one year, and the internship lasts nine months.

Dissertation Requirements. The doctoral dissertation must be a work of original scholarship, make a significant contribution to knowledge about families, and reflect a mastery of systemic research methods.

Final Examinations. A final oral examination in defense of the dissertation is required.

Research and Clinical Facilities. The department's clinical and research facilities include a marriage and family clinic, marital interaction laboratory, children's social development laboratory, child development laboratory, and collaborative arrangements with the ASU Prevention Intervention Research Center. The Department of Family and Human Development also provides access to sophisticated microcomputing technology within the department as well as to centralized computing services at ASU. The department offers several fellowships that provide students with collaborative research experiences under the supervision of faculty members.

COURSES

For courses, see listings under "Family and Human Development," page 219.

Fine Arts

COLLEGE OF FINE ARTS (CFA)

CFA 422 Concepts in Collaborative Multimedia. (3)
spring

Designed to bring students from different disciplines throughout the Herberger College of Fine Arts to experience the collaboration process in creating art. Lab, studio.

CFA 522 Concepts in Collaborative Multimedia. (3)
spring

Designed to bring students from different disciplines throughout the Herberger College of Fine Arts to experience the collaboration process in creating art. Lab, studio.

CFA 584 Internship. (1–12)
fall and spring

CFA 594 Special Topics. (3)
fall and spring

CFA 684 Internship. (1–12)
fall and spring

CFA 784 Internship. (1–12)
fall and spring

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

French

See "Languages and Literatures," page 247.

Geographic Information Science

Interdisciplinary Certificate Program

John Briggs
Director, Executive Committee
 (LSE 218) 480/965-3414

William Miller
Director, Executive Committee
 (AGB2 114) 480/727-1288
gis1.inre.asu.edu/GIScertificate.htm

Geography

Professor: Burns;
 Assistant Professor: Wentz

Planning and Landscape Architecture

Assistant Professors: Guhathakurta, Musacchio

Plant Biology

Professor: Klopatek

Public Affairs

Assistant Professor: DeLorenzo

Under the auspices of the Graduate College, the interdisciplinary certificate program in Geographic Information Science (GIS) is administered by an Executive Committee. The objective of this program is to enable existing ASU graduate students and GIS professionals with advanced degrees to learn how to apply GIS concepts and technology for the purposes of spatial analysis.

A minimum of 16 semester hours consisting of three required and two elective courses (three semester hours each) plus a capstone seminar (one semester hour) is required to complete the GIS Certificate. For a full description of the program course work, access the GIS Web site at gis1.inre.asu.edu/GIScertificate.htm.

Current graduate students receive priority admission to the certificate program. Students qualify for admission to the certificate program by maintaining good standing in a cooperating department and completing an application specific to the GIS Certificate. Practicing professionals who already hold a graduate degree furnish proof of an advanced degree by a formal transcript and enroll as nondegree graduate students through the Graduate College. Prospective students must complete prerequisites listed for the level one required course, or pass a proficiency test.

Geography

Master's and Doctoral Programs

Breandán Ó hUallacháin
Chair
 (SCOB 330) 480/965-7533
geography.asu.edu

REGENTS' PROFESSOR GRAF

PROFESSORS

ARREOLA, BALLING, BRAZEL, BURNS, CERVENY,
 COMEAUX, DORN, GOBER,
 Ó hUALLACHÁIN, PASQUALETTI, ZEHNDER

ASSOCIATE PROFESSORS

FALL, KUBY, MCHUGH

ASSISTANT PROFESSORS

EDSALL, ELLIS, SIERRA-MALDONADO, WENTZ

The faculty in the Department of Geography offer graduate programs leading to the M.A. and Ph.D. degrees in Geography. Departmental research and graduate education focuses upon seven areas of study: climatology, earth-surface processes, natural resources and environment, urban-economic geography, population, Latin America and the Southwestern United States, and spatial analysis methods.

Students admitted to the Master of Education degree program with a major in Secondary Education may also elect geography as the subject matter field. See "Master of Education," page 186, for information on the Master of Education degree.

MASTER OF ARTS

The M.A. program is designed to offer a specialized program of academic and professional training in geography so that the student may secure a sound graduate background for further specialization or for immediate employment. The program has sufficient flexibility to allow for individual needs and interests of the student. A minimum of 30 semester hours beyond the bachelor's degree is required. At least 24 hours must be in geography.

Admission. Applications for the M.A. program must be accompanied by the applicant's scores on the Graduate Record Examination (verbal and quantitative) and three letters of recommendation from professors. All applications are reviewed by the Graduate Recruiting and Admissions Committee and the chair of the Department of Geography. To be considered for financial assistance for the next academic year, students must be admitted by February 15.

It is presumed that all students entering the master's program have an adequate background in geography, including course work that is the equivalent of GPH 371 Cartography and GCU 495 Quantitative Methods in Geography. Additional prerequisite course work is required of students insufficiently prepared in geography. The program of study consists of the following elements:

GCU 529 Contemporary Geographic Thought	3
GCU 585 Advanced Research Methods in Geography	3
GCU 591 Seminar	3
or GPH 591 Seminar (3)	
or graduate 500-level course in geography (3)	
GCU 599 Thesis	6
or GPH 599 Thesis (6)	
Total	15

The remaining 15 hours are composed of a suitable combination of course work and/or research.

A student in the M.A. program is required to pass an oral and a written examination administered by the student's supervisory committee. The written examination consists of questions from the area of interest. The oral examination serves as a defense of the thesis.

DOCTOR OF PHILOSOPHY

Admission to the Ph.D. program requires a completed master's degree in Geography or equivalent preparation. At a minimum this preparation should include competence in cartography and quantitative methods and basic course work in human and physical geography. Students who have not already acquired these basic skills or taken these basic courses must do so during the first year of their graduate program. These courses are considered prerequisites.

To be considered for financial assistance for the next academic year, students must be admitted by February 15.

The specific academic program is carefully planned by the student in consultation with a supervisory committee. Special efforts are taken to plan a course of study compatible with the student's career objectives.

See "Doctor of Philosophy," page 103, for general requirements.

Program of Study. A minimum of 30 semester hours of course work at ASU beyond the master's degree is required, plus a minimum of 24 semester hours of credit in research and dissertation. All Ph.D. students are required to take

1. GCU 529 and
2. GCU 585;
3. and two three-semester-hour seminars (GCU 591 or GPH 591) or graduate courses (500-level) in geography.

Foreign Language Requirements. At the discretion of the student's supervisory committee, a reading proficiency in a foreign language may be required.

Field Examination. The Department of Geography requires Ph.D. students to pass a two-week field problem examination before taking the comprehensive examination.

Comprehensive Examinations. Written and oral comprehensive examinations are required. These are taken at the completion of all course work. After students have passed the comprehensive examinations and satisfied the other requirements, they are eligible to apply for candidacy.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

CULTURAL GEOGRAPHY (GCU)

GCU 421 Geography of Arizona and Southwestern United States. (3)

fall and spring

Geography of the Southwest with an emphasis on Arizona. Divided into physical geography, history, people, and economy.

General Studies: SB, C

GCU 423 Geography of South America. (3)

not regularly offered

Prerequisite: GCU 323 or instructor approval.

General Studies: SB, G

GCU 424 Geography of Mexico and Middle America. (3)

once a year

Central America and Mexico. Prerequisite: GCU 323 or instructor approval.

General Studies: SB, G

GCU 425 Geography of the Mexican American Borderland. (3)

spring

Geography of a binational and bicultural region. Examination of settlement, boundary issues, ethnic subregions, population change, industrial development, and urban growth. Fee.

General Studies: L/SB, G

GCU 426 Geography of Russia and Surroundings. (3)

not regularly offered

Examines the geography of Russia and other post-Soviet states. Prerequisite: GCU 121 or instructor approval.

General Studies: SB, G

GCU 433 Geography of Southeast Asia. (3)

spring

Examines the biophysical and social features of Southeast Asian nations and peoples. Prerequisite: GCU 326 or instructor approval.

GCU 441 Economic Geography. (3)

once a year

Spatial distribution of primary, secondary, and tertiary economic and production activities. Prerequisite: GCU 141 or instructor approval.

General Studies: SB

GCU 442 Geographical Analysis of Transportation. (3)

fall

Networks, modes, economics, and flows at the urban, national, and international scales. Prerequisite: GCU 141 or 441.

General Studies: SB

GCU 444 Geographic Studies in Urban Transportation. (3)

spring

Current urban transportation issues in metropolitan Phoenix. Lecture, team project. Prerequisite: GCU 361.

General Studies: SB

GCU 453 Recreational Geography. (3)

not regularly offered

Examines problems surrounding the organization and use of space for recreation. Introduces geographic field survey methods of data collection and analysis. Saturday field trips may be required.

GCU 455 Historical Geography of U.S. and Canada. (3)

not regularly offered

Geographical perspective on the evolution of the United States and Canada from pre-Columbian times to early 20th century.

General Studies: SB, H

GCU 474 Public Land Policy. (3)

not regularly offered

Geographic aspects of federal public lands, policy, management, and issues. Emphasis on western wilderness and resource development problems.

General Studies: SB

GCU 495 Quantitative Methods in Geography. (3)

fall and spring

Statistical techniques applied to the analysis of spatial distributions and relationships. Introduction to models and theory in geography. Prerequisite: MAT 119.

General Studies: CS

GCU 496 Geographic Research Methods. (3)

fall and spring

Scientific techniques used in geographic research. Prerequisites: GCU 495; GPH 371, 491.

General Studies: L

GCU 515 Human Migration. (3)*fall*

Economic, political, social, and geographic factors underlying population movements. Migration selectivity, streams and counter-streams, labor migration, and migration decision making. Lecture, seminar. Prerequisite: GCU 351 or instructor approval.

GCU 526 Spatial Land-Use Analysis. (3)*not regularly offered*

Determination, classification, and analysis of spatial variations in land-use patterns. Examines the processes affecting land-use change. Prerequisite: 15 hours in geography or instructor approval.

GCU 529 Contemporary Geographic Thought. (3)*fall*

Comparative evaluation of current philosophy concerning the nature and trends of geography. Prerequisites: 15 hours in geography; instructor approval.

GCU 585 Advanced Research Methods in Geography. (3)*spring*

Specialized research techniques and methodologies in economic, political, or cultural geography.

GCU 591 Seminar. (1–3)*fall, spring, summer*

Selected topics in economic, political, or cultural geography. Field trips may be required.

GCU 596 History of Geographic Thought. (3)*not regularly offered*

Historical development of geographic thought from pre-Greek days to the early 20th century.

GCU 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Geography of the Mexican-American Borderland. (3)
Fee.

GCU 599 Thesis. (6)*fall and spring*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

PHYSICAL GEOGRAPHY (GPH)**GPH 401 Topics in Physical Geography. (1–3)***once a year*

Open to students qualified to pursue independent studies. Field trips may be required. Prerequisite: instructor approval.

GPH 405 Energy and Environment. (3)*spring*

Sources, regulatory and technical controls, distribution, and consequences of the supply and human use of energy. Prerequisite: physical or life sciences courses or instructor approval.

GPH 409 Synoptic Meteorology I. (4)*fall*

Diagnostic techniques and synoptic forecasting. Includes techniques of weather analysis, map interpretation, and satellite and radar analysis. Prerequisites: MAT 270; PHY 131, 132.

GPH 410 Synoptic Meteorology II. (4)*spring*

Diagnostic techniques and synoptic forecasting. Includes techniques of weather analysis, map interpretation, and satellite and radar analysis. Prerequisite: GPH 409.

GPH 411 Physical Geography. (3)*once a year*

Introduction to physiography and the physical elements of the environment. Credit is allowed for only GPH 411 or 111. Field trips.

GPH 412 Physical Climatology. (3)*once a year*

Physical processes in the earth-atmosphere system on regional and global scales; concepts and analysis of energy, momentum, and mass balances. Prerequisites: both GPH 212 and 213 or only instructor approval.

GPH 413 Meteorological Instruments and Measurement. (3)*once a year*

Design and operation of ground-based and aerological weather measurement systems. Collection, reduction, storage, retrieval, and analysis of data. Required field trips. Prerequisites: both GPH 212 and 213 or only instructor approval.

GPH 414 Climate Change. (3)*spring*

Survey of three climate research areas: paleoclimatology, theories (e.g., greenhouse warming), numerical modeling. Prerequisite: GPH 212 or instructor approval.

*General Studies: G***GPH 418 Landforms of the Western United States. (3)***once a year*

Studies landforms and geomorphic processes in the western United States, including lecture, topographical maps, aerial photographs, satellite imagery, and field trips. Lecture, critical inquiry, laboratory, field work. Fee. Prerequisites: GPH 211 (or its equivalent); completion of General Studies L course.

*General Studies: L***GPH 422 Plant Geography. (3)***not regularly offered*

Plant communities of the world and their interpretation, emphasizing North American plant associations. Cross-listed as PLB 422. Credit is allowed for only GPH 422 or PLB 422. Prerequisites: preferably both PLB 200 and 201 or only BIO 182 or only GPH 111.

GPH 433 Alpine and Arctic Environments. (3)*not regularly offered*

Regional study of advantages and limitations of the natural environment upon present and future problems involving resource distribution, human activities, and regional and interregional adjustments. Required field trips. Prerequisite: GPH 111 or instructor approval.

*General Studies: G***GPH 471 Cartographic Design. (3)***fall*

Advanced design using desktop mapping. Cartographic decision making, qualitative and quantitative symbol design, projections, color. Prerequisites: GPH 371 or instructor approval.

*General Studies: CS***GPH 473 Geographic Information Science II. (3)***fall*

GIS as a basis for microcomputer spatial analysis and synthesis. Includes digitizing, database organization, spatial retrieval, and graphics. Prerequisite: GPH 373.

*General Studies: CS***GPH 474 Dynamic Meteorology I. (3)***fall*

Large-scale atmospheric motion, kinematics, Newton's laws, wind equation, baroclinics, vorticity, and the midlatitude depression. Prerequisites: GPH 213, 215; MAT 271; PHY 131, 132.

GPH 475 Dynamic Meteorology II. (3)*spring*

Topics in climate dynamics. General circulation, numerical modeling, teleconnection phenomena, and surface-atmosphere interaction. Prerequisite: GPH 474 or instructor approval.

GPH 481 Environmental Geography. (3)*once a year*

Problems of environmental quality, including uses of spatial analysis, research design, and field work in urban and rural systems. Required field trips. Prerequisite: instructor approval.

GPH 491 Geographic Field Methods. (3)*spring and summer*

Field techniques, including use of aerial photos, large-scale maps, and fractional code system of mapping; urban and rural field analysis to be done off campus. Fee. Prerequisites: GCU 102, 121; GPH 111.

GPH 511 Fluvial Processes. (3)*once a year*

Geographical aspects of processes of river erosion, transportation, sedimentation: emphasizing spatial characteristics of forces, resistance, landforms, sediment; includes computer applications. Prerequisites: both GPH 111 (or GLG 101) and 211 (or GLG 362) or only instructor approval.

GPH 533 Snow and Ice. (3)*spring*

Processes, distribution, climatic interactions of snow/ice emphasizing mass balance, snow stratigraphy/metamorphism and glacier/snowpack climatology. Lecture, field work. Prerequisite: instructor approval.

GPH 573 Computer Mapping and Graphics. (3)*once a year*

Utilization of the digital computer in analysis and mapping of geographic data. Includes plotting, surficial display, compositing, and graphics. Field trips. Prerequisites: GPH 371; instructor approval.

GPH 575 Geographic Applications of Remote Sensing. (3)*not regularly offered*

Uses imaging and nonimaging methods of remote acquisition of data, including satellite sensors, airborne radar, multiband scanning, conventional photographic sensors, and ground-based equipment. Required field trips. Prerequisites: GCU 585 (or GPH 491); GPH 372.

GPH 591 Seminar. (1–3)*fall and spring*

Selected topics in physical geography. Field trips may be required.

GPH 596 Advanced Spatial Statistics. (3)*spring*

Multivariate and advanced statistical techniques including Box-Jenkins modeling and spectral analysis. Project papers and presentations required. Seminar. Prerequisite: GCU 495 (or its equivalent).

GPH 598 Special Topics. (1–4)*not regularly offered***GPH 599 Thesis. (6)***fall and spring*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Geological Sciences

Master's and Doctoral Programs

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The faculty in the Department of Geological Sciences offer graduate programs leading to the M.S. and Ph.D. degrees in Geological Sciences.

Students admitted to the Master of Education degree program in Secondary Education may also elect geological sciences as the subject matter field. See "Master of Education," page 186, for information on the Master of Education degree.

The faculty also participate in the programs leading to the Master of Natural Science degree when one of the concentrations is geological sciences. See "Natural Science," page 278, for information on the Master of Natural Science degree.

Students applying for admission to the M.S., M.N.S., or Ph.D. degree program must submit scores on the Graduate Record Examination (GRE) Aptitude Test. Submission of Advanced Geology GRE scores is encouraged. The deadline for applications for the fall term is February 15.

FIELD CAMP REQUIREMENT FOR M.S. AND PH.D. STUDENTS

All Geological Sciences graduate students must have completed the equivalent of the department's six-semester-hour GLG 451 Field Geology I and 452 Field Geology II sequence. A summer field mapping course completed as part of the student's undergraduate course work may fulfill this requirement. Upon the student's admission to the graduate program, the graduate committee will evaluate previous field course work and will determine whether the student must take a field course while a graduate student at ASU. The purpose of this requirement is to ensure that all geological sciences graduate students possess basic geological mapping skills, whatever their ultimate specialty.

MASTER OF SCIENCE

The M.S. degree consists of a minimum of 30 semester hours of work beyond the bachelor's degree; 20 or more semester hours consist of course work other than research and thesis. The program is designed to provide fundamental graduate training in geology and to prepare the student for certain careers in geology or for further graduate study.

Breadth Requirement. All students must demonstrate breadth in Geological Sciences by achieving a minimum score on the Advanced Geology GRE or by taking graduate courses covering a range of subdisciplines.

Program of Study. The student, with the approval of the advisor, selects courses that make a coherent program of study. Each M.S. candidate must include on the program of study one hour of GLG 500 Geology Colloquium and six hours of GLG 592 Research and GLG 599 Thesis, at least three of which must be GLG 599 Thesis. A maximum of six hours of thesis may appear on a program of study. One-half of the credits applicable toward the degree must be in geological sciences courses; the remainder may include work either in geological sciences or related fields.

Thesis Requirements. A thesis based on field, laboratory, and library study is required.

Final Examinations. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

The Ph.D. degree consists of a minimum of 54 semester hours of work beyond the master's degree. At least 25 hours must consist of course work other than research and dissertation. The program is designed to develop creative scholarship and to prepare the student for a professional career in geology.

See "Doctor of Philosophy," page 103, for general requirements.

Breadth Requirement. All students must demonstrate breadth in Geological Sciences by achieving a minimum score on the Advanced Geology GRE or by taking graduate courses covering a range of subdisciplines.

Program of Study. The program of study is selected with the recommendation of the student's supervisory committee. Each Ph.D. candidate must include on the program of study one hour of GLG 500 Geology Colloquium and at

least 24 hours of a combination of GLG 792 Research and GLG 799 Dissertation.

Foreign Language Requirements. None.

Comprehensive Examinations. The student's supervisory committee must determine the content of the comprehensive examination, consisting of a written and an oral examination. Students are required to take the comprehensive examination during their third semester in residence in the Ph.D. program.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

Recent faculty and student research topics include the following.

Geochemistry. Isotope geochemistry and the geology of authigenic silica; environmental and aqueous geochemistry; geochemistry and microbiology of hydrothermal systems; paleoclimate records; thermodynamics of fluid-mineral interfaces; synchrotron-based X-ray spectroscopies; analytical and theoretical chemical studies of meteorites with application to Mars and early solar system evolution; geochemical exploration for ore deposits; trace element partitioning between minerals, fluids, and magmas; atmospheric geochemistry; paleoceanography; and stable isotopic applications in geobiology.

Geomorphology. Fault zone landforms and structure; earthquake surface rupture and paleoseismology; theoretical studies of faulting and hillslope development; engineering geologic field methods.

Geophysics. Earthquake surface rupture and paleoseismology; environmental geophysics; high pressure experimental geophysics; mantle structure; physics and chemistry of earth and planetary interiors; thermal modeling of subduction zones.

Mineral Physics. Electrical properties of silicate minerals, melts, and partial melts; effects of shock on hydrous minerals; shock-induced metamorphism and phase transitions in meteorites; grain boundary diffusion; kinetic processes and reaction mechanisms; mineral deformation and deformation microstructures; high temperature, high pressure studies of mantle materials.

Mineralogy. High-resolution transmission electron microscopy; order/disorder in clays and related minerals; amorphous to crystalline transitions; graphitic carbon and the structures of poorly crystalline materials; polytypism and stacking sequences in sheet silicates (micas, chlorites, clays); mechanisms of phase transitions; surface studies: scanning tunneling and atomic force microscopy of mineral surfaces; determination of oxidation states and specific site environments through electron energy-loss spectroscopy (EELS); TEM cathodoluminescence studies of defects; airborne minerals: small airborne particles, air quality, air pollution; mineral thermodynamics and spectroscopy; high pressure mineralogy; phase transformation studies.

Paleontology/Paleoecology. Geobiology and the role of organisms in sedimentary processes; early biosphere evolution and the fossil record of early multicellular life; invertebrate paleontology; evolutionary paleoecology; stable isotopic and geochemical techniques; biological response to global change; ichnology; exopaleontology and the exploration for fossil records of extraterrestrial life.

Petrology. High temperature, high pressure phase equilibrium experiments, and models for the origin of major igneous rock types; volatile diffusion in silicate melts; experimental determination of mantle minerals and melts; field and analytical studies of temperature, pressure, and fluids during metamorphism; computer modeling of heat and mass transfer at convergent plate margins; subduction zones; continental extension; mineral equilibria in ore deposits.

Planetary Studies. Compositional and physical properties of the terrestrial planets; comparative geomorphology of the moon, Earth, Mars, Mercury, Venus, and the outer planet satellites; Venus tectonics; thermal infrared spectroscopy of planetary materials; planetary volcanic processes; laboratory simulation of eolian processes on Venus, Mars, and Earth; impact cratering experiments; meteorite studies.

Remote Sensing. Geologic mapping based on integrated field and remote sensing studies; multispectral mineralogical investigations; urban environmental studies.

Structure and Tectonics. Structural and tectonic evolution of Arizona and the North American Cordillera; regional geology of the Transantarctic Mountains; Cordilleran tectonics; relation between fluid and tectonic processes; active tectonic processes.

Volcanology. Explosive eruption processes; mechanisms of dike intrusion; structures in lava flows; multiphase flow in volcanic and geothermal systems; textures and volatile contents of volcanic domes; mineralization related to rhyolite domes; laboratory simulation of lava flow processes; field studies throughout the western United States, Hawaii, and Central and South America.

Astrobiology Institute. Astrobiology is broadly defined as "the study of the origin, evolution, and distribution of life in the universe." ASU is one of 11 partnering institutions in the United States composing the NASA Astrobiology Institute (NAI). In addition to supporting basic research in astrobiology, the NAI seeks to enhance opportunities for graduate students desiring cross-disciplinary training in such areas as the organic chemistry of extraterrestrial materials, origin of life studies, early biosphere evolution, and the exploration for life elsewhere in our solar system and beyond. The ASU Astrobiology Program is made up of a distributed faculty drawn from the Departments of Geological Sciences, Chemistry and Biochemistry, Biology, and Physics and Astronomy. The ASU Astrobiology Program also provides opportunities for regular interactions with other institute partners around the country through the use of advanced telecommunications and the next generation Internet.

Center for Solid-State Science, Materials Research Science and Engineering Center, and Affiliated Departments. Analytical equipment routinely used by Geological Sciences students includes: a JEOL JSX-8600 electron microprobe analyzer/SEM equipped with an image analysis system; 10 transmission electron microscopes specialized for high-resolution imaging ($\leq 1.7 \text{ \AA}$ resolution), EELS and

EDS chemical analysis; surface analytical microscopies (XPS, Auger and probe microscopies. Automated X-ray diffraction and fluorescence facilities are available, as is an ion microprobe. The high-pressure laboratory for experimental petrology is equipped with a complete range of vessels for investigations ranging from hydrothermal alteration to partial melting of planetary mantles.

Space Photography Laboratory. The Space Photography Laboratory contains an extensive research collection of photographs of the moon, Mars, Mercury, and outer planet satellites. A dedicated image processing facility with interactive and hardcopy capabilities is available for research utilizing spacecraft images.

Center for Meteorite Studies. The Department of Geological Sciences houses one of the largest collections of meteorites in the world. Geochemical and cosmochemical research is being undertaken in the Center for Meteorite Studies, including the following topics: trace element geochemistry, nature of asteroidal interiors, computer models of condensation in the nebula, meteorite mineralogy, organic compound investigations, chemical fractionation in meteorites, elemental partitioning in meteoritic minerals, transmission electron microscopy of chondritic meteorites, and fluid-rock interactions on asteroids and Mars.

GEOLOGICAL SCIENCES (GLG)

GLG 405 Geology of the Moon. (3)

not regularly offered

Current theories of the origin and evolution of the moon through photogeological analyses and consideration of geochemical and geophysical constraints. Possible field trips to examine Arizona geology. Fee. Prerequisite: GLG 105 or instructor approval.

GLG 406 Geology of Mars. (3)

not regularly offered

Geological evolution of Mars through analyses of spacecraft data, theoretical modeling, and study of terrestrial analogs; emphasis on current work. Possible field trips to examine Arizona geology. Fee. Prerequisite: GLG 105 or instructor approval.

GLG 410 Computers in Geology. (3)

fall

Geological computer skills including data processing, visualization, presentation, numerical analysis, software and hardware applications. 2 hours lecture, 3 hours lab. Prerequisites: both GLG 101 and one upper-division geology course or only instructor approval.

GLG 412 Geotectonics. (3)

not regularly offered

Earthquakes, earth's interior, formation of oceanic and continental crust, and plate tectonics. Emphasis on current work. Prerequisite: GLG 310.

GLG 416 Field Geophysics. (3)

spring

Methods of applied geophysical exploration; seismic refraction, gravity, electrical resistivity, geomagnetics. Includes survey planning, data acquisition, processing, analysis, and interpretation. Lecture, field exercises. Prerequisite: one course in geology or instructor approval.

GLG 418 Geophysics. (3)

fall

Solid earth geophysics; geomagnetism, gravity, seismology, heat flow. Emphasis on crust and upper mantle. Prerequisites: a combination of GLG 310 and MAT 272 and PHY 131 or only instructor approval.

GLG 419 Geodynamics. (3)

not regularly offered

Emphasis on application of continuum principles to geological problems, including lithospheric stresses, heat transfer, fluid mechanics, and rock rheology. Prerequisite: PHY 131.

GLG 420 Volcanology. (3)

once a year

Distribution of past and present volcanism, types of volcanic activity, mechanism of eruption, form and structure of volcanoes, and geochemistry of volcanic activity. Possible weekend field trips. Fee. Prerequisite: GLG 424.

GLG 424 Petrology. (3)

fall

Origin of igneous and metamorphic rocks. Optical mineralogy, hand specimen identification, and thin-section analysis. 2 hours lecture, 3 hours lab, possible weekend field trips. Fee. Prerequisite: GLG 321.

GLG 435 Sedimentology. (3)

spring

Origin, transport, deposition, and diagenesis of sediments and sedimentary rocks. Physical analysis, hand specimen examination, and interpretation of rocks and sediments. 2 hours lecture, 3 hours lab, possible weekend field trips. Fee. Prerequisites: GLG 102, 321.

GLG 441 Ore Deposits. (3)

not regularly offered

Origin, occurrence, structure, and mineralogy of ore deposits. Possible weekend field trips. Fee. Prerequisite: GLG 424 or instructor approval.

GLG 451 Field Geology I. (3)

spring

Geological mapping techniques using topographic maps and aerial photos. Intensive field-based instruction. Lab. Prerequisites: GLG 310, 321.

GLG 452 Field Geology II. (3)

summer

Continuation of GLG 451. Lab. Prerequisite: GLG 451.

GLG 455 Advanced Field Geology. (3–4)

once a year

Geologic mapping in igneous, sedimentary, and metamorphic terrains of the Basin and Range province of Arizona. May be repeated for credit. Weekend field trips. Fee. Prerequisite: instructor approval.

GLG 456 Cordilleran Regional Geology. (3)

not regularly offered

Systematic coverage through space and time of the geological development of western North America, emphasizing the western United States. Fee. Prerequisite: senior major or graduate student in Geological Sciences or instructor approval.

GLG 470 Hydrogeology. (3)

spring

Geology of groundwater occurrence, aquifer and well hydraulics, water chemistry and quality, contaminant transport, remediation. Emphasis on quantitative methods. Prerequisites: GLG 101 (or 103); MAT 270; PHY 121.

GLG 481 Geochemistry. (3)

spring

Origin and distribution of the chemical elements. Geochemical cycles operating in the earth's atmosphere, hydrosphere, and lithosphere. Cross-listed as CHM 481. Credit is allowed for only CHM 481 or GLG 481. Prerequisite: CHM 341 (or 346) or GLG 321.

GLG 485 Meteorites and Cosmochemistry. (3)

not regularly offered

Chemistry of meteorites and their relationship to the origin of the earth, solar system, and universe. Cross-listed as CHM 485. Credit is allowed for only CHM 485 or GLG 485.

GLG 490 Topics in Geology. (1–3)

fall, spring, summer

Special topics in a range of fields in geology. May be repeated for credit. Fee. Prerequisite: instructor approval.

GLG 500 Geology Colloquium. (1)

fall and spring

Presentation of recent research by faculty and invited guests. 1 semester required for all Geological Sciences graduate students. May be repeated for a total of 2 semesters. Research paper required. Prerequisite: instructor approval.

GLG 501 Geology of Arizona. (3)

once a year

Basic and historical geology, fossils, mining, energy resources, environmental problems, landscape development, and meteorites, cast in examples from Arizona. Research paper required.

GLG 504 Geology of the Grand Canyon. (2)*not regularly offered*

Review of the discovery, history, origin, and geology of the Grand Canyon of the Colorado River in Arizona. 6-day field trip down the river (first 6 days after commencement in May) required at student's expense. Field research and term paper on trip also required.

GLG 510 Advanced Structural Geology. (3)*not regularly offered*

Mechanics of rock deformation, emphasizing relationship between field observation, theory, and experiment. Stress, strain, simple constitutive relationships, failure criteria, and the basis of continuum methods. Possible field trips. Fee. Prerequisites: both GLG 310 and 424 or only instructor approval.

GLG 520 Advanced Physical Volcanology. (2-3)*not regularly offered*

Selected volcanologic topics, including explosive eruption processes, lava flow mechanics, and intrusive mechanisms. Possible field trips. Fee. Prerequisite: GLG 420 or instructor approval.

GLG 524 Advanced Igneous Petrology. (3)*not regularly offered*

Theoretical and practical aspects of the genesis of igneous rocks. Study of selected sites. Modern laboratory techniques. 2 hours lecture, 3 hours lab, possible weekend field trips. Fee. Prerequisite: GLG 424.

GLG 581 Isotope Geochemistry. (3)*not regularly offered*

Geochemistry and cosmochemistry of stable and radioactive isotopes; geochronology; isotope equilibria. Prerequisite: instructor approval.

GLG 582 Physical Geochemistry. (3)*not regularly offered*

Applies thermodynamic and kinetic principles to geochemical processes. Prerequisite: CHM 341 (or 346) or GLG 321.

GLG 583 Phase Equilibria and Geochemical Systems. (3)*not regularly offered*

Natural reactions at high temperatures and pressures; silicate, sulfide, and oxide equilibria. Cross-listed as CHM 583. Credit is allowed for only CHM 583 or GLG 583. Prerequisite: instructor approval.

GLG 591 Seminar. (1-3)*fall, spring, summer*

Topics in a range of fields in geology. May be repeated for credit. Fee. Prerequisite: instructor approval.

GLG 592 Research. (1-12)*fall, spring, summer***GLG 598 Special Topics. (1-4)***fall, spring, summer*

Special topics in geological sciences. May be repeated for credit. Possible topics:

- (a) Advanced Field Geology. (1-3)
Fee.
- (b) Clastic Sedimentology and Petrology. (1-3)
Fee.
- (c) Cordilleran Regional Geology. (1-3)
Fee.
- (d) Fundamental Planetary Geology. (1-3)
- (e) Geology of Mars. (1-3)
Fee.
- (f) Methods in Geoscience Teaching. (1-3)
- (g) Ore Deposits. (1-3)
Fee.
- (h) Orogenic Systems. (1-3)
- (i) Petrology-Petrography. (1-3)
Fee.
- (j) Principles of Stratigraphy. (1-3)
Fee.
- (k) Remote Sensing. (1-3)
- (l) Sedimentology. (1-3)
Fee.
- (m) Volcanology. (1-3)
Fee.

Prerequisite: instructor approval.

GLG 599 Thesis. (1-12)*fall, spring, summer***GLG 792 Research. (1-12)***fall, spring, summer***GLG 799 Dissertation. (1-15)***fall, spring, summer*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

German

See "Languages and Literatures," page 247.

Gerontology

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Janet H. Shirreffs

Director, ASU West

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Fax 602/543-6612

www.west.asu.edu/chs/grn

ASU MAIN

Anthropology

Professor: Carr

Communication

Professor: Arnold

Design

Associate Professor: Cutler

Economics

Professor: Hogan

English

Professor: Kehl

Exercise Science and Physical Education

Regents' Professor: Landers;

Professors: Corbin, Stelmach;

Assistant Professors: Etnier, Phillips, Swan

Family and Human Development

Professor: Hoover

Geography

Associate Professor: McHugh

Health Administration and Policy

Professors: Schneller, Williams

History

Professor: Gratton

Marketing

Associate Professor: Stephens

Music

Professor: Crowe;
Assistant Professor: Rio

Nursing

Professor: Gale;
Associate Professors: Killeen, Komnenich, McCarthy

Nutrition (ASU East)

Professors: Manore, Vaughan

Psychology

Professors: Karoly, Okun, Reich, Sadalla, Zautra;
Associate Professor: Leshowitz

Psychology in Education

Professor: Strom

Sociology

Professors: Kronenfeld, Kulis;
Associate Professors: Blair, Keith, Miller-Loessi, Sullivan

ASU WEST**Communication Studies**

Associate Professor: Waldron

Education

Associate Professor: Achilles

Life Sciences

Professor: Graves;
Assistant Professor: Hughes

Psychology

Professor: McGovern;
Assistant Professor: Burluson

Recreation and Tourism Management

Professors: Gitelson; Knopf, Searle, Shirreffs

Social and Behavioral Sciences

Assistant Professors: Burluson, Carter;
Senior Lecturer: Luken

Social Work

Professor: Brawley

Sociology

Assistant Professor: Carter

An interdisciplinary, 21-semester-hour Certificate in Gerontology may be earned by graduate students who wish to study the psychological, sociological, biological, and policy-related aspects of aging and the health, economic, and social concerns of older people. Graduate students enrolled in the certificate program simultaneously pursue a major in an academic unit offering an advanced degree, whereas non-degree graduate students, typically, are either working with or seeking to work with older people. The Certificate in Gerontology provides a broad academic foundation for students who wish to apply the knowledge and skills acquired in their major and/or work experience to a variety of aging-related pursuits. Course work is evenly divided between required and elective courses. For their electives, students choose courses from the gerontology-related offerings of several departments. For more information, contact the ASU director, Gerontology Program, ASU Main, 480/965-3225, or ASU West, 602/543-6600.

GERONTOLOGY (GRN)**ASU Main****GRN 430 Multidisciplinary Approaches to Gerontology. (3)**

once a year
Examines literature that each discipline brings to the study of gerontology. Covers both theory and practice. Lecture, discussion.
General Studies: SB

GRN 431 Caregiving. (3)

once a year
Examines theory and practice of caregiving for the senior population. Lecture, discussion.

GRN 440 Aging and Wellness. (3)

fall and spring
One-on-one service/experiential learning with seniors from the community. May be repeated for credit. Lecture, lab.

GRN 450 Biology of Aging. (3)

spring
Examines normal biological aging and changes in the functional capabilities in the elderly. Lecture, lab.

GRN 460 Alzheimer's and Related Dementias. (3)

fall and spring
Familiarizes students with Alzheimer's disease and related dementias from a caregiver's perspective. Lecture, lab.

GRN 484 Undergraduate Internship. (3-6)

fall, spring, summer

GRN 494 ST: Undergraduate Special Topics. (3)

fall and spring

GRN 498 PS: Undergraduate Pro-Seminar. (3)

spring

GRN 499 Undergraduate Individualized Instruction. (3)

fall, spring, summer

GRN 530 Multidisciplinary Approaches to Gerontology. (3)

once a year
Examines literature that each discipline brings to the study of gerontology. Covers both theory and practice. Lecture, discussion.

GRN 531 Caregiving. (3)

once a year
Examines theory and practice of caregiving for the senior population. Lecture, discussion.

GRN 540 Aging and Wellness. (3)

fall and spring
One-on-one service/experiential learning with seniors from the community. Lecture, lab. Cross-listed as SWG 517. Credit is allowed for only GRN 540 or SWG 517.

GRN 550 Biology of Aging. (3)

spring
Examines normal biological aging and changes in the functional capabilities in the elderly. Lecture, lab.

GRN 560 Alzheimer's and Related Dementias. (3)

fall and spring
Familiarizes students with Alzheimer's disease and related dementias from a caregiver's perspective. Lecture, lab.

GRN 584 Graduate Internship. (3-6)

fall, spring, summer

GRN 590 Graduate Reading and Conference. (3)

fall, spring, summer

GRN 591 Graduate Seminar. (1-6)

fall and spring

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Health Services Administration

Master's Program

Eugene Schneller

Director

(BA 318) 480/965-7778

Fax 480/965-6654

asuhap@asu.edu

www.cob.asu.edu/mba/day_mhlsa/mhlsa_info.cfm

PROFESSORS

FORSYTH, JOHNSON, KIRKMAN-LIFF,

SCHNELLER, WILLIAMS

ASSISTANT PROFESSOR

RIVERS

The faculty in the School of Health Administration and Policy, College of Business, offer a graduate program leading to the Master of Health Services Administration degree. This degree is offered only in conjunction with the ASU M.B.A.

MASTER OF HEALTH SERVICES ADMINISTRATION

The ASU M.B.A./M.H.S.A. is a concurrent degree program structured to prepare students to become managers and leaders in contemporary health-related industries and systems. The curriculum is designed to equip graduates with knowledge of the broad continuum of healthcare products and services, advanced managerial knowledge and analytical skills, as well as in-depth preparation in one of the four ASU M.B.A. areas of study: financial management and markets, information management, services marketing and management, and supply chain management. Students graduate from this program prepared to assume advanced leadership roles in a wide range of settings, including biotechnology corporations, consulting firms, delivery systems, health financing, health information organizations, and pharmaceutical industry. This preparation consists of the core ASU M.B.A. curriculum, a series of eight M.H.S.A. courses, a summer internship, and one of the ASU M.B.A. areas of study.

Admission. For the general requirements, see "Admission to the Graduate College," page 92. Applicants are required to submit evidence of their ability to pursue a graduate degree program in health services administration successfully. All students must take the GMAT. For more information, call 609/771-7330 or write

EDUCATIONAL TESTING SERVICE
PO BOX CN 6108
PRINCETON NJ 08541-6108

Students must apply separately to the ASU M.B.A. and M.H.S.A. degree programs. Applicants must submit two applications for admission and two copies of all transcripts directly to the Graduate College. Two recommendations commenting on the student's motivation, commitment, achievements, work experience, and opportunity for success

in the program are required. The application package includes the M.B.A. supplemental application, which contains a box that must be checked, indicating your interest in the M.H.S.A. degree program. In addition, applicants are required to submit a statement of personal objectives and professional interest statement that reflects your interest in health-related industries and systems. Students should identify their preliminary interest in one of the four M.B.A. specialization areas. Application deadlines are December 15, March 1, and May 1. Because the ASU M.B.A./M.H.S.A. program begins in early June, preference for admission and financial assistance will be given to applicants applying by the March 1 deadline. It is recommended that students visit the campus for a personal interview. In cases where this creates a hardship, a student may ask for a telephone interview with an M.H.S.A. faculty member when the application file is complete. Materials describing the Master of Health Services Administration are available by calling 480/965-7778, accessing the Web site at www.cob.asu.edu/mba/day_mhlsa/mhlsa_info.cfm, sending e-mail to asuhap@asu.edu, or writing

SCHOOL OF HEALTH ADMINISTRATION
AND POLICY
COLLEGE OF BUSINESS
ARIZONA STATE UNIVERSITY
PO BOX 874506
TEMPE AZ 85287-4506

Program of Study. The program of study for the concurrent ASU M.B.A./M.H.S.A. consists of a minimum of 72 semester hours. The total amount of hours a student is required to take is dependent upon his or her choice of ASU M.B.A. specialization area. The program of study for the ASU M.B.A./M.H.S.A. is a 23-month program consisting of the following components:

M.H.S.A. component	24
M.B.A. core	36
M.B.A. concentration	27-30

Additional semester hours (prerequisites) may be required to strengthen preparation in a given specialty. Subject to availability, students may complete an optional residency/fellowship for a period of up to one year (following completion of the degree program).

Prerequisites. Students lacking sufficient background in business fundamentals are encouraged to take a basic financial accounting course. Those without a basic course in computer skills are required to complete CIS 200. Students must demonstrate strong quantitative ability. This may be accomplished by taking a calculus course (MAT 210).

Foreign Language Requirements. None.

Comprehensive Examinations. All students must successfully complete the integrative seminar, which meets the comprehensive requirement established by the College of Business and Graduate College for the M.H.S.A. degree.

Thesis Requirements. None.

Other Concurrent Degree Programs

The College of Law and the School of Health Administration and Policy offer graduate students a program in Law and Health Services Administration that leads concurrently

to the degrees of Juris Doctor/Master of Health Services Administration. Students in the concurrent degree program must be regularly admitted to both the J.D. and the M.H.S.A. degree programs. It is recommended that application to the concurrent degree program be made no later than the end of the first year of law school or first year of enrollment in the M.H.S.A. program. All applicants must comply with the minimum requirements and admission procedures of the Graduate College. Full-time students can expect to complete the concurrent J.D./M.H.S.A. program in four years.

HEALTH SERVICES ADMINISTRATION (HSA)

HSA 502 Health Care Organization. (3)

once a year

Concepts, structures, functions, and values which characterize contemporary health care systems in the United States.

HSA 505 Managerial and Population Epidemiology. (3)

once a year

Quantitative tools to make health care management decisions including biostatistics, epidemiology, and cost-effectiveness analysis. Prerequisite: HSA 561 or basic statistics course.

HSA 512 Health Care Economics. (3)

once a year

Economics of production and distribution of health care services, with special emphasis on the impact of regulation, competition, and economic incentives. Prerequisite: HSA 502.

HSA 520 Health Care Organizational Structure and Policy. (3)

once a year

Functional relationships among managerial elements of health care institutions with major focus on hospital governance and policy dynamics. Prerequisite: HSA 502.

HSA 522 Health Care Management Systems. (3)

once a year

Systems concepts, quantitative methods, and information systems applied to management problems in health institutions and community health planning. Prerequisites: HSA 505; QBA 502.

HSA 532 Financial Management of Health Services. (3)

once a year

Acquisition, allocation, and management of financial resources within the health care enterprise. Budgeting, cost analysis, financial planning, and internal controls. Prerequisites: ACC 503; FIN 502; HSA 502.

HSA 540 Health Care Outcomes. (3)

once a year

Project-oriented course on application of efficiency-based methods for the evaluation of the outcomes of health care. Seminar, individual student research. Prerequisite: HSA 512 or enrollment in Ph.D. program.

HSA 542 Health Care Jurisprudence. (3)

once a year

Legal aspects of health care delivery for hospital and health services administration. Legal responsibilities of the hospital administrator and staff. Prerequisites: HSA 505, 520.

HSA 560 Health Services Administration and Policy. (3)

fall and spring

Introduction to organizational theory and management of complex organization within the historical and contemporary contexts of the U.S. public health.

HSA 561 Biostatistics. (3)

fall

Aspects of descriptive statistics and statistical inference most relevant to health issues, including data, rates, and confidence intervals.

HSA 562 Health Care Organization and Systems. (3)

once a year

Functional relationships among managerial elements of health care institutions with major focus on hospital governance and policy dynamics.

HSA 563 Health Care Economics. (3)

fall

Introduction to concepts and methods used to direct and understand production and distribution of health care services.

HSA 564 Health Care Finance. (3)

once a year

Overview of the acquisition, allocation, and management of financial resources by health care providers. Focuses on economic, financial, and accounting principles.

HSA 565 Policy Issues in Health Care. (3)

once a year

Current policy issues in health through concepts of access, cost, and quality; issues relating to disease trends and policy formulation.

HSA 566 Basic Principles of Epidemiology. (3)

spring

Basic principles of epidemiology, evaluation of etiology, natural history, intervention therapy, and disease prevention. Lecture, lab. Prerequisite: Master of Public Health major or instructor approval.

HSA 571 Managed Care. (3)

not regularly offered

Trends in managed care/integrated systems, complexities of balancing objectives (e.g., financial and quality). A two-semester-long marketplace simulation. Prerequisite: HSA 502.

HSA 573 Comparative Health Systems. (3)

once a year

Comparison of health care financing and delivery in industrialized countries; covers insurance, hospital management, and physician payment. Lecture, discussion.

HSA 575 Chronic Care Administration. (3)

not regularly offered

Management of long-term care services and facilities, including behavioral health and rehabilitation programs.

HSA 589 Integrative Seminar. (3)

fall, spring, summer

Capstone assessment of current policies, problems, and controversies across the broad spectrum of health services administration. Prerequisites: HSA 505, 520, 522, 532.

HSA 591 Seminar. (1–12)

once a year

Possible topics:

- (a) Behavioral Health. (3)
- (b) Cost Containment and Quality Assurance. (3)
- (c) Health Care Economic Outcomes. (3)
- (d) Health Care Policy. (3)
- (e) Managing Physicians. (3)
- (f) Topics in Health Services Research. (3)

HSA 593 Applied Project. (3)

fall, spring, summer

Optional on-site experience in advanced development of managerial skills in health services administration and policy. Minimum of 10 weeks. Prerequisites: 18 hours of credit toward program of study; director approval.

HSA 598 Special Topics. (1–4)

once a year

Possible topics:

- (a) Epidemiology. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Higher and Postsecondary Education

Master's and Doctoral Programs

Robert Fenske
Program Coordinator
 (ED 144C) 480/965-5327
 robert.fenske@asu.edu
 www.ed.asu.edu/elps

PROFESSORS

FENSKE, HANSON, TURNER, VALVERDE, WEBB

ASSOCIATE PROFESSORS

HARTWELL-HUNNICUTT, WILKINSON

RESEARCH PROFESSOR

de los SANTOS

The faculty in the Division of Educational Leadership and Policy Studies offer graduate programs leading to the Master of Education and Doctor of Education degrees in Higher and Postsecondary Education.

Candidates for the M.Ed. and Ed.D. programs may be required to take certain College of Education core courses depending upon previous experience and education. Pre-approval by an advisor is required. The M.Ed. program requires 33 semester hours of course work, including a practicum. Candidates for all degrees must pass a written comprehensive examination, and candidates for the Ed.D. must also pass a final oral examination in defense of the dissertation.

Students interested in the Ph.D. degree with a field of study encompassing higher education should refer to the major in "Educational Leadership and Policy Studies," page 190. See "Doctor of Philosophy," page 103, for information on the Ph.D. degree.

MASTER OF EDUCATION

Applicants for admission to the M.Ed. degree program must submit scores on either the Graduate Record Examination (GRE) or the Miller Analogies Test; scores on the GRE are preferred.

For more information, see "Master of Education," page 186.

DOCTOR OF EDUCATION

Applicants for admission to the Doctor of Education program must submit scores on the GRE.

See "Doctor of Education," page 187, for information on the Doctor of Education degree.

RESEARCH ACTIVITY

Current faculty research includes a focus on the impact of affirmative action policies on student recruitment, enrollment, and retention; equity and access for students of color within the educational system; minorities as research subjects in higher education; student financial aid policies; hiring policies and diversity; and K-16 reform policy.

HIGHER AND POSTSECONDARY EDUCATION (HED)

HED 510 Introduction to Higher Education. (3)

fall

Overview of American higher education, including philosophical, political, and social aspects.

HED 515 Student Diversity in Higher Education. (3)

spring

Orients students to the demographic profile of college students and addresses diverse students' access, retention, and graduation. Lecture, collaborative learning.

HED 527 Seminar: Student Affairs Administration. (3)

fall

Organizational models, administrative competencies and skills, and emerging challenges of student affairs administration. Lecture, discussion, group projects, written assignments.

HED 533 The Community-Junior College. (3)

fall and spring

History, functions, organization, and current issues. Meets Arizona community college course requirement for certification.

HED 602 Institutional Research/Strategic Planning. (3)

fall

Provides an overview of policy research and planning in higher education at the campus system and governing/coordinating agency levels. Lecture, group discussion, research projects. Prerequisite: HED 510.

HED 603 Computer-Assisted Qualitative Data Analysis. (3)

spring

Emphasizes the applied and computing aspects of qualitative research design, data analysis, and reporting of results. Lecture, lab, demonstrations. Prerequisite: COE 503 (or its equivalent).

HED 611 Curriculum and Instruction. (3)

spring

Curriculum development, instructional organization, and improvement of instruction in higher education. Prerequisite: HED 510.

HED 644 Higher Education Finance and Budgeting. (3)

spring

Financial planning and budgeting in higher education institutions. Issues related to financing public and private colleges and universities. Prerequisite: HED 510.

HED 649 Law of Higher Education. (3)

fall

Analyzes legal issues related to higher education; examines key court decisions. Prerequisite: HED 510.

HED 679 The American College Student. (3)

spring

Overview of American college student from demographic, background characteristics, and values/attitudes/perspectives. Includes access, persistence, and degree completion. Lecture, group discussion, research projects. Cross-listed as CED 656. Credit is allowed for only CED 656 or HED 679.

HED 687 Governance, Coordination, and External Influences in Higher Education. (3)

spring in odd years

Study of governance and coordination in higher education systems and the impact of external forces on them. Lecture, discussion.

HED 688 Organizational Theory. (3)

spring

Major views of organizations and their influence on role definition and participant behaviors in educational organization. Seminar, discussion. Cross-listed as SPF 622. Credit is allowed for only HED 688 or SPF 622.

HED 689 Leadership in Higher Education. (3)

fall

Theory and practice of leadership and administration in higher education institutions.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

History

Master's and Doctoral Programs

Noel J. Stowe
Chair

(SS 204) 480/965-5778

graduate.history@asu.edu

www.asu.edu/clas/history/graduate/graduate.html

CORE FACULTY

Regents' Professor: Iverson;

Professors: Adelson, Batalden, Burg, Davis, Dellheim, Fuchs, Giffin, Gratton, Kleinfeld, Lavrin, Luckingham, MacKinnon, Rosales, Ruiz, Simpson, Stowe, Tambs, Tillman, Trennert, Warnicke;

Associate Professors: Barnes, Carroll, Gray, Gullett, Hendricks, Kahn, Longley, Rush, Samuelson, Smith, Soergel, Stoner, Thornton, VanderMeer, Warren-Findley;

Assistant Professors: Manchester, Thompson, Wilson;

Senior Instructional Professional: Luey

AFFILIATED FACULTY

Biology

Professor: Pyne

Chicana and Chicano Studies

Associate Professors: Escobar, Ruiz

Women's Studies

Professor: Rothschild

The faculty in the Department of History offer graduate programs leading to the M.A. and Ph.D. degrees in History. M.A. candidates are offered an opportunity to develop knowledge of a specific historical field, to study comparative history, and to learn research techniques. Students with various goals benefit from this degree program, including those planning to advance to Ph.D. study, those seeking positions in the public sector, or in business, and those now holding or looking for educational posts in elementary and secondary schools and community colleges.

Students admitted to the Master of Education (M.Ed.) degree program with a major in Secondary Education may elect history as the subject matter field.

MASTER OF ARTS

See "Master's Degrees," page 100, for general requirements.

Admission. Applications for the master's program must be accompanied by the applicant's scores on the Graduate Record Examination (GRE); three letters of recommendation from faculty members or others who are qualified to judge the applicant's potential for advanced study in history; a résumé; a writing sample; and a statement of purpose.

Forms and instructions for filling them out are available from the graduate administrative assistant, the Graduate College Web site (www.asu.edu/graduate) and the Department of History Web site (www.asu.edu/clas/history). M.Ed. applicants must submit scores from both the GRE aptitude and advanced history tests. For M.Ed. program

requirements, see "M.Ed. Degree in Secondary Education," page 234.

All applications and supporting materials are reviewed by the graduate committee of the department. The committee recommends to the Graduate College that the student be granted regular or provisional admission or be denied admission.

Areas of Concentration. In consultation with the supervisory committee, the candidate may select a field of history from the following: Asian, British, European, Latin American, public history, United States, and U.S. Western. For information on the concentration in public history, see "Public History Concentration," on this page. Under the United States concentration, students may choose to specialize in a variety of areas; some examples are African-American, American Indian, Chicana/Chicano, and women.

Program of Study

M.A. Degree in History. A minimum of 30 semester hours of graduate course work are required for the M.A. in History. Upon matriculation, the student, in consultation with the graduate director, selects a faculty advisor in the student's area of concentration. The faculty advisor directs the student toward completion of required course work. The 30 semester hours must conform to the following guidelines:

1. A minimum of 24 semester hours of course work in history is required. With the approval of the supervisory committee, candidates may add to the 24 semester hours, six hours of closely related course work in another academic unit (this does not apply to students in the public history concentration).
2. Eighteen of the 24 semester hours must be in 500-level history courses. If 400-level courses are included in the program of study, documented proof must be provided that they were taken for graduate credit. Contact the graduate administrative assistant for details.
3. Six of the 18 semester hours must be in comparative courses (HST 551 to HST 555). This requirement does not apply to students with a concentration in public history.
4. At least three of the 24 semester hours must be in HST 591 Seminar (in the major field of study).
5. At least six semester hours of HST 599 Thesis are required of students writing an M.A. thesis. The thesis equivalent substitutes six semester hours of HST 592 in place of six hours of HST 599 and incorporates an additional three semester hours of HST 591 into the program.

Public History Concentration. Candidates admitted to the M.A. degree in History with a concentration in public history select two areas of emphasis, one of which is public history, and must complete HST 502 and at least two short courses (of one semester hour). Beyond these requirements, each of the six emphases within public history has other specific requirements, which are listed in the department's graduate handbook. The following is a list of the differing minimum number of hours for a degree in each of the six emphases: business, 41 semester hours; community history, 40; historic preservation, 40; historical administration, 37; historical editing and publishing, up to 44; public sector, 39.

Course work taken outside of the department for inclusion in the program of study must be approved in advance by the appropriate program director.

M.Ed. Degree in Secondary Education. Candidates for the M.Ed. degree in Secondary Education with an emphasis in history must complete 15 semester hours of history course work. Three of the 15 semester hours must be in historiographic survey (HST 512 to HST 515). Three of the 15 semester hours must be in either comparative courses (HST 551 to HST 555) or a research seminar (HST 591). Overall, 12 of the 15 semester hours must be in 500-level history courses. If 400-level courses are included in the program of study, documented proof must be provided that they were taken for graduate credit. Contact the department for specific details. All candidates for the M.Ed. must maintain at least a 3.00 G.P.A. in HST courses.

Foreign Language Requirements. The student is expected to have a reading knowledge of one foreign language, but some other research skills may be substituted for this requirement by the supervisory committee.

Thesis Requirements. A master's thesis or its equivalent is required. Students have two options: They can either write a M.A. thesis or the M.A. thesis equivalent. The M.A. thesis is approximately 100 pages in length and is based on original research. Students who choose this option must enroll for six hours of thesis work (HST 599).

The M.A. thesis equivalency is composed of two parts: (1) two three-hour seminars (HST 591) on a broad topic and (2) two three-hour research courses (HST 592) on a topic derived from the first research course.

Both the M.A. thesis and the M.A. thesis equivalent must be prepared according to Graduate College requirements, defended, and approved by a thesis committee. Bound copies of both are placed in Hayden Library and the Department of History.

Final Examinations. A final oral defense of the thesis or the thesis equivalent is required.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in History offers candidates the opportunity to study past and contemporary civilizations and to learn research and writing techniques that may be used in scholarly careers at leading academic institutions, in historical societies and agencies, in the public sector, and in business.

Major emphasis is placed upon developing a disciplined and inquiring mind, expertise in a chosen subject area, and competence in research methodology. The program is composed of small classes that bring students into a close working relationship with faculty and other students and offers flexibility in designing degree programs.

The five areas of concentration are Asian history, British history, European history, Latin American history, and United States history. Students must select a minimum of three historical fields for examination.

See "Doctor of Philosophy," page 103, for general requirements.

Admission. Applications for the Ph.D. degree in History must be accompanied by the applicant's scores on the Graduate Record Examination, three letters of recommendation

from faculty members or others who are qualified to judge the applicant's potential for doctoral study, a writing sample, a résumé, and a statement of purpose. Applications and supporting materials are reviewed by the graduate committee of the Department of History. The committee recommends to the Graduate College that the applicant be granted regular or provisional admission or be denied admission.

Program of Study. For students admitted to the doctoral program with a master's degree or other graduate credits in hand, the requirements for the Ph.D. are an additional 54 semester hours of credit in residence, which should consist of 30 semester hours of historical study and 24 semester hours of dissertation research and writing. All 54 semester hours have to be taken after admission to the program. A minimum of 84 semester hours is required for the doctorate.

For students admitted to the doctoral program directly from a baccalaureate program, the requirements for the Ph.D. are 84 semester hours of course work, which should consist of 60 semester hours of historical study and 24 semester hours of dissertation research and writing. A minimum of 54 semester hours must be taken while the student is in residence after admission to the doctoral program. These hours should conform to the expectations of students who enter with a master's degree or other graduate credits in hand.

Upon matriculation, the student, in consultation with the graduate director, selects a faculty advisor in the area of concentration. Together the faculty advisor and student select a Ph.D. program committee consisting of at least three faculty members. In consultation with the student, the committee draws up the program of study and helps direct the student to the completion of required course work.

The program of study (a minimum of 60 graduate semester hours of history) required of all students in the doctoral program must conform to the following guidelines:

1. At least 36 semester hours must be at the 500-level or above;
2. If 400-level courses are taken as part of the program of study, the student must have documented proof that they were taken for graduate credit, contact the graduate administrative assistant for details;
3. At least six semester hours must be in historiographic course work (HST 512 to HST 515);
4. At least three semester hours must be in a comparative course (HST 551 to HST 555);
5. At least nine semester hours must be in research seminars (HST 591); and
6. 24 semester hours of dissertation research and writing are required.

Foreign Language Requirements. Demonstration of a satisfactory reading knowledge of two foreign languages is required before the student may take the comprehensive examinations. For the second language, the student's program committee is free to approve the substitution of a demonstrated capacity in some other research skill, such as quantitative or statistical analysis, archival management, historical preservation, oral history, or educational technology.

Preliminary Reviews. During the first academic year of residence, students are required to schedule a preliminary

review with their program committee. A preliminary review is an oral interview during which a student defends the program of study and his or her progress in the program to that point. Students who fail this review must withdraw from the program.

It is recommended that students make arrangements for the preliminary review by February 1 and have the preliminary review completed by March 1. It is further recommended that the student demonstrates a satisfactory reading knowledge of at least one foreign language before scheduling the review.

Comprehensive Examinations. Candidates for the doctoral degree must display a command of the historical knowledge in their chosen fields of study. This command is determined through a series of written and oral assessments known collectively as the comprehensive examinations. Comprehensive examinations are taken after the student has completed 60 semester hours of graduate course work. Students are allowed to retake the written portions of the comprehensive examination only once. Only upon successful completion of the written portions of the examination are students allowed to sit for the oral portion. The comprehensive examinations are conducted by the program committee.

Dissertation Committee. Upon satisfactory completion of the comprehensive examination, a supervisory committee for the dissertation is selected. In consultation with the director of Graduate Studies, the student chooses a chair of the dissertation committee. In consultation with the chair, the student then chooses two other faculty members to serve on the dissertation committee. The role of the committee is to approve the subject and title of the dissertation and to advise the candidate during the completion of the research and writing of the dissertation.

Dissertation Prospectus. Before a candidate is permitted to begin researching a dissertation topic, the candidate must prepare a prospectus of four to seven pages outlining the thesis. The prospectus presents the connection between the thesis and relevant historiography. The prospectus must be presented to the dissertation committee by the end of the semester following the comprehensive exams. The topic must be in one of the candidate's fields of study and should include the following:

1. a thesis statement;
2. a discussion of relevant literature;
3. a discussion of possible research material and availability of sources;
4. a secondary bibliography; and
5. a historiographical statement.

Consult the graduate handbook for more information on the composition of a dissertation prospectus.

Dissertation Requirements. The dissertation must be an original contribution to knowledge and demonstrate the student's proficiency in independent research.

Final Examinations. A final oral defense of the dissertation is required.

Graduate Preparation in Public History

The department offers several public history emphases preparing students to apply the skills of the historian in

careers beyond the classroom. Public historians focus their historical insight, expertise, and critical abilities in the broad—that is, public—community. Six areas of emphasis are offered within public history: business, community history, scholarly publishing, historic preservation, historical administration, and the public sector. Graduate course work in public history may be included in both master's and doctoral programs of study.

The public history core combines specially designed course work and specific program requirements with traditional degree requirements. The department imposes additional admission requirements and includes periodic evaluations of public history students' progress. (The business emphasis requires prerequisites in the business field.) Enrollment is limited to provide careful preparation and advising. The curriculum integrates required course work in a public history component with courses in a geographic area concentration. As a special feature of the program, short courses are taught each year by visiting public historians. Each emphasis requires completion of two short courses. Courses from other disciplines, such as anthropology, business, public administration, fine arts, geography, political science, and architecture (architectural history and preservation planning) may be included in a program of study when students have the necessary prerequisites and if the courses meet particular student needs or are required within the various emphases of the concentration. Students who select the scholarly publishing option must be admitted to the Scholarly Publishing Certificate program and complete all certificate requirements. (See "Scholarly Publishing," page 306, for more information.)

Course work for all areas of the program *begins each fall semester with a required* special workshop during the fall orientation week before classes start. Students are admitted for the fall semester, though some class work outside the public history field may be started earlier. With concentrated full-time study, the master's public history component may be completed in four semesters, depending on the public history area selected for emphasis. In some instances, the mandatory internship or other program requirements must be completed during the *summer* months.

Each student in the program completes a core of courses appropriate to an area of emphasis. Basic to each core is the completion of HIS 502 Public History Methodology during the first semester of study. The work introduced in this methodology class is continued in the public history research seminar (HIS 591), required or optional, depending on the area of emphasis.

At the satisfactory completion of the training work and upon the recommendation of the appropriate director and the department, a certificate of completion is issued by the department. Assistance is provided in job placement.

Students interested in this curriculum should consult the department's graduate handbook, which provides detail about public history work.

HISTORY (HST)

HST 405 Colonial American History to 1763. (3)

once a year

Political, economic, social, and cultural history of the colonial era.

Concentrates on English colonies, with some consideration of Spanish, French, and other colonial regions in North America.

General Studies: SB, H

HST 406 The American Revolution, 1763–1789. (3)*once a year*

Causes, course, and consequences of the American Revolution culminating in the ratification of the Constitution.

HST 407 The Early U.S. Republic, 1789–1850. (3)*once a year*

Political, social, economic, and cultural development of the United States from the Revolution to 1850.

*General Studies: L/SB, H***HST 408 Civil War and Reconstruction. (3)***once a year*

Explores the causes, conduct, and consequences of the American Civil War, concentrating on the years 1848 to 1877.

*General Studies: L/SB, H***HST 409 The Emergence of the Modern United States, 1877 to 1918. (3)***once a year*

Triumph of modern political, social, and economic structures and values, 1877–1918; role of region, religion, race, and ethnicity.

*General Studies: SB, H***HST 410 The Modern United States, 1918 to 1945. (3)***once a year*

1920's boom and the crash, the Depression and the New Deal response. The Second World War at home and abroad.

*General Studies: SB, H***HST 411 The Postwar United States, 1945 to 1973. (3)***once a year*

Cold War, prosperity, reform, and immense social and political change in the U.S.

*General Studies: SB, H***HST 412 The Contemporary United States, 1973 to the Present. (3)***once a year*

End of the Cold War, political crises, and cultural transformations in the U.S.

*General Studies: SB, H***HST 414 The Modern U.S. Economy. (3)***not regularly offered*

Origins of 19th-century slavery and industrialization; 20th-century crisis and regulation: political economy of an advanced capitalist democracy. Prerequisite: ECN 111 (or 112) or HST 109 (or 110).

*General Studies: SB, H***HST 415 Unequal Sisters: Women and Political and Cultural Change. (3)***once a year*

Examines race, ethnic, and class differences among women, focusing on the political and cultural experiences of women in the U.S.

*General Studies: L/SB, C, H***HST 416 Indian History of the Southwest. (3)***once a year*

Reviews historical events from prehistoric peoples, the Spanish and Mexican periods, and the U.S. period from 1846 to present.

*General Studies: SB, C, H***HST 417 Topics in Mexican American History. (3)***once a year*

Focuses on specific topics in Mexican American history including immigration, civil rights, the Chicano Movement, union activism, and regional and generational differences.

*General Studies: SB, C, H***HST 423 The Tudor Monarchy. (3)***once a year*

Political, cultural, and social foundations of 16th-century England.

*General Studies: SB, H***HST 424 The Stuart Transformation of England. (3)***once a year*

Political, social, economic, and cultural developments in 17th-century England.

*General Studies: SB, H***HST 426 The British Empire. (3)***once a year*

British imperialism and colonialism in Africa, the Americas, Asia, and the South Pacific. Prerequisite: upper-division standing or instructor approval.

*General Studies: SB, H***HST 427 The French Revolution and the Napoleonic Era. (3)***once a year*

Conditions in Pre-Revolutionary and Revolutionary France; organization of France under Napoleon and impact of French changes upon Europe.

*General Studies: SB, H***HST 428 Modern France. (3)***not regularly offered*

Social, political, economic, and cultural transformations of French society, 1815–present. Impact of industrialization, war, and revolution on people's lives. Prerequisite: upper-division standing or instructor approval.

*General Studies: SB, G, H***HST 429 Modern Germany. (3)***once a year*

Germany since 1871.

*General Studies: SB, G, H***HST 430 Hitler: Man and Legend. (3)***once a year*

Biographical approach to the German Third Reich emphasizing nature of Nazi regime, sociocultural issues, World War II, and historiography.

*General Studies: SB, H***HST 431 Eastern Europe and the Balkans Before 1914. (3)***not regularly offered*

Empire and nation in Eastern Europe and the Balkans before World War I, emphasizing Hapsburg and Ottoman lands.

*General Studies: SB, H***HST 432 Eastern Europe and the Balkans in the 20th Century. (3)***not regularly offered*

Politics and culture in Eastern Europe and the Balkans from World War I to the present.

*General Studies: SB, G, H***HST 435 The Russian Empire. (3)***fall*

Development of Russian imperial institutions and civil society from the 17th to the early 20th centuries. Lecture, discussion.

*General Studies: SB, H***HST 436 The Soviet Experiment. (3)***spring*

Communist revolutionaries' rule of Russia, focusing on utopian culture, Stalinist terror, heroism in war, and the breakup of the U.S.S.R.

*General Studies: SB, G, H***HST 437 Spain Through the Golden Age. (3)***not regularly offered*

Cultural, economic, political, and social development of Spain from antiquity to the late 17th century.

*General Studies: HU/SB, H***HST 438 Modern Spain. (3)***not regularly offered*

Cultural, economic, political, and social development of modern Spain.

*General Studies: HU/SB, G, H***HST 441 Spanish South America. (3)***not regularly offered*

Political, economic, and social development of the Spanish-speaking nations of South America since independence. 19th-century developments.

*General Studies: SB, H***HST 442 Spanish South America. (3)***once a year*

Political, economic, and social development of the Spanish-speaking nations of South America. 20th-century developments.

*General Studies: SB, H***HST 443 The United States and Latin America. (3)***once a year*

Latin American struggle for diplomatic recognition, attempts at political union, participation in international organizations since 1810, and relations between the United States and Latin America.

*General Studies: SB, G, H***HST 445 20th-Century Cuba. (3)***once a year*

History of Cuba from colonial era to formation of the early republic; political, economic, social development in late 20th century. Lecture, discussion.

General Studies: SB, G, H

HST 446 Colonial Mexico. (3)*once a year*

Political, economic, social, and cultural developments from pre-Columbian times to 1810.

*General Studies: SB, H***HST 447 Modern Mexico. (3)***once a year*

Political, economic, social, and cultural developments from 1810 to the present.

*General Studies: SB, H***HST 451 Chinese Cultural History. (3)***not regularly offered*

China's classics in translation studied both for their intrinsic ideas and for the origins of Chinese thought.

*General Studies: SB, H***HST 452 Chinese Cultural History. (3)***not regularly offered*

Evolution of Confucian thought, its synthesis with Taoism and Buddhism, and modern reactions against, and uses of, Confucian traditions.

*General Studies: SB, G, H***HST 453 The People's Republic of China. (3)***not regularly offered*

Analysis of major political, social, economic, and intellectual trends in China since the founding of the People's Republic in 1949.

*General Studies: SB, G, H***HST 455 The United States and Japan. (3)***fall*

Cultural, political, and economic relations in the 19th and 20th centuries. Emphasis on post-World War II period.

*General Studies: SB, G, H***HST 456 The Vietnam War. (3)***once a year*

Intersection of American and Asian histories in Vietnam, viewed from as many sides as possible.

*General Studies: SB, G, H***HST 460 History of Fire. (3)***fall*

Global survey of the natural and cultural history of fire. Lecture, discussion.

*General Studies: L, H***HST 480 Methods of Teaching History: Classroom Resources. (3)***fall*

Methods in instruction, organization, and presentation of the subject matter of history and closely allied fields. Prerequisites: HST 300; admission to PTPP.

HST 481 Methods of Teaching History: Community Resources. (3)*spring*

Identify community-based resources for teaching history, work with resources, and learn how to integrate them into the secondary classroom. Lecture, lab. Prerequisites: HST 300; admission to PTPP.

HST 484 Internship. (1–4)*not regularly offered***HST 492 Honors Directed Study. (1–6)***not regularly offered***HST 493 Honors Thesis. (3)***not regularly offered**General Studies: L***HST 494 Special Topics. (1–4)***not regularly offered***HST 498 PS: History Pro-Seminar. (3)***fall and spring*

Required course for majors on topic selected by instructor; writing-intensive course related to the development of research skills and writing tools used by historians. Prerequisites: HST 300; History major.

*General Studies: L***HST 499 Individualized Instruction. (1–3)***not regularly offered***HST 500 Methods of Historical Investigations. (1–12)***not regularly offered***HST 502 Public History Methodology. (3)***fall*

Introduction to historical research methodologies, techniques, and strategies used by public historians. Readings, short papers, and guest speakers. Required for students in the public history concentration.

HST 512 Western Civilization to the Enlightenment. (3)*fall*

Systematically examines various interpretations of Western civilization from the ancient Middle Eastern civilizations to the European Enlightenment. Seminar.

HST 513 Western Civilization Since the French Revolution. (3)*spring*

Systematically examines various interpretations of Western civilization since the French Revolution. Seminar.

HST 514 Historians of the United States. (3)*not regularly offered*

Study of the history of American historical writing from the early colonial days to the 20th century.

HST 515 Studies in Historiography. (3)*fall and spring*

Methods and theories of writers of history. May be repeated for credit.

HST 525 Historical Resource Management. (3)*fall*

Identification, documentation, and interpretation of historic period buildings, sites, and districts. Emphasis on interdisciplinary efforts among historians, architects, and anthropologists.

HST 526 Historians and Preservation. (3)*spring*

Preparation of historians for public and private historic preservation programs. Prerequisite: HST 525 or instructor approval.

HST 527 Historical Administration. (3)*fall*

Preparation of historians in administration of archives, historical sites, historical museums, historical societies, and historical offices in government agencies.

HST 532 Community History. (3)*not regularly offered*

Techniques and methods of community history emphasizing local resources. Required for community history option. Seminar.

HST 551 Comparative Histories of War and Revolution. (3)*once a year*

Comparative field course of the themes of war and revolution.

HST 552 Comparative History of Family and Community. (3)*not regularly offered*

Comparative course with a focus on family, including minority and ethnic groups, in society.

HST 553 Comparative History of State and Institutions. (3)*not regularly offered*

Comparative course that explores the changing nature of central institutions and government.

HST 554 Comparative Historical Population Studies: Ethnicity, Economy, and Migration. (3)*not regularly offered*

Comparative course that explores the impact of social, cultural, or economic changes in the population.

HST 555 Comparative Historical Topics. (3)*not regularly offered*

Analyzes a variety of specific social, political, cultural, and intellectual topics.

HST 584 Internship. (1–12)*not regularly offered***HST 590 Reading and Conference. (1–12)***not regularly offered***HST 591 Seminar. (3)***not regularly offered*

May be repeated for credit.

HST 592 Research. (1–12)*not regularly offered***HST 595 Continuing Registration. (1)***not regularly offered*

HST 598 Special Topics. (1–4)*not regularly offered*

Reading courses designed to increase students' familiarity with a particular topic and the important writing concerning it. May be repeated for credit. Possible topics:

- (a) Asian History. (3)
- (b) English and British History. (3)
- (c) European History. (3)
- (d) Latin American History. (3)
- (e) U.S. History. (3)

HST 599 Thesis. (1–12)*not regularly offered***HST 684 Internship. (1–12)***not regularly offered***HST 690 Reading and Conference. (1–12)***not regularly offered***HST 695 Continuing Registration. (1)***not regularly offered***HST 700 Public History Research Methods. (1–12)***not regularly offered***HST 790 Reading and Conference. (1–12)***not regularly offered***HST 791 Seminar. (1–12)***not regularly offered***HST 792 Research. (1–12)***not regularly offered***HST 795 Continuing Registration. (1)***not regularly offered***HST 799 Dissertation. (1–15)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

History and Theory of Art

See "Ph.D. in History and Theory of Art," page 124.



Entrance to ASU Art Museum

H. Val Peterson photo

Humanities

Interdisciplinary Master's Program

Charles Dellheim

Director

(LL 641) 480/965-6747

humanities@asu.edu

www.asu.edu/clas/humanities

CORE FACULTY

Humanities

Professors: Dellheim, Foster, Kugelmass, Lehman;

Associate Professors: Privateer, Wright;

Assistant Professors: Baker, Ballew, Lund, Romeyn, Taylor

Languages and Literatures

Regents' Professor: Foster

The Graduate Committee on Humanities offers an interdisciplinary program leading to the M.A. degree in Humanities. One of the unique features of this interdisciplinary program is that, because it uses faculty research/teaching interests from a number of disciplines, a student may tailor a course of study to fit individual needs and goals. The committee is chaired by Humanities core faculty and may include members from several departments. At the same time, the individualized program is balanced by a required core of several courses emphasizing interdisciplinary methodology and theory. Faculty and courses are not limited, however, to the departments and schools listed, since it is understood that many fields may be approached from a humanistic perspective.

MASTER OF ARTS

Among the small number of humanities M.A. programs in the U.S., the ASU program stands out in terms of its substance and breadth. The core of the curriculum, a sequence of three required courses, provides students with an introduction to an extremely wide range of classical and contemporary cultural theory. At the same time, the large number of elective classes at their disposal permits students to fashion a specialized field for themselves, typically combining work in two or more of the traditional humanities disciplines. The thesis—the capstone of the requirements for the degree—gives students the opportunity to make an original and substantial contribution to scholarship in their chosen field. This combination—a solid grounding in cultural theory, interdisciplinary specialization, and advanced research and writing—makes this M.A. program unique among its peers.

Admission. Students who fulfill the general requirements of the Graduate College and who have a B.A. in any of the humanities disciplines listed by the National Endowment for the Humanities are invited to apply. This invitation, however, does not preclude students who have bachelor's degrees in the social and natural sciences. In addition to meeting Graduate College requirements, students must submit Graduate Record Examination scores; three letters of academic recommendation; and a brief letter of intent, outlining their academic career to date and suggesting plans for

the future, at ASU and beyond. Prospective students should apply by March 1 for admission into the program the following fall. Students whose applications are complete by the March 1 deadline will be notified of their admission status by April 15. Qualified students applying after March 1 will be admitted depending on the availability of space.

Program of Study. M.A. students must complete a minimum of 30 hours of course work, including six hours of thesis preparation. In most cases, this involves a two-year program of study, focused on the following requirements:

Core Courses. Students take a sequence of three core courses, one in each of their first three semesters. Contact an advisor for details.

Area of Study. Beyond the core courses, students use their remaining electives to develop a specific area of study, whose ultimate expression is the thesis, but which is also grounded in course work. The areas of study sponsored by the faculty include, but are not limited to: American studies; art and society; comparative literatures and cultures; film and media studies; gender and sexuality; intellectual history and philosophy; Jewish studies; performance studies; post-colonial studies; science, technology, and culture.

Foreign Language Exam. M.A. students are required to pass a foreign language reading examination, typically at some point during their first three semesters.

Master's Thesis. The centerpiece of the master's degree is a written thesis that makes an original and substantial contribution to scholarship in the humanities. Most students are expected to work toward a thesis proposal and the formation of a thesis committee (consisting of a chair drawn from the Humanities faculty and two other members) during their first two semesters; to finalize their committee and receive its approval of their proposal in their third semester; and to complete the thesis in the fourth semester. A final oral defense of the thesis is required.

Faculty Research Interests. Social and intellectual history; British history; the Enlightenment; media studies; cultural studies; Latin America; queer theory; gender studies; subaltern studies; ideological approaches to literature; comparative literature; postcolonial studies; Chinese culture; East European and American Jews; Israel; urban studies; humor; technology and culture; intercultural perceptions; colonial Latin American identity construction; law and society in European and modern periods; narratives of European colonialism/exploitation; American studies; science and the humanities; Southeast Asian art history; critical theory; cultural anthropology; culture and organizational theory.

HUMANITIES (HUM)

HUM 420 Interpreting Latin America. (3)

spring

Introduces protocols and methodologies for cultural interpretation of Latin America, with emphasis on four principal cities as cultural space.

General Studies: HU, G, H

HUM 440 Los Angeles and Cultural Theory. (3)

spring

Analyzes representations of Los Angeles in literary, film, and musical texts and broader implications for contemporary American society.

General Studies: L/HU, C

HUM 450 Technology and Culture. (3)*spring*

Explores sociocultural, ideological, and postmodern implications of technology and the role technology plays in social constructions as well as the spaces it creates. Seminar, discussion.

*General Studies: L/HU***HUM 460 Postmodern Culture and Interpretation. (3)***not regularly offered*

Currents and interpretations of postmodern culture; international, comparative perspective on the culture and traditions of contemporary "Europes" and "Americas." Seminar, discussion.

*General Studies: L***HUM 462 Psychoanalysis and Culture. (3)***fall*

Introduction to intellectual history of psychoanalytic movement of the 20th century and its contribution to humanities disciplines.

*General Studies: L/HU/SB***HUM 465 Narrative in the Human Sciences. (3)***fall*

Theories of narrative and narrativity in the humanities, concentrating on the problems of specific disciplines and interdisciplinary solutions.

*General Studies: L/HU***HUM 501 Introduction to Cultural Theory. (3)***fall*

Selective history of cultural theory. Major figures and topics include Marx, Nietzsche, Freud, phenomenology, western Marxism, structuralism, and post-structuralism. Seminar.

HUM 503 Research and Writing in the Humanities. (3)*fall*

Systematic training in humanistic research and writing with particular attention to the interdisciplinary study of culture. Seminar.

HUM 511 Structures of Knowledge. (3)*fall*

Theories and examples of structures of knowledge, including such topics as metaphor, semiotics, and knowledge of the "other."

HUM 512 Writing Cultures. (3)*spring*

Theories and methods of representing Western and non-Western cultures in literature, history, ethnography, and pictorial media.

HUM 513 Interpretation of Cultures. (3)*once a year*

Methodologies and comparative theories for the study of relationships between various aspects of culture, the history of ideas, and the arts. May be repeated for a total of 6 semester hours when topics vary.

HUM 549 Contemporary Critical Theory. (3)*once a year*

Advanced survey of major schools of 20th-century literary and critical theory. Lecture, discussion. Cross-listed as ENG 502. Credit is allowed for only ENG 502 or HUM 549.

HUM 591 Seminar. (1–12)*once a year*

Possible topics:

- (a) Cultural Productions. (3)
- (b) Theory and Culture. (3)
- (c) Tragedy: Meaning and Form. (3)

HUM 598 Special Topics in the Humanities. (1–4)*not regularly offered*

Open to all students. Possible topics:

- (a) Comparative Fine and Performing Arts. (3)
- (b) Cultures of Ethnic Minorities. (3)
- (c) Film and Media Studies. (3)
- (d) Non-Western Cultures. (3)
- (e) Western Historical or Contemporary Cultures. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Indian Law

Certificate Program

See "Indian Legal Program," page 78.

Industrial Engineering

Master's and Doctoral Programs

Gary L. Hogg

Chair

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PROFESSORS

COCHRAN, DOOLEY, HENDERSON, HOGG, HUBELE,
MONTGOMERY, RUNGER, WOLFE

ASSOCIATE PROFESSORS

ANDERSON-ROWLAND, FOWLER, MACKULAK, MOOR,
MOU, ROBERTS, SHUNK, VILLALOBOS, YE

ASSISTANT PROFESSORS

CARLYLE, GEL

The faculty in the Department of Industrial and Management Systems Engineering offer graduate programs leading to the M.S., the Master of Science in Engineering, and the Ph.D. degrees in Industrial Engineering.

The overall educational objective of graduate study in industrial engineering is to improve each student's ability to understand, analyze, and resolve problems within complex organizations. Industrial engineers must develop qualitative and quantitative abilities to assist management in such diverse organizations as banks, government, hospitals, military, and manufacturing operations.

It is required that all students applying for one of the master's or doctoral degree programs submit scores (verbal, quantitative, analytical) on the Graduate Record Examination, a statement of purpose, and three letters of recommendation.

Applicants may have a baccalaureate degree in a major field other than industrial engineering, although engineering, mathematics, or science is recommended. The student's qualifications are reviewed by the faculty.

MASTER OF SCIENCE

The Master of Science (M.S.) degree is a research degree requiring a thesis and an oral defense. See "Master's Degrees," page 100, for general requirements.

MASTER OF SCIENCE IN ENGINEERING

The Master of Science in Engineering (M.S.E.) degree is a non-research degree requiring additional course work and a written comprehensive examination. See "Master of Sci-

ence in Engineering,” page 195, for more information on the Master of Science in Engineering degree.

The faculty also participate in offering the tri-university Master of Engineering Program. For more information, see “Master of Engineering,” page 195.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Industrial Engineering is conferred upon evidence of excellence in research that culminates in a dissertation representing a significant contribution to the field of industrial engineering.

See “Doctor of Philosophy,” page 103, for general requirements.

Program of Study. The program of study should be developed early in the second semester of Ph.D. study or when the student has completed nine semester hours of courses at ASU. Specific requirements may be obtained from the department.

Early Evaluation. In the second regular semester in residence, the student’s program of study and academic accomplishment to date serve as a basis for evaluation by the supervisory committee. The results of this evaluation are used to assist the student in improving or modifying the program of study, to encourage the continuance of Ph.D. studies or, if necessary, to discourage the student from continuing in the program.

Foreign Language Requirements. None.

Comprehensive Examinations. When the Ph.D. student has essentially completed the course work in the approved program of study and submitted a research proposal to the advisory committee, the student is given a written comprehensive examination relating to the research area. The written examination is followed by an oral exam. Upon successful completion of the comprehensive examinations, the student is admitted to candidacy.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examination. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

For up to the date information about research activity, access the Department of Industrial Engineering Web site at ceaspub.eas.asu.edu/ie.

INDUSTRIAL ENGINEERING (IEE)

IEE 505 Applications Engineering. (3)

fall and spring

Develops working knowledge of application systems development tools needed for computer-integrated enterprise. Includes techniques for application generation in fourth- and fifth-generation software environments. Topics include client server network systems, decision support systems, and transaction systems in distributed environment. Prerequisite: graduate standing.

IEE 511 Analysis of Decision Processes. (3)

spring

Methods of making decisions in complex environments and statistical decision theory; effects of risk, uncertainty, and strategy on engineering and managerial decisions. Prerequisite: ECE 380.

IEE 520 Ergonomics Design. (3)

spring

Human physiological and psychological factors in the design of work environments and in the employment of people in man-machine systems. Open-shop lab assignments in addition to class work. Prerequisite: IEE 437.

IEE 530 Enterprise Modeling. (3)

spring

Focuses on social, economic, and technical models of the enterprise with emphasis on the management of technological resources. Includes organization, econometric, financial, and large-scale mathematical models. Prerequisite: graduate standing.

IEE 531 Topics in Engineering Administration. (3)

spring in even years

Consideration given to philosophical, psychological, political, and social implications of administrative decisions. Prerequisite: graduate standing.

IEE 532 Management of Technology. (3)

spring

Topics include designing a technical strategy; technological forecasting; interfacing marketing engineering and manufacturing; designing and managing innovation systems; creativity; application of basic management principles to technology management. Prerequisite: IEE 431.

IEE 533 Scheduling and Network Analysis Models. (3)

spring

Application of scheduling and sequencing algorithms, deterministic and stochastic network analysis, and flow algorithms. Prerequisites: ECE 380; IEE 476.

IEE 541 Engineering Administration. (3)

fall

Introduces quantitative and qualitative approaches to management functions, engineering administration, organizational analysis, decision making, and communication. Credit is allowed for only IEE 541 or 431. Prerequisite: graduate standing.

IEE 543 Computer-Aided Manufacturing and Control. (3)

spring

Computer control in manufacturing, CIM, NC, logic controllers, group technology, process planning and robotics. Credit is allowed for only IEE 543 or 463. Prerequisite: C programming capability.

IEE 545 Simulating Stochastic Systems. (3)

fall and spring

Analysis of stochastic systems using basic queuing networks and discrete event simulation. Basic network modeling, shared resources, routing, assembly logic. Credit is allowed for only IEE 545 or 475. Prerequisites: ASE 485; IEE 476.

IEE 546 Operations Research Techniques/Applications. (4)

fall and spring

Students model and analyze industrial systems applications with operations research techniques. Resource allocation, product mix, production, shipping, task assignment, market share, machine repair, customer service. Credit is allowed for only IEE 546 or 476. Prerequisite: ASE 485.

IEE 547 Human Factors Engineering. (3)

fall and spring

Study of people at work; designing for human performance effectiveness and productivity. Considerations of human physiological and psychological factors. Credit is allowed for only IEE 547 or 437. Prerequisite: graduate standing.

IEE 552 Strategic Technological Planning. (3)

spring

Study of concept of strategy, strategy formulation process, and strategic planning methodologies with emphasis on engineering design and manufacturing strategy, complemented with case studies. An analytical executive planning decision support system is presented and used throughout course. Pre- or corequisites: IEE 545, 561, 572, 574.

IEE 560 Object-Oriented Information Systems. (3)

spring

Application of object-oriented technology concepts to manufacturing and enterprise systems. Topics include Java, object management systems, and application design. Prerequisite: IEE 505.

IEE 561 Production Systems. (3)*spring*

Understanding how factories operate, how performance is measured, and how operational changes impact performance metrics. Operational philosophies, increasing production efficiency through quantitative methods. Prerequisites: ASE 485; IEE 476.

IEE 562 Computer-Aided Manufacturing (CAM) Tools. (3)*spring*

Current topics in automation, distributed control, control code generation, control logic validation, CAM integration, CAD/CAM data structures, planning for control systems. Topics vary by semester. Prerequisite: IEE 463 or 543.

IEE 563 Systems Analysis for Distributed Systems. (3)*spring*

Analysis and design of distributed groupware applications for manufacturing and enterprise systems. Prerequisite: graduate standing.

IEE 564 Planning for Computer-Integrated Manufacturing. (3)*fall*

Theory and use of IDEF methodology in planning for flexible manufacturing, robotics, and real-time control. Simulation concepts applied to computer-integrated manufacturing planning. Prerequisite: graduate standing.

IEE 565 Computer-Integrated Manufacturing Research. (3)*spring*

Determination and evaluation of research areas in computer-integrated manufacturing, including real-time software, manufacturing information systems, flexible and integrated manufacturing systems, robotics, and computer graphics. Prerequisite: IEE 564.

IEE 566 Simulation in Manufacturing. (3)*spring in even years*

Use of simulation in computer-integrated manufacturing with an emphasis on modeling material handling systems. Programming, declarative, and intelligence-based simulation environments. Prerequisite: IEE 545.

IEE 567 Simulation System Analysis. (3)*fall*

Simulation modeling of processes involving discrete and continuous system components. Topics include random number generators, output analysis, variance reduction, and statistical issues related to simulation. Prerequisite: IEE 545.

IEE 569 Advanced Statistical Methods. (3)*fall in even years*

Application of statistical inference procedures, based on ranks, to engineering problems. Efficient alternatives to classical statistical inference constrained by normality assumptions. Prerequisite: ASE 485.

IEE 570 Advanced Quality Control. (3)*spring*

Economic-based acceptance sampling, multiattribute acceptance sampling, narrow limit gauging in inspector error and attributes acceptance sampling, principles of quality management, and selected topics from current literature. Prerequisite: ASE 485.

IEE 571 Quality Management. (3)*fall*

Total quality concepts, quality strategies, quality and competitive position, quality costs, vendor relations, the quality manual, and quality in the services. Prerequisite: graduate standing.

IEE 572 Design of Engineering Experiments. (3)*fall and spring*

Analysis of variance and experimental design. Topics include general design methodology, incomplete blocks, confounding, fractional replication, and response surface methodology. Prerequisite: ASE 485.

IEE 573 Reliability Engineering. (3)*spring*

Nature of reliability, time to failure densities, series/parallel/standby systems, complex system reliability, Bayesian reliability, and sequential reliability tests. Prerequisite: ECE 380.

IEE 574 Applied Deterministic Operations Research Models. (3)*fall and spring*

Develops advanced techniques in operations research for the solution of complex industrial systems problems. Goal programming, integer programming, heuristic methods, dynamic and nonlinear programming. Prerequisite: IEE 476.

IEE 575 Applied Stochastic Operations Research Models. (3)*spring*

Students formulate and solve industrial systems problems with stochastic components using analytical techniques. Convolution, continuous-time Markov chains, queues with batching, priorities, balking, open/closed queuing networks. Prerequisites: ASE 485; IEE 476.

IEE 577 Decision and Expert Systems Methodologies. (3)*fall*

Application of artificial intelligence methodologies in decision support systems. Topics include neural networks, fuzzy logic systems, and expert systems. Prerequisite: graduate standing.

IEE 578 Regression Analysis. (3)*fall*

Regression model building oriented toward engineers/physical scientists. Topics include linear regression, diagnostics biased and robust fitting, nonlinear regression. Prerequisite: ASE 485.

IEE 579 Time Series Analysis and Forecasting. (3)*fall in odd years*

Forecasting time series by the Box-Jenkins and exponential smoothing techniques; utilizes existing digital computer programs to augment the theory. Prerequisite: ASE 485.

IEE 582 Response Surfaces and Process Optimization. (3)*spring*

Introduction to response surface method and its applications. Topics include steepest ascent, canonical analysis, designs, and optimality criteria. Prerequisite: IEE 572.

IEE 593 Applied Project. (1–12)*not regularly offered***IEE 594 Conference and Workshop. (1)***fall and spring*

Orientation to the developing work in the field with an emphasis on what the IE faculty are doing.

IEE 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Advanced Topics in Deterministic Operations Research. (3)
- (b) Advanced Topics in Scheduling. (3)
- (c) Analysis of Massive Data Sets. (3)
- (d) Computer and Human Vision. (3)
- (e) DOE/SPC for Semiconductor Processes. (3)
- (f) Enterprise Internet/Intranet. (3)
- (g) Introduction to Rapid Prototyping. (3)
- (h) Mechatronics. (3)
- (i) Modeling and Analysis of Semiconductor Manufacturing. (3)
- (j) Product Modeling. (3)
- (k) Strategic Design of Manufacturing Systems. (3)
- (l) Strategic Issues in Manufacturing. (3)

IEE 599 Thesis. (1–12)*not regularly offered***IEE 672 Advanced Topics in Experimental Design. (3)***spring in even years*

Engineering applications of factorial and fractional factorial designs with randomization restrictions, analysis techniques in parameter comparison, missing data, unbalanced designs. Prerequisite: IEE 572.

IEE 677 Regression and Linear Models. (3)*spring in odd years*

General linear models, applications, theory, including least squares, maximum likelihood estimation, properties of estimators, likelihood ratio tests, and computational procedures. Prerequisite: IEE 578.

IEE 679 Time Series Analysis and Control. (3)*fall in even years*

Identification, estimation, diagnostic checking techniques for ARIMA models, transfer functions, multiple time series models for feedback and feedforward control schemes. Prerequisite: IEE 579.

IEE 681 Reliability, Availability, and Serviceability. (3)*fall in even years*

Organizing hardware and software, integrity and fault-tolerant design, maintenance design and strategy, Markov models, fault-free analysis, and military standards. Prerequisite: IEE 573.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Interdisciplinary Studies

ASU West offers a Master of Arts degree in Interdisciplinary Studies. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Justice Studies

Master's Program

David Altheide
Interim Director
 (WILSN 327) 480/965-7682
www.asu.edu/copp/justice

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ASSISTANT PROFESSORS
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The faculty in the School of Justice Studies offer a program leading to the M.S. degree in Justice Studies.

Information about the interdisciplinary Ph.D. degree in Justice Studies may be obtained from the graduate coordinator's office. See "Justice Studies," page 245.

MASTER OF SCIENCE

The faculty in the School of Justice Studies offer a program leading to the M.S. degree in Justice Studies. The study of justice is an interdisciplinary field of scholarship, research, and teaching, embracing those aspects of social and behavioral sciences relevant to an understanding of law, justice, crime, and social deviance. It includes a critical examination of the policies and organizational processes that have evolved for handling attendant problems. The M.S. degree has been designed to prepare students for professional positions in justice-related agencies, for teaching in community colleges, and for further study and research in the justice field.

Admission. In addition to meeting Graduate College requirements, the applicant must submit Graduate Record Examination (GRE) scores, a one- or two-page statement outlining the applicant's educational and career goals related to Justice Studies, areas of interest, and three letters of recommendation, preferably from academic referees. Because of enrollment limits, candidates who meet minimum requirements are not automatically admitted into the program.

Selection Criteria. In selecting promising candidates, the admissions committee evaluates past academic performance, scores from the GRE, and potential for success as indicated by recommendations and personal statements.

Applications to the program may be made at any time; however, complete files must be submitted to the Graduate College by January 1 for fall admission.

International Applicants. In addition to admission material, international applicants whose native language is not English must submit scores from the Test of English as a Foreign Language. Evidence that sufficient funds are available for financing the student's academic program also must be submitted. See "Admission to the Graduate College," page 92, for more information.

Advisory Committee. Upon admission of the applicant, a temporary advisor is appointed. The temporary advisor is a faculty member who assists students in the selection of courses for the first semester until an advisory committee is formed. Typically, by the end of the first year, students form an advisory committee consisting of a chair and two members. The chair and at least one member must be faculty of the School of Justice Studies.

The committee members must be appointed by the dean of the Graduate College upon the recommendation of the director of the School of Justice Studies. The advisory committee works with the student to establish a program of study, to direct the thesis or applied project, and to administer the oral examination.

Program of Study. The M.S. degree in Justice Studies has two options: a thesis or an applied project. The thesis option requires the completion of 36 semester hours, of which six are thesis hours. The applied project option requires the completion of 42 semester hours, of which three are JUS 593 Applied Project. Each student's program is developed in concert with the advisory committee, in accord with the student's background of preparation and educational and career objectives. The program of study has three major categories: foundation courses, elective courses, and thesis or applied project requirements.

Foundation Courses. The required foundation courses provide students with a fundamental understanding of the theories, methods, and analytic techniques associated with the study of justice. Foundation courses include:

JUS	500 Justice Research Methods	3
JUS	501 Justice Theory	3
JUS	509 Statistical Problems in Justice Research	3
JUS	521 Qualitative Data Analysis and Evaluation.....	3

Elective Courses. Offered by the School of Justice Studies and other academic units, elective courses develop a unique research area in justice studies. Students may choose these courses in consultation with their advisory committees. Alternatively, students may choose one of the following areas within justice studies:

1. adolescence and justice;
2. American Indian justice;
3. comparative justice;
4. crime and justice;
5. dispute resolution;
6. gender and justice;

7. law, ecology, and society;
8. law, policy, and evaluation;
9. race, ethnicity, and justice; or
10. social and economic justice.

Thesis Requirements. To satisfy the research requirement for the Master of Science degree, candidates must write a thesis and defend it in an oral examination.

Applied Project Requirements. Candidates pursuing the applied project option must present their applied project and defend it in an oral examination conducted by the faculty member who supervises the project. The project should be an analytical report.

Concurrent M.A. Anthropology/M.S. Justice Studies. Graduate students in the School of Justice Studies and the Department of Anthropology are able to receive a concurrent Master of Science degree in Justice Studies and Master of Arts degree in Anthropology with a concentration in sociocultural anthropology. The program is designed for individuals with combined and complementary knowledge and skills. It prepares them for basic and applied research and administrative and educational activities related to justice studies and anthropology. Students must apply and be admitted separately to each program in accordance with the guidelines of the Graduate College, the Department of Anthropology, and the School of Justice Studies.

Foreign Language Requirements. None.

Financial Assistance. A limited number of assistantships are available on a competitive basis for well-qualified students at the master's level. To be eligible for an assistantship, students must be admitted to a graduate degree program with regular admission status. Application should be made directly to the School of Justice Studies.

JUSTICE STUDIES (JUS)

JUS 500 Justice Research Methods. (3)

once a year

Theories and methods of research with emphasis on development of designs most relevant to justice data and problems.

JUS 501 Justice Theory. (3)

once a year

Theories and philosophies of social, economic, political, and criminal justice. Applications of theories to contemporary justice issues. Lecture, discussion.

JUS 503 Crime and Social Causation. (3)

once a year

Theories of deviance and crime as they relate to social policies and specific response of the justice complex.

JUS 509 Statistical Problems in Justice Research. (3)

once a year

Methodological problems of research design and statistical methods specific to justice studies.

JUS 510 Understanding the Offender. (3)

once a year

Survey of learning, personality, and biological theories of causation and their relevance to understanding criminal and delinquent behavior.

JUS 514 Justice Policy. (3)

once a year

Assessment of the politics of justice policy as well as an understanding of the basic tools available to social scientists for analyzing the formulation, implementation, and evaluation of justice policy.

JUS 515 Comparative Justice. (3)

once a year

Focuses on justice, legality, and human rights cross-culturally, examining both theoretical and methodological issues. Seminar.

JUS 520 Qualitative Theory and Data Collection. (3)

once a year

Basic theoretical rationale and perspectives for justice-related qualitative research, e.g., symbolic interactionism. Techniques for data collection, e.g., ethnography and depth interviewing.

JUS 521 Qualitative Data Analysis and Evaluation. (3)

once a year

Analysis of qualitative data, e.g., field notes, depth interview transcripts, document analysis, coding, and retrieval with a microcomputer; qualitative evaluation.

JUS 542 American Indian Justice. (3)

once a year

Provides a broad overview of American Indian and Alaskan Native issues of justice and injustice in contemporary society.

JUS 547 Program Evaluation. (3)

once a year

Nature/role of program evaluation; types, program monitoring, impact and process assessment, evaluability assessment, methods, utilization, and politics of evaluation. Lecture, lab. Pre- or corequisite: JUS 500 recommended.

JUS 550 Alternatives to Incarceration. (3)

once a year

Investigates various alternatives to incarceration; advantages/disadvantages; major issues including net widening, cost effectiveness, risk assessment, community crime prevention. Lecture, research.

JUS 560 Women, Law, and Social Control. (3)

once a year

Gender issues in the exercise of formal and informal mechanisms of social control, including economic, social, legal factors, both violent and nonviolent.

JUS 570 Juvenile Delinquency. (3)

once a year

Study of delinquency, including causation theories. Alternative definitions of delinquency, official statistics, and the critique and analysis of the interaction between social institutions and youth.

JUS 571 Juvenile Justice System. (3)

once a year

Graduate-level introduction to juvenile justice system, including historical development, philosophical orientation, organizational structure, and contemporary controversies.

JUS 575 Race, Gender, and Crime. (3)

fall and spring

Current theoretical and methodological debates and controversies regarding race, ethnicity, gender, class, crime, and the criminal justice system; policy implications. Seminar.

JUS 579 Political Deviance. (3)

once a year

Seminar examines the politics of deviance by integrating the study of conflict with aspects of social organization, especially state formation.

JUS 584 Internship. (3 or 6)

fall, spring, summer

Assignments in a justice agency designed to further the student's integration of theory and practice. Placements are arranged through consultation with students and agencies. Fee.

JUS 588 Justice and the Mass Media. (3)

once a year

Analyzes the nature and impact of mass media messages about justice concerns for social order. Lecture, discussion.

JUS 591 Seminar. (1-3)

once a year

Topics chosen from various fields of justice studies. May be repeated for credit.

JUS 593 Applied Project. (1-12)

not regularly offered

JUS 610 Law and the Social Sciences. (3)

once a year

Analyzes the theoretical grounds underlying diverse studies of law and society; creation and administration of law; and jurisprudence and politics.

JUS 620 Justice Research and Methods. (3)

once a year

Concept development, research design, data collection strategies, legal research, and building computer databases relevant to the study of justice.

JUS 630 Data Analysis for Justice Research. (3)*once a year*

Bivariate and multivariate techniques of data analysis and hypothesis testing for justice-related research and use of information and statistical programs.

JUS 640 Theoretical Perspectives on Justice. (3)*once a year*

Analyzes philosophical perspectives of justice; linkages between social science theory and justice constructs; application of justice to social issues.

JUS 650 Advanced Qualitative Data Analysis. (3)*spring*

Advanced qualitative data collection and analysis techniques, including ethnography, in-depth interviews, field notes, coding, transcribing, content analysis, textual analysis. Seminar.

JUS 669 Political Trials and Indigenous Justice. (3)*once a year*

Focuses upon research on political trials, deviance, and conceptions of indigenous and contemporary justice. Lecture, discussion.

JUS 691 Seminar. (1–3)*fall, spring, summer*

Topics chosen from various fields of justice studies. May be repeated for credit.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Justice Studies

Interdisciplinary Doctoral Program**John Johnson***Interim Director***(WILSN 370) 480/965-7083****www.asu.edu/copp/justice****Administration of Justice
(ASU West)**

Associate Professor: Haarr

Anthropology

Professor: Brandt

Communication

Professor: Nakayama;
Associate Professor: Corey;
Assistant Professor: Trethewey

Curriculum and Instruction

Professor: Edelsky

English

Professor: Sands;
Assistant Professor: Stevens

History

Professors: Davis, Fuchs

Humanities

Assistant Professor: Baker

Justice Studies

Regents' Professors: Altheide, Palumbo;
Professors: Cavender, Figueira-McDonough, Haynes,
Hepburn, Johnson, Jurik, Lauderdale, Musheno, Romero,
Schneider, Zatz;
Associate Professors: Bortner, Lujan, Riding In;
Assistant Professors: Adelman, Bernstein, Hanson, Menjivar

Languages and Literatures

Regents' Professor: Foster;
Professor: Baldini

Law

Regents' Professor: Murphy;
Professors: Bartels, Kader, Lowenthal, Stanton, Strouse,
Tesón, Tsosie;
Clinical Professor: Dauber

Philosophy

Regents' Professor: Murphy;
Associate Professors: de Marneffe, McGregor

Political Science

Associate Professors: Ashley, Dantico, Doty, Simhony

Psychology

Regents' Professor: Russo;
Professor: Lanyon

Psychology in Education

Associate Professor: Moore

Recreation Management and Tourism

Professor: Allison

Religious Studies

Associate Professor: Gereboff

Social Work

Professor: Ashford

Sociology

Professors: Kronenfeld, Nagasawa, Thomas;
Associate Professor: Benin

Women's Studies

Associate Professor: Ferraro

The Committee on Law and the Social Sciences (COLASS) offers an interdisciplinary graduate program leading to the Ph.D. degree in Justice Studies. Faculty are from a large number of academic units and provide the students with an opportunity to tailor their courses of study to fit individual needs and goals. COLASS committee members represent the following departments: Anthropology, Communication, Languages and Literatures, History, Management, Philosophy, Political Science, Psychology, Recreation Management and Tourism, Religious Studies, Sociology, the College of Law, and the Schools of Justice Studies and Social Work. An executive committee, appointed by the dean of the Graduate College from this larger body of faculty, has the primary responsibility for the operation of the Ph.D. program.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Justice Studies integrates philosophical, legal, historical, and social science approaches to the study of law and justice in society.

This interdisciplinary program aims to produce scholars whose research activities contribute to the knowledge and understanding of conflicts and dilemmas surrounding social change. Courses on the study of justice are a part of the curriculum of many academic disciplines, and academic books and journals increasingly stress issues of justice and injustice. In addition to the interdisciplinary programs featuring justice, students may enter academic programs that focus on business administration, class, ecology, gender, law, public administration, and race. Justice Studies graduates from the interdisciplinary Ph.D. program have a strong

theoretical background, interdisciplinary training in law, humanities, and the social sciences, and possess the technical skills associated with both qualitative and quantitative research methodologies. These qualifications can provide graduates with the opportunity to successfully compete for a variety of positions in academic and justice-related fields.

Admission. Applications are reviewed on an annual basis by an admissions committee representing COLASS. Recommendations for admission are made by the director of the Executive Committee to the dean of the Graduate College. In addition to meeting minimum Graduate College admission requirements, each applicant must provide a statement of educational and career goals and the reasons for seeking the interdisciplinary Ph.D. in Justice Studies, a Graduate Record Examination test score or the Law School Admission Test score, a sample of written work, and three letters of recommendation, preferably from academic referees. Application to the program may be made at anytime. However, complete files must be submitted to the Graduate College by January 1 for the following fall semester. Because of enrollment limits, candidates who meet minimum requirements cannot automatically be admitted.

Advisory Committee. An advisory committee consisting of the committee chairperson and at least two other members, must represent a minimum of two disciplines and be from two different academic units. The dean of the Graduate College, upon the recommendation of the director of COLASS, appoints this committee. The advisory committee assists the students in developing programs of study, assumes primary responsibility for assessing the students' academic progress, and prepares and evaluates the comprehensive examination.

Core Courses. Five core courses are required of all students in the program. The core courses are taken within the first three semesters of the student's program of study. Each core course is interdisciplinary in nature.

JUS 610 Law and the Social Sciences.....	3
JUS 620 Justice Research and Methods	3
JUS 630 Data Analysis for Justice Research	3
JUS 640 Theoretical Perspectives on Justice.....	3
JUS 650 Advanced Qualitative Data Analysis	3
Total	15

Areas of Concentration. Students use elective courses to develop a specialization in an area relevant to justice studies from a law and social sciences perspective. The specialization is developed through consultation with the student's advisory committee. Five areas of concentration have been established, based on the research and teaching expertise of participating faculty.

1. criminal and juvenile justice;
2. dispute resolution;
3. law, justice, and minority populations;
4. law, policy, and evaluation; and
5. women, law, and justice.

From these broad concentrations, students can develop areas of study emphasizing

1. adolescence and justice;
2. American Indian justice;

3. comparative justice;
4. crime and justice;
5. dispute resolution;
6. gender and justice;
7. law, ecology, and society;
8. law, policy, and evaluation;
9. race, ethnicity, and justice; and
10. social and economic justice.

Students may develop other areas of study in consultation with their advisory committee. Courses are not limited to those departments and schools participating in the Committee on Law and Social Sciences.

Program of Study. Students entering the program with a master's degree in the social sciences, philosophy, a relevant interdisciplinary field, or a Juris Doctorate (J.D.), must complete a minimum of 54 semester hours of study beyond the master's or J.D. degree, including 24 semester hours of dissertation and research. Applicants holding only the baccalaureate degree are required to complete a total of 84 semester hours. At least 30 hours of the approved Ph.D. program of study must be completed after admission into the program. The Graduate College also requires that two consecutive semesters, subsequent to admission to the program, must be spent in full-time residence at ASU.

Foreign Language Requirements. None.

Comprehensive Examinations. Upon completion of course work and before the start of dissertation research, the student is given a written examination. The examination evaluates the student's accumulation of interdisciplinary knowledge and ability to communicate across disciplines. The exam is developed and administered by the student's advisory committee.

Dissertation Committee. After passing the comprehensive examination, a dissertation committee is formed and approved by the dean of the Graduate College upon the recommendation of the director of the executive committee. The dissertation committee must consist of at least three faculty members, including the dissertation committee chairperson. The committee must represent an interdisciplinary faculty, with demonstrated interdisciplinary knowledge and skills to advise the student during the formulation of the research topic and during the completion of the research and dissertation. The three-membered committee must represent at least two disciplines and two different academic units. The dissertation and advisory committees may have different memberships.

Advancement to Candidacy. Ph.D. students will achieve candidacy status in a letter from the Graduate College dean upon (1) passing the comprehensive examination, and (2) successfully defending the dissertation prospectus.

Dissertation Requirements. The dissertation consists of a fully documented written analysis demonstrating an appropriate level of interdisciplinary skills and competence associated with a justice issue. Each student must register for a minimum of 24 semester hours of dissertation and research; 12 of these semester hours must be completed in subsequent semesters following the semester the student is advanced to candidacy.

Final Examinations. The dissertation must be defended in an oral examination. A candidate must pass the final examination within five years after completing the comprehensive examination.

Concurrent Ph.D. in Justice Studies/J.D. The purpose of the concurrent Ph.D. in Justice Studies/J.D. is to provide a rigorous education for highly qualified students interested in pursuing academic careers in law, law and the social sciences, or law and philosophy. To seek concurrent degrees, the prospective student must first gain separate admission to the College of Law and the interdisciplinary Ph.D. program in Justice Studies. The student must then obtain special approval to pursue concurrently the J.D. and Ph.D. degrees. No more than three students a year are admitted into the concurrent degree program.

COURSES

For courses, see "Justice Studies (JUS)," page 244.

Languages and Literatures

Master's and Doctoral Programs

David William Foster
Chair

(LL 440) 480/965-6281
languages@asu.edu
www.asu.edu/clas/dll

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INSTRUCTORS

DEAL, LE, OH, PANG

ASSISTANT RESEARCH PROFESSIONAL

ORLICH

ACADEMIC ASSOCIATE

GLESSNER

The faculty in the Department of Languages and Literatures offer graduate programs leading to the M.A. degree in Asian Languages and Civilizations—Chinese/Japanese, French, German, and Spanish. For concentrations available under each major, see the "College of Liberal Arts and Sciences Graduate Degrees and Majors" table, page 82.

Students admitted to the Master of Education degree program in Secondary Education may elect foreign languages as the subject matter field. See "Master of Education," page 186, for information on the Master of Education degree.

The faculty also offer a graduate program leading to the Ph.D. degree in Spanish. See "Doctor of Philosophy," page 103, for general requirements.

It is recommended, but not required, that students applying for admission to the M.A., M.Ed., or Ph.D. program submit scores on the Graduate Record Examination.

The department also offers a Certificate in Translation.

MASTER OF ARTS

Candidates for the M.A. degree should, upon entrance, present the equivalent of an undergraduate major in the language in which the degree is sought. Those who lack this background, but who show strong potential and meet Graduate College admissions requirements, may be admitted to a graduate program on a provisional basis, pending removal of specified deficiencies. These deficiencies must be completed in addition to the regular program of study for the master's degree.

Students in all graduate programs are expected to maintain a high level of linguistic fluency acceptable to a native speaker. Before acceptance in the program, applicants may be requested to furnish evidence of their proficiency.

The program of study for the M.A. degree includes a minimum of 30 semester hours of graduate-level work, as approved by the candidate's supervisory committee. The program must include a 500-level Bibliography and Research Methods course offered by the department. It is recommended that the course be taken, if possible, in the first semester of the candidate's graduate career. When approved by the candidate's supervisory committee, nine hours in another language or in closely related courses may be included in the program.

Students who are primarily interested in teaching on the secondary or community college levels may select, with the approval of the supervisory committee, a program of study with a concentration in language and culture. Students in all programs present a thesis for which six hours of credit are granted.

Comprehensive Examinations. All candidates are required to pass a comprehensive written or oral examination designed to evaluate the candidate's knowledge in the area of specialization. A reading list is provided as a guide to preparation for this examination.

Thesis Requirements. There are two options. The thesis option is required for students intending to pursue doctoral studies. There is a portfolio option thesis equivalent for students intending to teach in K–12 or the community colleges; however, such students may also choose the thesis option. See the director of graduate studies to inquire about the two options.

Final Examinations. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

The Ph.D. degree is offered with a major in Spanish with concentrations in literature or cultural studies.

Program of Study. A student's individual program of courses covering the various periods of Spanish and Latin American literature and/or culture, as well as the historical and political background of both areas, is determined in consultation with the supervisory committee. Specifically required as prerequisites are SPA 500 Bibliography and Research Methods, SPA 545 Concepts of Literary Criticism (for a concentration in literature), and SPA 598 ST: Cultural Studies/Semiotics of Culture (for a concentration in cultural studies).

At least 15 graduate credits must be earned in the subfield, and the candidate's program of study in the subfield must be approved by the subfield department. Normally the comprehensive examination on the subfield, administered by the subfield department, must be satisfied before the comprehensive in Spanish. Students are urged to consult the *Spanish Graduate Handbook*.

Foreign Language Requirements. Each candidate is expected to demonstrate a reading knowledge of two languages other than Spanish. The language requirements must be satisfied before the candidate is eligible to take the comprehensive examination.

Comprehensive Examinations. A written and oral comprehensive examination, designed to ascertain the candidate's knowledge and orientation in the field of study and competency to proceed with the dissertation, is required at or near the end of course work.

Dissertation Requirements. The candidate must present an acceptable dissertation based on original investigation. The dissertation must represent a significant contribution to knowledge and demonstrate the candidate's ability to do independent, scholarly research.

Final Examinations. A final oral examination is required. This examination covers the subject matter of the dissertation and appropriate field.

CERTIFICATE IN TRANSLATION

The Certificate in Translation program is designed to provide the advanced training required for professional translation in both the public and private sectors, preparation for the rigorous examinations required by national and international agencies, and training as an ancillary skill for professional fields, such as international business, public health and medicine, and law, in accordance with guidelines recommended by the American Translators' Association. The certificate is a nondegree program consisting of 12 semester hours of course work and two semester hours of in-service practicum primarily into the receptor language of English from the source language of Spanish. The practicum may be taken simultaneously with course work leading to an undergraduate or graduate degree, as a related area sequence, or as the sole program of study for members of the community who meet the admission requirements of the certificate program and are enrolled in the university. A complete bro-

chure is available at the Department of Languages and Literatures in LL 440.

While the certificate program is not yet available in French, FRE translation courses may be available. See the *Schedule of Classes* for course offerings.

RESEARCH ACTIVITY

Faculty in the Department of Languages and Literatures conducts a wide array of research on topics relating to languages and cultures of the world. Of particular interest are contemporary and urban topics relating to the 20th-century and beyond, with special emphasis on urban studies, gender issues/sexual identities, popular culture, film, theater, and print media. Current pedagogical issues relating to language acquisition figures prominently in the department, as do technological developments. These include the teaching of languages and cultures, and the accessibility to and distribution of information regarding regions and topics of interest to faculty and students.

Spanish Research Activity. In addition to broad coverage of peninsular and Spanish-American literary and cultural topics, particular regional emphases lie within the U.S. Southwest, Mexico, Central America, the Caribbean, the Andes, and the River Plate. Specific research projects by Spanish faculty members include topics in Chicano and Latino literature, literary translation, Hispanic literary bibliography, contemporary literary theory, Spanish-American colonial literature, Argentine narrative, contemporary Mexican and Centro-American literature, contemporary Spanish and Spanish-American poetry, Spanish-American oral tradition, Hispanic women writers, Latin American popular culture, Spanish-American Jewish writers, gender and queer studies, contemporary Spanish and Spanish-American theater and film, Spanish-American postmodern culture, prose narrative of the Golden Age, Hispanic linguistics and bilingualism/sociolinguistics, and various topics in Brazilian literature.

CHINESE (CHI)

CHI 500 Bibliography and Research Methods. (3)

not regularly offered

Introduction to research materials on China in Chinese, Japanese, and Western languages. Overview of research methods. Lecture, discussion.

CHI 514 Advanced Classical Chinese. (3)

not regularly offered

Close readings in selected premodern texts, with focus on special grammatical features, and increased vocabulary. Lecture, discussion.

CHI 520 Teaching of Chinese as a Second Language. (3)

not regularly offered

Theory and practice of teaching Chinese, including presentation, interaction, and evaluation, with consideration given to cultural factors. Lecture, discussion.

CHI 535 Advanced Readings. (3)

not regularly offered

Readings in primary and secondary sources in history, art, religious studies, economics, or other fields. Lecture, discussion.

CHI 543 Chinese Language and Linguistics. (3)

fall

Analysis and discussion, within the framework of linguistic theory, of selected problems in Chinese phonetics, morphology, and syntax. Lecture, discussion.

CHI 585 Problems of Translation. (3)

not regularly offered

Theories and practice of translation: strategies for handling a variety of Chinese texts. Lecture, discussion.

CHI 591 Seminar. (3)

not regularly offered

Topics in literary, linguistic, or cultural studies.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

FOREIGN LANGUAGES (FLA)

FLA 515 Second Language Acquisition. (3)

spring

Discussion and application of theories of second language acquisition. Prerequisite: FLA 400 (or its equivalent).

FLA 525 Trends and Issues in Foreign Language Teaching. (3)

not regularly offered

Advanced methods seminar, designed for experienced teachers.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

FRENCH (FRE)

FRE 416 French Civilization II. (3)

spring

Political, intellectual, social, economic, and artistic development of France from the 18th century to present. Prerequisite: 6 hours of upper-division French.

General Studies: HU, G

FRE 421 Structure of French. (3)

fall

Phonology, morphology, syntax, semantics, and varieties of French. Prerequisites: both FRE 311 and 312 or only instructor approval.

FRE 422 Applied French Linguistics. (3)

spring

Applies linguistic theory and second language acquisition theory to teaching of French. Prerequisite: ASB 480 or ENG 213 or FLA 400.

FRE 423 French Syntax. (3)

fall

Analysis of French syntactic structure by contemporary theoretical models. Prerequisite: ASB 480 or ENG 213 or FLA 400.

FRE 424 French Phonology. (3)

spring

Introduction to phonological theory and its application to French. Prerequisites: both FRE 311 and 312 or only instructor approval.

FRE 441 French Literature of the 17th Century. (3)

not regularly offered

From 1600 to 1660. Prerequisites: both FRE 321 and 6 hours of 300-level French or only instructor approval.

General Studies: HU

FRE 442 French Literature of the 17th Century. (3)

not regularly offered

From 1660 to 1700. Prerequisites: both FRE 321 and 6 hours of 300-level French or only instructor approval.

General Studies: HU, H

FRE 445 French Literature of the 18th Century. (3)

not regularly offered

Contributions of the philosophers and the development of the novel and drama. Prerequisites: both FRE 321 and 6 hours of 300-level French or only instructor approval.

General Studies: L/HU

FRE 451 French Poetry of the 19th Century. (3)

not regularly offered

From Romanticism to Parnassian poetry to Symbolism. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

FRE 452 French Novel of the 19th Century. (3)

not regularly offered

From Constant, Hugo, Balzac, Stendhal, and Sand to Flaubert and Zola, with emphasis on major literary movements. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

General Studies: HU

FRE 453 Theater of the 19th Century. (3)

not regularly offered

From Romantic drama to the Symbolist Theater. Representative plays of Hugo, Musset, Vigny, Dumas, Becque, Rostand, Feydeau, and Mirbeau. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

General Studies: L/HU

FRE 461 Modern Narrative. (3)

fall

Representative authors from Gide to the new Nouveau Roman. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

General Studies: HU

FRE 462 Modern Poetry. (3)

spring

Representative authors from Mallarmé to Bonnefoy. Lecture, discussion. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

General Studies: HU

FRE 471 The Literature of Francophone Africa and the Caribbean. (3)

not regularly offered

Selected prose, poetry, and drama of black authors from Africa and the Caribbean. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

General Studies: L/HU

FRE 472 Franco-Canadian Civilization. (3)

spring

Study of the civilization of Quebec in particular through its history, language, literature, music, and customs. Prerequisite: 9 hours of 300-level French or instructor approval.

FRE 480 Translation Theory and Practice. (3)

fall

Theoretical and practical approaches to the fundamentals of meaning-based translation. Lecture, seminar. Prerequisite: FRE 412 or instructor approval.

FRE 482 Business Translation. (3)

spring

Practical approach to meaning-based translation through exposure to a variety of business texts. Prerequisite: FRE 312 or instructor approval.

FRE 485 Literary Translation. (3)

spring

Theory and practice of literary translation with emphasis on application through individual translation project. Prerequisite: FRE 480.

FRE 500 Bibliography and Research Methods. (3)

fall

Required of all graduate students.

FRE 510 Explication de Textes. (3)

not regularly offered

Detailed analysis of literary texts.

FRE 515 Intellectual Currents in France, from the Middle Ages to the 18th Century. (3)

not regularly offered

Significant social, aesthetic, philosophic, and scientific ideas as presented by major writers of fiction and nonfiction.

FRE 516 Intellectual Currents in France, from the 19th Century to the 20th Century. (3)

not regularly offered

See FRE 515.

FRE 521 History of the French Language. (3)

not regularly offered

Principal phonological, morphological, and semantic developments of French from Latin to present, with emphasis on Old and Middle French. Some familiarity with Latin is recommended.

FRE 531 Medieval French Literature. (3)

fall

Readings in the epics, early drama, roman courtois, and other representative literary genres of the Middle Ages.

FRE 535 French Literature of the 16th Century. (3)

spring

Readings in French Renaissance literature with special attention to the humanist movement and to Rabelais, Montaigne, and the Pleiade.

FRE 580 Translation Theory and Practice. (3)

fall

Theoretical and practical approaches to the fundamentals of meaning-based translation. Lecture, seminar. Prerequisite: FRE 412 or instructor approval.

FRE 582 Business Translation. (3)*spring*

Practical approach to meaning-based translation through exposure to a variety of business texts. Prerequisite: FRE 312 or instructor approval.

FRE 585 Literary Translation. (3)*spring*

Theory and practice of literary translation with emphasis on application through individual translation project. Lecture, seminar. Prerequisite: FRE 480.

FRE 591 Seminar. (1–12)*not regularly offered*

Possible topics:

- (a) Advanced Problems in French Literature. (3)
- (b) Balzac. (3)
- (c) Corneille, Molière, and Racine. (3)
- (d) Diderot, Voltaire, and Rousseau. (3)
- (e) Flaubert. (3)
- (f) French Existentialist Literature. (3)
- (g) French Literary Criticism. (3)
- (h) Proust. (3)
- (i) Realism and Naturalism. (3)
- (j) Romanticism. (3)
- (k) Stendhal and Zola. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

GERMAN (GER)**GER 421 German Literature. (3)***fall*

From the beginning to Classicism. Prerequisite: 6 hours of 300-level German.

*General Studies: HU***GER 422 German Literature. (3)***spring*

From Romanticism to the present. Prerequisite: 6 hours of 300-level German.

*General Studies: L/HU***GER 453 German Literary Masterpieces on Film. (3)***fall, spring, summer*

Film and literature in their correlation to each other and to cultural, political, and social trends in German-speaking countries. Special arrangements for graduate students and those without a knowledge of German. Lecture, discussion.

*General Studies: HU, G, H***GER 500 Bibliography and Research Methods. (3)***not regularly offered*

Required of all graduate students.

GER 511 German Stylistics. (3)*not regularly offered*

Art of writing literary German, comparative stylistics.

GER 521 History of German Language. (3)*not regularly offered*

Linguistic development of German from the earliest records to the present.

GER 523 German Drama. (3)*not regularly offered*

Drama of the 19th and 20th centuries.

GER 525 German Novel. (3)*not regularly offered*

Special studies in the German novel.

GER 527 The Novelle. (3)*not regularly offered*

Special studies in the German short story.

GER 531 Middle High German Language and Literature. (3)*not regularly offered*

Reading and discussion of specimens of the Middle High German epics, romances, and other literary genres.

GER 551 Romanticism. (3)*not regularly offered*

Treatment of early and late Romanticism.

GER 555 Modern German Literature. (3)*not regularly offered*

Major works from the period of Expressionism to 1945.

GER 591 Seminar. (1–12)*not regularly offered*

Special topics are concerned with a figure, theme, or work in German literature or Germanic studies. Possible topics:

- (a) Faust. (3)
- (b) Germanic Studies. (3)
- (c) Goethe. (3)
- (d) Grass and Böll. (3)
- (e) Hesse. (3)
- (f) Kafka. (3)
- (g) Kleist. (3)
- (h) Schiller. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

JAPANESE (JPN)**JPN 500 Bibliography and Research Methods. (3)***not regularly offered*

Introduction to research materials on Japan both in Japanese and in Western languages. Overview of research methods. Lecture, discussion.

JPN 514 Advanced Premodern Japanese. (3)*not regularly offered*

Close readings of selected premodern texts, with focus on grammatical and stylistic features. Lecture, discussion. Prerequisite: JPN 414 (or its equivalent).

JPN 520 Teaching of Japanese as a Second Language. (3)*not regularly offered*

Theory and practice of teaching Japanese, including presentation, interaction, and evaluation, with consideration given to cultural factors. Lecture, discussion.

JPN 535 Advanced Readings. (3)*not regularly offered*

Readings in primary and secondary sources in history, art, religious studies, literature, or other fields. Lecture, discussion. Prerequisite: JPN 414 (or its equivalent).

JPN 543 Japanese Language and Linguistics. (3)*not regularly offered*

Analysis and discussion of linguistic theories applied to Japanese phonology, morphology, and syntax, including psychological, sociological, and historical aspects.

JPN 585 Advanced Problems of Translation. (3)*not regularly offered*

Theories and practice of translation; strategies for handling a variety of Japanese texts. Lecture, discussion. Prerequisite: JPN 435 (or its equivalent).

JPN 591 Seminar. (3)*not regularly offered*

Topics in literary, linguistic, or cultural studies.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

RUSSIAN (RUS)**RUS 591 Seminar. (3)***not regularly offered*

Topics in literary, linguistic, or other cultural studies.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

SPANISH (SPA)

SPA 500 Bibliography and Research Methods. (3)

fall

Required of all graduate students.

SPA 536 Generation of 1898. (3)

not regularly offered

Works of Unamuno, Baroja, Azorín, and their contemporaries, studied against the ideological background of the turn of century in Spain.

Prerequisite: SPA 325.

SPA 540 History of the Spanish Language. (3)

spring

Analyzes and discusses the development of Spanish from Vulgar Latin to the present day. Prerequisite: FLA 400 (or its equivalent).

SPA 541 Spanish Language in America. (3)

fall

Discusses and analyzes various regional and social varieties of Spanish in the Americas. Prerequisite: FLA 400 (or its equivalent).

SPA 542 Studies in the Spanish of the Southwest. (3)

spring

Examines bilingualism and the social and regional dialects of Spanish in the Southwest. Prerequisite: FLA 400 (or its equivalent).

SPA 543 Structure of Spanish. (3)

spring

Analyzes and discusses data on selected topics in Spanish morphology, semantics, and syntax. Prerequisite: FLA 400 (or its equivalent).

SPA 544 Spanish Phonology. (3)

spring

Surveys problems of Spanish phonology within the context of recent phonological theory. Prerequisite: FLA 400 (or its equivalent).

SPA 545 Concepts of Literary Criticism. (3)

spring

Aims and methods of modern literary scholarship. Discusses major theories of literary analysis.

SPA 555 Spanish American Modernism. (3)

not regularly offered

Principal works and figures of literary modernism, 1880–1920, with emphasis on international literary context of the movement. Prerequisite: SPA 325.

SPA 557 Contemporary Spanish American Poetry. (3)

not regularly offered

Major works and problems in contemporary poetry and poetics, with emphasis on Paz, Parra, Cardenal, and new poetry since 1960. Prerequisite: SPA 325.

SPA 560 Medieval Spanish Literature. (3)

not regularly offered

Major figures and works of the Middle Ages in Spain.

SPA 561 Golden Age Spanish Prose Fiction. (3)

not regularly offered

Major figures and works of the 16th and 17th centuries, with emphasis on the picaresque novel.

SPA 562 Golden Age Spanish Poetry. (3)

not regularly offered

Major figures and works of the 16th and 17th centuries, with emphasis on lyric poetry.

SPA 563 Spanish Romanticism. (3)

not regularly offered

Principal figures and works of the Spanish romanticism, with emphasis on international literary context of the movement.

SPA 564 19th-Century Spanish Prose Fiction. (3)

not regularly offered

Principal figures and works of realism in the 19th-century novel, with emphasis on Galdós.

SPA 565 20th-Century Spanish Drama. (3)

not regularly offered

Principal figures and works of Spanish dramatic literature from the Generation of 1898 to the present.

SPA 566 Generation of 1927. (3)

not regularly offered

Major poets of the Generation of 1927, with emphasis on works of Lorca, Guillén, Salinas, and Aleixandre.

SPA 567 Contemporary Spanish Novel. (3)

not regularly offered

Major works of post-Civil War Spanish fiction.

SPA 568 Cervantes. (3)

not regularly offered

Extensive analysis of the prose and theater of Cervantes as a key figure of the Spanish Golden Age. Lecture, seminar.

SPA 570 Indigenous Literatures of Spanish America. (3)

not regularly offered

Indigenous literary traditions, with emphasis on Nahuatl, Mayan, and Quechua literatures through readings in Spanish translations.

SPA 571 Colonial Spanish American Literature. (3)

not regularly offered

Major figures and works from conquest to independence.

SPA 572 Spanish American Drama. (3)

not regularly offered

Major contributions of Spanish American drama, with emphasis on contemporary dramatists.

SPA 573 Spanish American Essay. (3)

not regularly offered

Major works of the essay, within the framework of intellectual history and literary movements.

SPA 574 Spanish American Vanguard Poetry. (3)

not regularly offered

Examines poetic developments, 1920–1940, with emphasis on Huidobro, Vallejo, Neruda, and the international context of their works.

SPA 575 Contemporary Spanish American Novel. (3)

not regularly offered

Principal novels of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative.

SPA 576 Contemporary Spanish American Short Story. (3)

not regularly offered

Principal short stories of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative.

SPA 577 Regional Spanish American Literature. (3)

not regularly offered

Figures and works of major national (Peru, Argentina, Chile, and Mexico) and regional (Caribbean) literatures. Topics offered on a rotating basis. May be repeated when topics vary.

SPA 578 Novel of the Mexican Revolution. (3)

not regularly offered

Representative works and authors of this genre (Guzmán, Azuela, Urquiza, Muñoz, and Romero), including related or peripheral offshoots in indigenous novels.

SPA 581 Latin American Popular Culture. (3)

not regularly offered

Studies in selected topics of Latin American popular culture, with emphasis on appropriate academic models for the critical analysis of these materials.

SPA 582 Studies in Latin American Film. (3)

not regularly offered

Examines the role of film in contemporary Latin American culture; films viewed and analyzed as casebook examples. Seminar.

SPA 591 Seminar. (3)

not regularly offered

Spanish and Spanish American literary, cultural, and linguistic topics.

SPA 598 Special Topics. (1–4)

not regularly offered

Possible topics:

(a) Cultural Studies/Semiotics of Culture

SPA 691 Figures and Works Seminar. (3)

not regularly offered

Topics may be selected from Spanish and Spanish American literatures.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Law

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For more information about the College of Law programs, see "College of Law," page 77.

LAW (LAW)

LAW 500 Holding Registration. (1–16)

fall and spring

LAW 515 Contracts I. (3)

fall

Explores common law legal method and the structure of Article 2 of the U.C.C. in the context of issues of contract formation.

LAW 516 Criminal Law. (3)

fall

Substantive law of crimes.

LAW 517 Torts I. (2–4)

spring

Legal protections of personality, property, and relational interests against physical, economic, and emotional harms.

LAW 518 Civil Procedure I. (3)

fall

Explores the structure of a lawsuit and techniques of alternative dispute resolution. Specific topics include commencement of suit, joinder of parties, discovery, pretrial motions, and subject matter jurisdiction.

LAW 519 Legal Method and Writing. (2)

fall

Examines methods used to analyze legal problems. Reviews precedent statutory construction and basic *res judicata* problems. Use of basic legal writing formats.

LAW 520 Contracts II. (2)

spring

Continuation of LAW 515 focusing on contract interpretation.

LAW 522 Constitutional Law I. (3)

spring

Role of courts in the federal system, distribution of powers between state and federal governments, and the role of procedure in litigation of constitutional questions.

LAW 523 Property I. (2–3)

fall

Indicia of ownership, found property, estates in land, landlord tenant.

LAW 524 Legal Research and Writing. (2)

spring

Continuation of LAW 519.

LAW 525 Torts II. (2)

spring

Continuation of LAW 517 with emphasis on strict and products liability.

LAW 526 Property II. (2–3)

spring

Nonpossessory interests in property (easements, covenants, servitudes); nuisance; land use planning; and transfers of interests in property.

LAW 527 Civil Procedure II. (3)

spring

Continuation of LAW 518; subjects in LAW 518 are addressed in greater depth as well as personal jurisdiction, *res judicata*, collateral estoppel, and choice of law under the Erie doctrine.

LAW 600 Administrative Law. (3)

once a year

Administrative process, emphasizing nature of powers exercised by administrative agencies of government, problems of procedure, and scope of judicial review.

LAW 601 Antitrust Law. (3)

once a year

Legislation and its implementation to prevent monopoly and business practices in restraint of trade, including restrictive agreements involving price-fixing, trade association activities, and resale price maintenance.

LAW 602 Partnership Taxation. (2–3)

not regularly offered

Federal tax consequences of forming, operating, terminating, or transferring partnerships.

LAW 603 Conflict of Laws. (3)

not regularly offered

Problems arising when the operative facts of a case are connected with more than one state or nation. Choice of law, bases of jurisdiction, effect of foreign judgments, and underlying federal and constitutional issues.

LAW 604 Criminal Procedure. (3)

fall and spring

Nature of the criminal procedural system with special focus on constitutional protections for the accused.

LAW 605 Evidence. (3)

once a year

Principles and practice governing the competency of witnesses and presentation of evidence, including the rules of exclusion and roles of lawyer, judge, and jury under the adversary system.

LAW 606 Federal Income Taxation. (3–4)

fall and spring

Federal income tax in relation to concepts of income, property arrangement, business activity, and current tax problems, with focus on the process of tax legislation and administration.

LAW 607 Advanced Civil Procedure. (3)

fall and spring

Overview of the structure and life cycle of a lawsuit from pleadings to appeal, emphasizing the Federal Rules of Civil Procedure.

LAW 608 Business Associations I. (3)

once a year

Partnerships, limited partnerships, and small business corporations. Includes a brief introduction to accounting. Detailed analysis of the problems of forming a close corporation, state law duties of care and loyalty, management, dividends and redemptions, issuance of stock, internal dispute resolution, dissolution, and the general law of derivative actions.

LAW 609 Business Associations II. (3)*once a year*

Interrelationship of federal and state law and a brief introduction to corporate finance (1933 Act). Broad overview of large company regulations including reporting rules, proxy regulation, insider trading, sale of control, tender offers and takeovers, and going private. Prerequisite: LAW 608.

LAW 610 Advanced Criminal Procedure. (2–3)*once a year*

Topics in criminal procedure, with emphasis on legal constraints on grand jury investigations, police practices, pretrial release, preliminary hearings, prosecutorial discretion, and plea bargaining.

LAW 611 Estate Planning I. (2–3)*not regularly offered*

Tax laws relating to transfer of wealth both at death and during lifetime, including federal estate tax, gift tax, and income taxation of estates and trusts.

LAW 612 Family Law. (3)*once a year*

Legal and nonlegal problems that an individual may encounter because of a situation as a family member.

LAW 613 Federal Courts. (3)*not regularly offered*

Federal judicial system; relationship of federal and state law; jurisdiction of federal courts and their relation to state courts.

LAW 614 Labor Relations. (3)*not regularly offered*

Collective bargaining, including the right of employees to organize and to engage in concerted activities; resolution of questions concerning the representation of employees; duty of employers and unions to bargain; administration and enforcement of collective bargaining agreements.

LAW 615 Public International Law. (3)*once a year*

Role of law in international disputes. Considers drafting and interpretation of treaties and multilateral conventions.

LAW 616 Jurisprudence. (3)*once a year*

Introduction to legal philosophy, with readings on the nature of law and legal reasoning, the relationship between law and morality and equality and social justice.

LAW 618 Trusts and Estates. (3)*once a year*

Substantive concepts involved in transmitting wealth, including interstate succession, wills and will substitutes, the modern trust as a family protective device, creation of future interests in a planned estate, social restrictions of a nontax nature, and methods of devoting property to charitable purposes.

LAW 619 Commercial Law: Payment and Credit Systems. (3)*fall*

Law of credit obligations and payment devices. Focuses on Articles 3, 4, and 4A of the Uniform Commercial Code.

LAW 620 Civil Rights Legislation. (2–3)*not regularly offered*

Coverage of the rights and remedies provided by federal civil rights legislation, principally, the key provisions of the Reconstruction Era Civil Rights Acts, portions of the employment discrimination legislation, and voting rights legislation.

LAW 621 Commercial Law: Sales and Leases of Goods. (3)*spring*

Advanced issues involving the formation and interpretation of sales and lease contracts. Focuses primarily on Articles 2 and 2A of the Uniform Commercial Code.

LAW 622 Commercial Law: Secured Transactions. (3)*once a year*

Secured transactions under Article 9 of the Uniform Commercial Code and other relevant sections. Overview of the creation, perfection, and priority effects of security interests. Financing of business enterprise and consumer credit.

LAW 623 Commercial Torts. (3–4)*once a year*

Involves an analysis of actionable wrongs against a business entity or against proprietary rights held by that entity, covering the entire spectrum of private remedies for competitive wrongs.

LAW 624 Community Property. (1–2)*fall and spring*

Property rights of husband and wife; the Arizona community property system; homestead.

LAW 625 Constitutional Law II. (3–4)*fall, spring, summer*

Fundamental protection for person, property, political, and social rights.

LAW 627 Corporate Taxation. (2–3)*once a year*

Problems in taxability of the corporation, corporate distributions, and corporate reorganizations.

LAW 628 Creditor-Debtor Relations. (3)*once a year*

Creditors' remedies in satisfaction of claims and debtors' protection and relief under bankruptcy, other laws.

LAW 629 Employment Law. (3)*once a year*

Employment law topics including testing, privacy, OSHA, FLSA, benefits, worker's compensation, rights to compensation, workplace emotional injuries, termination, and sexual harassment.

LAW 630 Employment Discrimination. (2–3)*not regularly offered*

Focuses primarily on Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act, and the Americans with Disabilities Act.

LAW 631 Environmental Law. (3)*once a year*

Litigation, administrative law, and legislation relating to problems of environmental quality. Topics covered may include air and water pollution, toxic substances, pesticides, and radiation.

LAW 632 Indian Law. (3)*once a year*

Inquiry into legal problems special to American Indians and tribes.

LAW 634 Judicial Remedies. (3)*once a year*

Nature and limits of injunctive, restitutionary, and compensatory remedies for the protection of personal, property, political, and civil rights.

LAW 635 Juvenile Justice System. (3)*not regularly offered*

Special problems in the juvenile system.

LAW 636 Land Use Regulation. (2–3)*once a year*

Legal problems in the regulation and control of land development by state and local governments. Administration of zoning, subdivision, and other planning controls; issues of fairness and procedure in the utilization of such controls.

LAW 637 Lawyering Theory and Practice. (4)*fall and spring*

Issues of competency and professionalism in the practice of law.

LAW 638 Law and Ethics of Lawyering. (3)*fall and spring*

Emphasis on the Model Rules and Model Code that govern the professional responsibility of lawyers and their interpretation and application.

LAW 639 Natural Resource Law. (3)*once a year*

Examines the constitutional basis for federal land management and the different kinds of public lands management schemes (e.g., parks, forests, wildlife refuges), emphasizing acquisition of right to, and regulation of, the different uses of public lands and resources (e.g., mining, grazing, timber, wildlife habitat, recreation).

LAW 640 Securities Regulation. (2)*once a year*

Selected problems arising under the major statutes concerned with regulating the securities market.

LAW 641 State and Local Government. (2–3)*not regularly offered*

Legal problems involved in the organization and administration of governmental units, including the city, county, town, village, school district, and special district.

LAW 643 Water Law. (3)*once a year*

Acquisition of water rights; water use controls; interstate conflicts.

LAW 644 Intellectual Property. (3)*once a year*

Protection of intellectual property and encouragement of creativity—trade values, trade secrets, patents, copyrights, performing arts, and visual arts.

LAW 645 Patent Law. (3)*once a year*

In-depth examination of substantive patent law as it applies to the commercialization and enforcement of patent rights.

LAW 646 Copyright Law. (3)*once a year*

Legal rights in original forms of human expression.

LAW 702 Alternative Dispute Resolution. (2–3)*once a year*

Broad exposure to methods of settling disputes in our society such as mediation, arbitration/conciliation, and negotiation, including examination of the current litigation model.

LAW 703 Law, Science, and Technology. (2–3)*once a year*

Legal mechanisms used in dealing with various issues raised by contemporary science and technology. Explores current legal responses to science and technology.

LAW 705 Media Law. (2–3)*once a year*

Examines First Amendment principles and statutory and regulatory requirements with respect to the conventional print and broadcast media, as well as recent technologies such as cable.

LAW 706 Immigration Law. (2–3)*not regularly offered*

Explores political, economic, social, and legal issues concerning immigration. Specific topics covered include citizenship and naturalization, denaturalization, deportation, and refugee rights and asylum.

LAW 707 Elder Law. (2–3)*once a year*

Looks at legal and policy questions related to aging individuals and an older society. Seminar.

LAW 708 Gender, Sexuality, and the Law. (2–3)*once a year*

Examines assumptions made in the law about gender and sexuality and the impact of those assumptions on the application of the law. Seminar.

LAW 709 International Human Rights. (2–3)*not regularly offered*

International rules and procedures governing the protection of human rights.

LAW 710 Real Estate Tax Planning. (2–3)*once a year*

Discusses topics, including but not limited to real estate investments as tax shelters, alternative acquisition finance devices, refinancing techniques, and nontaxable exchanges.

LAW 711 Real Estate Transfer. (2–3)*once a year*

Examines the legal aspects of the sale and purchase of real property encompassing three areas: the role of the lawyer and broker in the transaction, the sales contract, and issues relating to title protection.

LAW 712 Religion and the Constitution. (2–3)*once a year*

In-depth study of the “establishment” and “free exercise” clauses of the First Amendment to the U.S. Constitution.

LAW 714 Law and Social Science. (2–3)*not regularly offered*

Investigates the use of social science research and methods in the legal system. Topics include psychology of eyewitness identification, social-psychological studies of decision making, statistical evidence of discrimination, econometric studies of the deterrent effects of capital punishment, and clinical predictions of violent behavior.

LAW 715 Professional Sports. (2–3)*not regularly offered*

Unique legal problems relating to professional sports, including their relationship to antitrust laws, the nature of player contracts, and associated tax problems.

LAW 716 Timber and Range. (2–3)*once a year*

Explores legal aspects of environmental controversies surrounding timber cutting and livestock grazing on public lands. Seminar. Prerequisite: LAW 639.

LAW 717 Legislative Process. (2–3)*not regularly offered*

Explores both the legal and the practical contexts within which the legislative process operates, with a major component being a legislative drafting project.

LAW 721 Education and the Law. (2–3)*not regularly offered*

Current legal problems affecting institutions of higher education, faculty, students, and governing boards.

LAW 722 Mexican Law. (2–3)*fall*

Comparative overview of Mexican law. Poses questions regarding the proper role and function of a legal system. Seminar.

LAW 733 Negotiation, Mediation, and Counseling. (3)*once a year*

Explores alternative models of negotiated dispute resolution, as well as the roles of lawyer and client in the negotiation process. Extensive use of simulation exercises.

LAW 734 Products Liability. (2–3)*once a year*

Traces the development of products liability law; analyzes the major issues currently confronting the courts in this area. Seminar.

LAW 735 Estate Planning II. (2–3)*not regularly offered*

Preparation of actual estate plans and implementing legal documents for a variety of typical private clients. Considers both tax and nontax elements in preparation of the plans. Prerequisite: LAW 611.

LAW 736 Planning for the Business Client. (2–3)*not regularly offered*

Planning transactions involving business organizations with special emphasis on income tax and corporate considerations.

LAW 738 Trial Advocacy. (2–3)*fall and spring*

Students confront issues of trial advocacy through simulation of a variety of aspects of trial practice in a mock court setting. Prerequisite: LAW 605.

LAW 745 The Supreme Court. (2–3)*once a year*

Intensive examination of selected current decisions of the U.S. Supreme Court.

LAW 768 International Business Transactions. (2–3)*not regularly offered*

Problems and policy considerations involved in international trade; tariffs, international monetary controls, and development loans.

LAW 770 Law Journal. (1–3)*fall and spring*

Academic credit for successful completion of editorial work by a member of the staff of *Arizona State Law Journal*; maximum of 5 semester hours.

LAW 771 Jurimetrics Journal. (1–3)*fall and spring*

Academic credit for successful completion of editorial work by a member of the staff of the *Jurimetrics Journal of Law, Science, and Technology*. Studio.

LAW 772 Public Defender Clinic. (1–6)*fall, spring, summer*

Placement in the Public Defender Clinic and related classroom component. Prerequisite: LAW 605.

LAW 773 Civil Practice Clinic. (1–6)*fall, spring, summer*

Placement in the Civil Practice Clinic and related classroom component. Prerequisite: LAW 605.

LAW 774 Criminal Practice Clinic. (1–6)*fall, spring, summer*

Placement with various prosecutor offices in the Phoenix area and related classroom component. Prerequisite: LAW 605.

LAW 775 Mediation Clinic. (4)*fall and spring*

Study of the mediation process and experience as mediators in cases pending before the justice courts and administrative agencies.

LAW 780 Moot Court. (1–3)

fall and spring

Academic credit for successful completion of work as a member of the Moot Court Board of Directors; maximum of 3 semester hours.

LAW 781 Individual Study. (1)

fall, spring, summer

With the approval of a faculty member, a student may research a legal subject of special interest and prepare a paper suitable for publication.

LAW 782 Individual Study. (2)

fall, spring, summer

See LAW 781.

LAW 783 Individual Study. (3)

fall, spring, summer

See LAW 781.

LAW 784 Moot Court Competition. (1–4)

fall and spring

Successful participation and completion of a national moot court competition.

LAW 785 Externship. (1–12)

fall, spring, summer

Supervised, practical lawyering in an external placement proposed by the student or established by a sponsoring agency and approved by the College of Law. In addition, an associated academic component is established by the student with a member of the faculty.

LAW 791 Seminar in Law. (1–12)

fall and spring

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Mass Communication

Master's Program

Joe Foote

Director

(STAUF A231B) 480/965-5011

masscomm@asu.edu

www.asu.edu/cronkite/masscom.html

PROFESSORS

CRAFT, CRONKITE, DOIG, FOOTE, GODFREY, MERRILL, SYLVESTER, WATSON, YOUM

ASSOCIATE PROFESSORS

ALLEN, BARRETT, BRAMLETT-SOLOMON, GALICIAN, HOY, LENTZ, MATERA, RUSSELL, RUSSOMANNO

CLINICAL PROFESSORS

ITULE, LEIGH

LECTURERS

CASAVANTES, NICHOLS

MASTER OF MASS COMMUNICATION

The faculty in the Walter Cronkite School of Journalism and Telecommunication offer a graduate program leading to the professional degree Master of Mass Communication (M.M.C.). The program is designed to help students achieve academic and professional growth, to prepare students for positions in the mass media, and to provide a background to enable persons currently in the media to advance their careers.

Admission. In addition to the general requirements for admission to the Graduate College, the M.M.C. program requires applicants to provide three letters of recommendation (including two from professors in the last unit of study

from degree-granting institutions), scores on either the GRE (verbal and quantitative) or the MAT, a biographical sketch that includes all professional media experience, and a 250–500 word statement outlining career aspirations that could be enhanced by admission to the program (the statement is also used as a writing sample). The applicant's undergraduate GPA, letters of recommendation, test scores, and professional media experience are all considered in the admission process. A TOEFL score of 600 or higher is required of all applicants whose native language is not English. Applicants wishing to enroll for fall semester must have all their application materials submitted by March 1.

Admission Classification. Applicants who have an undergraduate degree in an area of mass communication, who meet all other requirements, and who receive regular admission may begin the 36 semester hour program in either the fall or spring. A two-year program is designed for applicants who have an undergraduate degree in a discipline other than mass communication. This program consists of 45 semester hours. The first-year courses are designed to provide a foundation in journalism knowledge and skills and must be taken in prescribed sequence. Some first-semester courses are prerequisites for courses to be taken in subsequent semesters.

Registration. Registration in courses numbered 500 is limited to students who have been admitted to the M.M.C. program or have approval from the instructor of the class. Non-degree graduate students may not register for 500-level courses in the School of Journalism and Telecommunication during early registration. Undergraduate students wishing to reserve graduate course credit must follow Graduate College guidelines and obtain approval from the director of graduate studies.

Program of Study. The program consists of 36 semester hours of graduate credit for students with undergraduate degrees in the areas of mass communication. Requirements are as follows:

1. 12 hours of core course work,
2. six to 12 hours of specialization courses,
3. nine to 15 hours of a related area outside the school, and
4. three hours of supervised applied project (MCO 593).

The program consists of 45 semester hours of credit for students with undergraduate degrees in areas other than mass communication. Requirements are as follows:

1. 15 hours of core course work,
2. 12 hours of specialization courses,
3. six hours of mass communication writing skills courses,
4. nine hours of a related area outside the school, and
5. three hours of supervised applied project (MCO 593).

Foreign Language Requirements. None.

Thesis Requirements. None.

Final Examinations. An oral examination in defense of the supervised research or creative project is required.

JOURNALISM (JRN)

JRN 401 Public Relations Techniques. (3)

fall and spring

Theory and practice of publicity, public relations, and related techniques and procedures. Prerequisites: JRN 301 (or TCM 315); professional program admission.

JRN 412 Editorial Interpretation. (3)

not regularly offered

The press as an influence on public opinion. Role of the editorial in analyzing and interpreting current events. Prerequisites: JRN 301; professional program admission.

JRN 413 Advanced Editing. (3)

fall and spring

Theory and practice of newspaper editing, layout and design, picture and story selection. Prerequisites: JRN 313; professional program admission.

JRN 414 Electronic Publication Design. (3)

fall and spring

Theory, organization, and practice of layout, typography, and design in traditional and multimedia publishing. Prerequisites: JRN 401; professional program admission.

JRN 415 Writing for Public Relations. (3)

fall and spring

Development of specific writing techniques for the practitioner in public relations agencies and divisions of major organizations. Prerequisites: JRN 401; professional program admission.

JRN 417 Public Relations Campaigns. (3)

fall

Theory, principles, and literature of public relations and how they relate to audiences, campaigns, and ethics. Prerequisites: both JRN 401 and 415 or only instructor approval; professional program admission.

JRN 420 Reporting Public Affairs. (3)

fall and spring

Instruction and assignments in reporting the courts, schools, government, city hall, social problems, and other areas involving public issues. Prerequisites: JRN 301; professional program admission.

JRN 440 Magazine Writing. (3)

fall and spring

Writing and marketing magazine articles for publication. Prerequisites: JRN 301 (or instructor approval); professional program admission.

JRN 451 Photojournalism II. (3)

fall and spring

Theory and practice of photojournalism with emphasis on shooting, lighting, and layout for the media. Prerequisites: JRN 351; professional program admission.

JRN 452 Photojournalism III. (3)

fall and spring

Advanced theory and practice of photojournalism with emphasis on the photo essay and illustrations in black and white and color. 2 hours lecture, 2 hours lab. Prerequisites: JRN 451; professional program admission.

JRN 465 Precision Journalism. (3)

spring

Advanced writing course with focus on reporting polls and surveys and other numerically-based stories as well as on understanding the concepts that underlie polls and surveys. Lecture, lab. Prerequisites: JRN 301 (or instructor approval); professional program admission.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

MASS COMMUNICATION (MCO)

MCO 402 Mass Communication Law. (3)

fall, spring, summer

Legal aspects of the rights, privileges, and obligations of the press, radio, and television. Prerequisites: 70 hours; major professional status in Broadcasting or Journalism.

General Studies: L

MCO 418 History of Mass Communication. (3)

fall and spring

American journalism from its English and colonial origins to the present day. Development and influence of newspapers, magazines, radio, television, and news gathering agencies.

General Studies: SB, H

MCO 421 News Problems. (3)

spring

Trends and problems of the news media, emphasizing editorial decisions in the processing of news. Prerequisite: 9 hours in mass communication/journalism/telecommunication courses or instructor approval.

MCO 430 International Mass Communication. (3)

fall and spring

Comparative study of communication and media systems. Information gathering and dissemination under different political and cultural systems.

General Studies: G

MCO 450 Visual Communication. (3)

fall, spring, summer

Theory and tradition of communication through the visual media with emphasis on the continuity of traditions common to modern visual media.

General Studies: HU

MCO 456 Political Communication. (3)

fall and spring

Theory and research related to political campaign communication. The persuasive process of political campaigning, the role of the media, the candidate, and image creation.

General Studies: SB

MCO 460 Race, Gender, and Media. (3)

spring

Reading seminar designed to give students a probing examination of the interface between AHANA Americans and the mass media in the United States. Lecture, discussion. Cross-listed as AFR 460. Credit is allowed for only AFR 460 or MCO 460.

General Studies: C

MCO 463 Introduction to Media Statistics. (3)

fall and spring

Introduction to statistical analysis as applied to the mass media. Prerequisite: major professional status in Broadcasting or Journalism.

MCO 501 Newswriting and Reporting. (3)

fall

Designed for graduate students in the M.M.C. program who have undergraduate degrees in nonjournalism areas. Objective is to teach fundamentals of writing and reporting. Lecture, lab. Prerequisite: acceptance into M.M.C. graduate program.

MCO 503 Press Freedom Theory. (3)

spring

Examines philosophical and legal aspects of press freedom. Emphasis on First Amendment theory evolution from 1791 to present.

MCO 510 Research Methodology in Mass Communication. (3)

fall and spring

Identifies research problems in mass communication. Overview of questionnaire construction. Attention to survey, historical, content analysis, experimental, and legal research methods.

MCO 520 Mass Communication Theories and Process. (3)

fall

Analyzes various theoretic models of mass communication with emphasis on the applications of these theories to various professional communication needs.

MCO 522 Mass Media and Society. (3)

spring

Mass media as social institutions, particularly interaction with government and public. Emphasis on criticism and normative statements.

MCO 530 Media Ethics. (3)

fall

Ethical conventions and practices of print and electronic media as they relate to the government and private sectors of the society.

MCO 531 Broadcast Journalism. (3)

spring

News and information practices of networks, stations, and industry. Practice in writing, reporting, and editing with emphasis on video. Lecture, lab. Prerequisite: MCO 501.

MCO 540 Historical/Legal Methods. (3)

spring

Introduction to legal and historical methods necessary to conduct qualitative mass communication research. Prerequisite: M.M.C. graduate student.

MCO 560 Arizona Media Law. (3)*fall*

Case study approach of first amendment issues, media access, libel, confidentiality, and invasion of privacy as applied to media organizations in Arizona. Lecture, seminar.

MCO 593 Applied Project. (1–12)*not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

TELECOMMUNICATION (TCM)**TCM 433 Broadcast Sales and Promotion. (3)***fall and spring*

Basics of electronic media marketing practices, including commercial time sales techniques and radio/TV promotion fundamentals. Prerequisites: TCM 200; professional program admission.

TCM 435 Cable TV and Emerging Telecommunication Systems. (3)*fall and spring*

Structures and utilization of cable, industrial, and instructional television, satellite, and videocassettes. Prerequisites: TCM 200; professional program admission.

TCM 437 Advanced TV Production. (3)*fall and spring*

Emphasizes individual production projects of the student's own conception and design utilizing studio, field, and postproduction techniques. Prerequisites: TCM 235; professional program admission.

TCM 472 Broadcast Station Management. (3)*fall, spring, summer*

Management principles and practices, including organization, procedures, policies, personnel problems, and financial aspects of station management. Prerequisites: TCM 332; professional program admission.

TCM 475 Television Newscast Production. (3)*fall and spring*

Writing, reporting, and production of the television newscast. Capstone course of the broadcast journalism emphasis. Prerequisites: professional program admission; instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Materials Engineering

Master's and Doctoral Programs**Subhash Mahajan***Chair***(ECG 202) 480/965-3313****cbmerek@enpop2.eas.asu.edu****www.eas.asu.edu/~cme****REGENTS' PROFESSOR**

MAYER

PROFESSORS

ADAMS, DEY, KRAUSE, MAHAJAN, NEWMAN

ASSOCIATE PROFESSOR

ALFORD

ASSISTANT PROFESSOR

CHAWLA

The faculty in the Department of Chemical and Materials Engineering offer graduate programs leading to the Master of Science (M.S.) degree, the Master of Science in Engineering (M.S.E.) degree, and the Ph.D. degree in Engineering Science with specializations in materials science and

engineering (see "Engineering Science," page 201 for program description). Areas of concentration include electronic and advanced materials processing, mechanical behavior of materials, composites, thin films, ceramics, characterization and simulation of materials, and biomaterials.

The faculty also participate in offering the interdisciplinary program leading to the Ph.D. degree with a major in Science and Engineering of Materials (see "Science and Engineering of Materials," page 307, for program description). A *Graduate Student Handbook*, detailing information on graduate studies in Materials Engineering, is available to admitted students. For information on graduate studies in Materials Engineering, access the Web site at www.eas.asu.edu/~cme or call the Department of Chemical and Materials Engineering at 480/965-3313.

Graduate Record Examination. Graduate Record Examination scores are required from all students.

MASTER OF SCIENCE

For more information, including general requirements, see "Master's Degrees," page 100.

Transition Program. Students applying for the program leading to a master's degree with a major in Materials Engineering may have an undergraduate B.S. degree in a major field other than Materials Engineering or Materials Science. The qualifications of transition students are reviewed by the department graduate committee and a special program is then designed for successful applicants. In general applicants should have had, or should be prepared to take, calculus through differential equations, chemistry, and physics. Transition students are expected to complete the essential courses in their area of study from the undergraduate program in order to be prepared for the graduate courses. Other course work from the undergraduate program may be required depending upon the area of study selected by the student. Transition students should contact the graduate coordinator for an evaluation of their undergraduate transcript.

Program of Study. All candidates for the M.S.E. or M.S. degree in Materials Engineering are required to complete an approved program of study consisting of the minimum required semester hours, including research report (M.S.E.) or thesis (M.S.). Special course requirements for the different areas of study are established by the faculty and are available from the departmental graduate coordinator. In addition to the course/thesis requirements, all full-time graduate students must successfully complete a seminar course during each semester of attendance. Part-time students must enroll in a seminar course at least three times during the course of study. Candidates whose undergraduate degree was in a field other than Materials Engineering or Materials Science may be required to complete more than 30 semester hours.

Thesis Requirements. A thesis or equivalent is required.

Final Examinations. A final oral examination or equivalent is required in defense of the thesis.

MASTER OF SCIENCE IN ENGINEERING

The faculty also participate in offering the tri-university Master of Engineering degree program. See "Master of Engineering," page 195, for program description.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in the area of study in materials science and engineering under the Engineering Science major, is conferred upon evidence of excellence in research resulting in a scholarly dissertation that is a contribution to existing knowledge. See "Doctor of Philosophy," page 103, for general requirements.

Doctoral Program. Upon successful completion of the qualifying examination, a research supervisory committee is formed and the doctoral student is required to submit a research proposal. Following acceptance of the research proposal, the student is given a comprehensive examination to determine initiative, originality, breadth, and level of professional commitment to the problem selected for investigation. Upon successful completion of the comprehensive examination, the student applies for admission to candidacy.

Foreign Language Requirements. Candidates in the program leading to the Ph.D. degree in the area of study in materials science and engineering, under the Engineering Science major, normally are not required to pass an examination showing reading competency of a foreign language. However, the supervisory committee may establish such a requirement in special cases depending upon the research interests of the candidate. If a foreign language is required, the student must successfully fulfill the requirement before taking the comprehensive examination.

Dissertation Requirement. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

MATERIALS SCIENCE AND ENGINEERING (MSE)

MSE 421 Physical Metallurgy Laboratory. (1)

spring

Focuses on analysis of microstructure of metals and alloys and includes correlation with mechanical properties to some extent. Lab. Pre- or corequisite: MSE 420.

MSE 510 X-ray and Electron Diffraction. (3)

spring

Fundamentals of X-ray diffraction, transmission electron microscopy, and scanning electron microscopy. Techniques for studying surfaces, internal microstructures, and fluorescence. Lecture, demonstrations. Prerequisite: transition student with instructor approval.

MSE 511 Corrosion and Corrosion Control. (3)

not regularly offered

Introduction to corrosion mechanisms and methods of preventing corrosion. Topics include: electrochemistry, polarization, corrosion rates, oxidation, coatings, and cathodic protection. Prerequisite: transition student with instructor approval.

MSE 512 Analysis of Material Failures. (3)

not regularly offered

Identification of types of failures. Analytical techniques. Fractography, SEM, nondestructive inspection, and metallography. Mechanical and electronic components. Prerequisite: transition student with instructor approval.

MSE 513 Polymers and Composites. (3)

fall

Relationship between chemistry, structure, and properties of engineering polymers. Design, properties, and behavior of fiber composite systems.

MSE 514 Physical Metallurgy. (3)

spring

Crystal structure and defects. Phase diagrams, metallography, solidification and casting, and deformation and annealing. Prerequisite: transition student with instructor approval.

MSE 515 Thermodynamics of Materials. (3)

not regularly offered

Principles of statistical mechanics, statistical thermodynamics of single crystals, solutions, phase equilibrium, free energy of reactions, free electron theory, and thermodynamics of defects. Prerequisite: transition student with instructor approval.

MSE 516 Mechanical Properties of Solids. (3)

fall

Effects of environmental and microstructural variables of mechanical properties, including plastic deformation, fatigue, creep, brittle fracture, and internal friction. Prerequisite: transition student with instructor approval.

MSE 517 Introduction to Ceramics. (3)

fall

Principles of structure, property relations in ceramic materials. Processing techniques. Applications in mechanical, electronic, and superconducting systems. Prerequisite: transition student with instructor approval.

MSE 518 Integrated Circuits Materials Science. (3)

not regularly offered

Principles of materials science applied to semiconductor processing and fabrication in metals, ceramics, polymers, and semiconductors. Prerequisite: transition student with instructor approval.

MSE 519 Physical Metallurgy Laboratory. (1)

spring

Analyzes microstructure of metals and alloys and includes some correlation with mechanical properties. Lab. Pre- or corequisite: MSE 514.

MSE 520 Theory of Crystalline Solids. (3)

not regularly offered

Anisotropic properties of crystals; tensor treatment of elastic, magnetic, electric and thermal properties, and crystallography of Martensitic transformations.

MSE 521 Defects in Crystalline Solids. (3)

not regularly offered

Introduction to the geometry, interaction, and equilibrium between dislocations and point defects. Discusses relations between defects and properties. Prerequisite: ECE 350 or instructor approval.

MSE 530 Materials Thermodynamics and Kinetics. (3)

not regularly offered

Thermodynamics of alloy systems, diffusion in solids, kinetics of precipitation, and phase transformations in solids. Prerequisites: ECE 340, 350.

MSE 540 Fracture, Fatigue, and Creep. (3)

not regularly offered

Relationship between microstructure and fracture; fatigue and creep properties of materials. Environmental effects and recent developments. Current theories and experimental results. Prerequisite: MSE 440 (or its equivalent).

MSE 550 Advanced Materials Characterization. (3)

not regularly offered

Analytical instrumentation for characterization of materials; SEM, SIMS, Auger, analytical TEM, and other advanced research techniques.

MSE 556 Electron Microscopy Laboratory. (3)

fall

Lab support for MSE 558. Cross-listed as SEM 556. Credit is allowed for only MSE 556 or SEM 556. Pre- or corequisite: MSE 558 or SEM 558.

MSE 557 Electron Microscopy Laboratory. (3)

spring

Lab support for MSE 559. Cross-listed as SEM 557. Credit is allowed for only MSE 557 or SEM 557. Pre- or corequisite: MSE 559 or SEM 559.

MSE 558 Electron Microscopy I. (3)

fall

Microanalysis of the structure and composition of materials using images, diffraction, X-ray, and energy loss spectroscopy. Requires knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables. Cross-listed as SEM 558. Credit is allowed for only MSE 558 or SEM 558. Prerequisite: instructor approval.

MSE 559 Electron Microscopy II. (3)

spring

Microanalysis of the structure and composition of materials using images, diffraction, X-ray, and energy loss spectroscopy. Requires knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables. Cross-listed as SEM 559. Credit is allowed for only MSE 559 or SEM 559. Prerequisite: instructor approval.

MSE 560 Strengthening Mechanisms. (3)

not regularly offered

Deformation of crystalline materials. Properties of dislocations. Theories of strain hardening, solid solution, precipitation, and transformation strengthening. Prerequisite: ECE 350 (or its equivalent).

MSE 561 Phase Transformation in Solids. (3)

not regularly offered

Heterogeneous and homogeneous precipitation reactions, shear displacive reactions, and order-disorder transformation.

MSE 562 Ion Implantation. (3)

not regularly offered

Includes defect production and annealing. Generalized treatment, including ion implantation, neutron irradiation damage, and the interaction of other incident beams. Prerequisite: MSE 450.

MSE 570 Polymer Structure and Properties. (3)

not regularly offered

Relationships between structure and properties of synthetic polymers, including glass transition, molecular relaxations, crystalline state viscoelasticity, morphological characterization, and processing.

MSE 571 Ceramics. (3)

not regularly offered

Includes ceramic processing, casting, molding, firing, sintering, crystal defects, and mechanical, electronic, and physical properties. Prerequisites: MSE 521, 561.

MSE 573 Magnetic Materials. (3)

not regularly offered

Emphasizes ferromagnetic and ferrimagnetic phenomena. Domains, magnetic anisotropy, and magnetostriction. Study of commercial magnetic materials. Prerequisite: MSE 520 (or its equivalent).

MSE 598 Special Topics. (1-4)

not regularly offered

Possible topics:

- (a) Growth and Processing of Semiconductor Devices. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Materials Science

Master's Program

For information on the interdisciplinary M.S. degree in Materials Science, access www.asu.edu/graduate/SEM on the Web or call 480/965-2460.

Mathematics

Master and Doctoral Programs

**Rosemary Renaut
Chair**

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math.la.asu.edu

REGENTS' PROFESSOR TROTTER

PROFESSORS

ARMBRUSTER, BREMNER, BUSTOZ, GARDNER, HOPPENSTEADT, IHRIG, JACKIEWICZ, KADELL, KAWSKI, KIERSTEAD, KOSTELICH, KUANG, KUIPER, LEONARD, LOHR, MCDONALD, MITTELMANN, NICOLAENKO, QUIGG, RENAUT, RINGHOFER, H.A. SMITH, H.L. SMITH, THIEME, WEISS, YOUNG

ASSOCIATE PROFESSORS

BAER, BARCELO, BLOUNT, CARLSON, CHILDRESS, DRISCOLL, FAN, FARMER, HURLBERT, J. JONES, KURTZ, LAI, LOPEZ, MAHALOV, MCCARTER, MOORE, PREWITT, SPIELBERG, SWIMMER, TAYLOR, TURNER, WELFERT

ASSISTANT PROFESSORS

CZYGRINOW, GELB, D. JONES, KALISZEWSKI, NIKITIN, G. SMITH, SUSLOV, ZANDIEH, ZUO

The faculty in the Department of Mathematics offer graduate programs leading to the M.A. and Ph.D. degrees in Mathematics.

The faculty also participate in the program leading to the Master of Natural Science (M.N.S.) degree when one of the concentrations is mathematics. In collaboration with the College of Education, the Department of Mathematics offers an option for the M.N.S. degree that leads to high school certification.

In addition, the faculty participate in the interdisciplinary program leading to the M.S. degree in Statistics (see "Statistics," page 320).

It is required that students applying to one of these programs submit scores on the Graduate Record Examination.

Students in the College of Education admitted to the Master of Education (see "Master of Education," page 186) or Doctor of Education (see "Doctor of Education," page 187) degree program in Secondary Education may elect mathematics as the subject matter field. These programs are offered and administered through the College of Education.

MASTER OF ARTS

This degree is designed for students who wish to extend their knowledge of mathematics or prepare for certain careers related to mathematics. In order to be admitted without deficiencies, the student's background should include an undergraduate mathematics major or an equivalent preparation such as may be obtained in certain undergraduate programs in engineering or the sciences. In particular, it is

required that the student's preparation include courses in linear algebra and foundations of analysis. A certain degree of familiarity with computer languages may also be required for some areas of study.

Students pursuing the M.A. degree in Mathematics may choose one of the following areas: general mathematics, applied mathematics, statistics and probability, and computational mathematics. Information concerning the requirements for each area may be obtained from the Department of Mathematics.

See "Master's Degrees," page 100, for general requirements.

Program of Study. The program of study, including courses in mathematics and related subjects, is selected with the recommendation of the student's supervisory committee. Ordinarily, a program of study consists of a minimum of 30 semester hours.

Foreign Language Requirements. None.

Comprehensive Examinations. Written examinations are required. For details, contact the Department of Mathematics.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

MASTER OF NATURAL SCIENCE

The faculty of the Department of Mathematics participate in programs leading to the M.N.S. degree (see "Natural Science," page 278). This degree is intended for the student who is interested in an interdisciplinary program with a major emphasis in mathematics and a minor emphasis in a related subject outside mathematics. The student's supervisory committee consists of two faculty members of the Department of Mathematics and one faculty member of the department in the related area. The supervisory committee designs a program of study of at least 36 semester hours that is appropriate for the type of interdisciplinary work the student wishes to pursue. A special option of the M.N.S. degree leads to high school certification. The intention is to develop high school teachers with an excellent subject knowledge in mathematics. For more information, contact the Department of Mathematics.

DOCTOR OF PHILOSOPHY

This Ph.D. is intended for the student with superior mathematical ability, emphasizing the development of creative scholarship and breadth and depth in background knowledge. Admission to the degree program is normally granted after completion of the master's degree. See "Doctoral Degrees," page 102, for general requirements.

Program of Study. The program of study is selected with the recommendation of the student's supervisory committee.

Qualifying Examinations. Qualifying examinations are required. They test a student's mastery of basic material in two of the following five areas: algebra, differential equations, mathematical statistics, numerical methods, and real analysis. Normally, students entering the graduate program with a bachelor's degree take these qualifying examinations

at the beginning of the third semester, and those entering with a master's degree at the beginning of the second semester. These examinations are given once each semester.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral comprehensive examinations are required.

Dissertation Requirements. A dissertation reporting significant, original research suitable for publication in a professional research journal is required. (See "Doctoral Dissertations," page 102.)

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

With 59 faculty members in the department, research interests cover most aspects of mathematics. In particular, the department has strengths in algebra, analysis, computational mathematics, control and system science, differential equations, discrete mathematics, dynamical systems and chaos, mathematical biology, mathematics education, number theory, and statistics.

MATHEMATICS (MAT)

MAT 410 Introduction to General Topology. (3)

once a year

Topological spaces, metric spaces, compactness, connectedness, and product spaces. Prerequisite: MAT 300 or 371 or instructor approval.

MAT 415 Introduction to Combinatorics. (3)

fall

Topics include proof techniques, permutations, combinations; counting techniques including recurrence relations, generating functions, inclusion-exclusion; Ramsey theory and combinatorial designs. Prerequisites: both MAT 300 (or 243) and 342 (or 242) or only instructor approval.

MAT 416 Introduction to Graph Theory. (3)

spring

Topics include trees, cycles, matchings, planarity, connectivity, hamiltonicity, colorings, graph algorithms, and other advanced topics. Prerequisites: both MAT 300 (or 243) and 342 (or 242) or only instructor approval.

MAT 419 Introduction to Linear Programming. (3)

spring

Simplex method, duality, and network flows. Applications to game theory, geometry, combinatorics, graph theory, and posets. Prerequisites: a combination of CSE 100 (or 200 or 210) and MAT 300 (or 243) and 342 (or 242) or only instructor approval.

General Studies: CS

MAT 420 Scientific Computing. (3)

fall

Survey and application of programming languages, libraries, and scientific visualization tools. Programming assignments emphasize software development skills. Lecture, lab. Prerequisites: a combination of CSE 200 and MAT 274 and 342 (or their equivalents) or only instructor approval.

MAT 421 Applied Computational Methods. (3)

fall and spring

Numerical methods for quadrature, differential equations, roots of non-linear equations, interpolation, approximation, linear equations, floating-point arithmetic, and roundoff error. Prerequisites: both MAT 271 (or its equivalent) and fluency in computer programming (preferably FORTRAN) or only instructor approval.

General Studies: CS

MAT 423 Numerical Analysis I. (3)

fall

Analysis and algorithms for numerical solutions linear/nonlinear equations, direct solvers, iterative procedures, optimization. Determination of eigenvalues. Elementary computer arithmetic. Prerequisites: a combination of MAT 342 and 371 and fluency in computer programming or only instructor approval.

General Studies: CS

MAT 425 Numerical Analysis II. (3)

spring

Analysis of and algorithms for numerical interpolation, integration, and differentiation. Numerical solution of ordinary differential equations, and method of lines. Those seeking a methods survey course should take MAT 421. Prerequisites: a combination of MAT 342 and 371 and fluency in computer programming or only instructor approval.

General Studies: CS

MAT 427 Computer Arithmetic. (3)

not regularly offered

Number systems, hardware/software arithmetic, overflow, significance, rounding, multiple precision, and automatic error control; impact on languages, architectures, robust programming, and software development. Prerequisite: only CSE 100 (or 200) or both MAT 421 and 423 (or 425) or only instructor approval.

General Studies: CS

MAT 442 Advanced Linear Algebra. (3)

fall

Fundamentals of linear algebra, dual spaces, invariant subspaces, canonical forms, bilinear and quadratic forms, and multilinear algebra. Prerequisites: both MAT 300 and 342 or only instructor approval.

MAT 443 Introduction to Abstract Algebra. (3)

fall

Introduction to concepts of abstract algebra. Not open to students with credit for MAT 444. Prerequisites: both MAT 300 and 342 or only instructor approval.

MAT 444 Intermediate Abstract Algebra. (3)

spring

Basic theory of groups, rings, and fields, including an introduction to Galois theory. Appropriate as preparation for MAT 543. Prerequisite: MAT 443 or graduate standing or instructor approval.

MAT 445 Theory of Numbers. (3)

spring

Prime numbers, unique factorization theorem, congruences, Diophantine equations, primitive roots, and quadratic reciprocity theorem. Prerequisites: both MAT 300 and 342 or only instructor approval.

MAT 447 Cryptography. (3)

fall and spring

Block ciphers, stream ciphers, congruence arithmetic, information theory, public key cryptosystems, key exchange, electronic signatures. Prerequisites: MAT 242 (or 342); 300.

MAT 451 Mathematical Modeling. (3)

spring

Detailed study of 1 or more mathematical models that occur in the physical or biological sciences. May be repeated for credit with instructor approval. Prerequisites: both MAT 242 (or 342) and 274 or only instructor approval.

General Studies: CS

MAT 452 Introduction to Chaos and Nonlinear Dynamics. (3)

fall

Properties of nonlinear dynamical systems; dependence on initial conditions; strange attractors; period doubling; bifurcations; symbolic dynamics; Smale-Birkhoff theorem; and applications. MAT 371 is recommended. Prerequisites: MAT 274, 342 (or 242).

MAT 455 Introduction to Fractals and Applications. (3)

spring

Fractals; self-similar structures, fractals with iterated function systems of maps, computing fractals, fractal dimensions, chaotic dynamics on fractals, applications. MAT 371 is recommended. Prerequisites: MAT 274, 342 (or 242).

MAT 460 Vector Calculus. (3)

spring

Vectors, curvilinear coordinates, Jacobians, implicit function theorem, line and surface integrals, Green's, Stokes', and divergence theorems. Not open to students with credit for MAT 372. Prerequisites: MAT 242 (or 342), 272, 274.

MAT 461 Applied Complex Analysis. (3)

fall and summer

Analytic functions, complex integration, Taylor and Laurent series, residue theorem, conformal mapping, and harmonic functions. Prerequisite: MAT 272 (or its equivalent).

MAT 462 Applied Partial Differential Equations. (3)

spring

Second-order partial differential equations, emphasizing Laplace, wave, and diffusion equations. Solutions by the methods of characteristics, separation of variables, and integral transforms. Prerequisites: MAT 242 (or 342), 274.

MAT 472 Intermediate Real Analysis I. (3)

fall

Introduction to analysis in metric spaces with emphasis on the real line. Appropriate as preparation for MAT 570. Prerequisites: MAT 300, 342.

MAT 473 Intermediate Real Analysis II. (3)

spring

Analysis in \mathbb{R}^n : implicit function theorem, introduction to manifolds, Lebesgue integration, change of variables formula, convergence theorems for integrals. Prerequisite: MAT 472 or instructor approval.

MAT 475 Differential Equations. (3)

fall

Asymptotic behavior of solutions of linear and nonlinear ordinary differential equations, stability, Sturm-Liouville problems, boundary value problems, and singular point behavior of autonomous systems. Prerequisites: MAT 242 (or 342), 274.

MAT 476 Partial Differential Equations. (3)

spring

First-order quasilinear, second-order linear (wave, Laplace, heat). Characteristics, harmonic functions, maximum principles, Fourier series, separation of variables. Prerequisites: MAT 274 (or 475), 372 (or 472).

MAT 484 Internship. (1–12)

not regularly offered

MAT 485 History of Mathematics. (3)

not regularly offered

Topics from the history of the origin and development of mathematical ideas. Prerequisite: MAT 272 (or its equivalent).

MAT 505 Perturbation Methods. (3)

not regularly offered

Nonlinear oscillations, strained coordinates, renormalization, multiple scales, boundary layers, matched asymptotic expansions, turning point problems, and WKBJ method. Cross-listed as MAE 505. Credit is allowed for only MAE 505 or MAT 505.

MAT 514 Enumerative Combinatorics I. (3)

fall

First semester of a systematic development of enumerative combinatorics, including elementary counting techniques, sieve methods, and partially ordered sets. Prerequisite: graduate standing or instructor approval.

MAT 515 Enumerative Combinatorics II. (3)

spring

Second semester of a systematic development of enumerative combinatorics, including lattices, exponential structures, symmetric functions, and selected special topics. Prerequisite: MAT 514 or instructor approval.

MAT 516 Graph Theory I. (3)

fall

First semester of a systematic development of graph theory, including matchings, connectivity, arboricity, planarity, coloring, network flows. Prerequisite: graduate standing or instructor approval.

MAT 517 Graph Theory II. (3)

spring

Second semester of a systematic development of graph theory, including dense and sparse graphs, Ramsey theory, hamiltonicity, random graphs, minors. Prerequisite: MAT 516 or instructor approval.

MAT 518 Combinatorial Optimization I. (3)

fall

First semester of a systematic development of combinatorial optimization, including linear programming, duality, primal-dual algorithms, network flow algorithms, weighted matchings. Prerequisite: graduate standing or instructor approval.

MAT 519 Combinatorial Optimization II. (3)*spring*

Second semester of a systematic development of combinatorial optimization, including matroid algorithms, theory of NP-completeness, polynomial time approximation, dynamic programming. Prerequisite: MAT 518 or instructor approval.

MAT 520 Numerical Linear Algebra. (3)*fall*

Direct solution of linear systems, iterative methods, eigenvalues and eigenvectors, singular value decomposition, the QR algorithm, error propagation, arithmetic, and stability. Prerequisites: both MAT 342 and 423 (or 421) or only instructor approval.

MAT 521 Iterative Methods. (3)*spring*

Numerical methods for solving linear/nonlinear systems of equations (symmetric, nonsymmetric). Iterative methods for linear systems, conjugate gradients, multigrid methods, preconditioning, Krylov methods. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 523 Numerical Optimization. (3)*not regularly offered*

Linear programming, unconstrained nonlinear minimization, line search algorithms, conjugate gradients, quasi-Newton methods, constrained nonlinear optimization, gradient projection, and penalty methods. Prerequisite: MAT 342 or 371 or 460 or 520 (or its equivalent) or instructor approval.

MAT 524 Parallel Numerical Algorithms. (3)*not regularly offered*

Algorithms for massively parallel, hypercube architectures: "parallel" FORTRAN; solution of linear, nonlinear systems; partial differential equations; iterative methods; multigrid; domain decomposition. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 530 Numerical Solution of Ordinary Differential Equations. (3)*fall*

One step, linear multistep methods; consistency, order, stability, convergence; discretization, roundoff errors, error estimation, adaptive strategy; implementation, software for nonstiff equations. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 531 Numerical Solution of Stiff Differential Systems. (3)*spring*

Runge-Kutta methods, order conditions, construction of highly stable methods, order stars, error estimation, stepsize selection, contractivity properties, linear multistep methods. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 533 Computational Elliptic and Parabolic Partial Differential Equations. (3)*fall*

Parabolic and elliptic equations, finite difference, finite element methods, stability, consistency, convergence, practical aspects, applications, software. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 534 Computational Hyperbolic Partial Differential Equations. (3)*spring*

Numerical solutions of hyperbolic PDEs, finite difference methods, well-posedness, stability, consistency, convergence, adaptive grids; Maxwell's equations, elastic wave propagation; Navier-Stokes. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 535 Spectral Methods for Partial Differential Equations. (3)*not regularly offered*

Spectral, pseudospectral theory; Galerkin, collocation methods; Tau-methods, global approximation properties, stability; convergence; solutions for linear, nonlinear systems. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 543 Abstract Algebra. (3)*fall*

Groups, modules, rings and fields, Galois theory, homological algebra, and the representation theory. Prerequisite: MAT 444 or instructor approval.

MAT 544 Abstract Algebra. (3)*spring*

Continuation of MAT 543. Prerequisite: MAT 543 or instructor approval.

MAT 551 Linear Operators and Integral Equations. (3)*spring*

Bounded linear and compact operators on Hilbert spaces. Linear integral equations, Fredholm and Hilbert-Schmidt theory, and approximate methods. Distributions. Prerequisites: MAT 242 and 462 (or their equivalents).

MAT 555 Fractal Geometry. (3)*not regularly offered*

Geometry and analysis of fractal sets; definitions of dimensions; calculating dimensions; projections, products of fractals; random fractals; multifractal measures; and applications. Prerequisites: MAT 371, 455. MAT 472 is recommended.

MAT 560 Dynamical Systems Methods in Fluid Dynamics. (3)*fall*

Applications of modern dynamical systems methods to fluid mechanics: bifurcations, normal forms, nonlinear dynamics, pattern formation, mixing, and Lagrangian chaos. Prerequisite: graduate standing or instructor approval.

MAT 570 Real Analysis. (3)*spring*

Lebesgue integration, selected function spaces, differentiation, abstract measure theory, and elements of functional analysis. Prerequisite: MAT 372 or instructor approval.

MAT 571 Real Analysis. (3)*fall*

Continuation of MAT 570. Prerequisite: MAT 570 or instructor approval.

MAT 572 Complex Analysis. (3)*fall*

Analytic functions, series and product representations, entire and meromorphic functions, normal families, Riemann mapping theorem, harmonic functions, and Riemann surfaces. Prerequisite: MAT 371 or instructor approval.

MAT 573 Complex Analysis. (3)*spring*

Continuation of MAT 572. Prerequisite: MAT 572 or instructor approval.

MAT 574 Theory of Ordinary Differential Equations. (3)*not regularly offered*

Systems, existence proofs, singularities, asymptotic behavior of solutions, boundedness of solutions, eigenvalues and eigenfunctions, and perturbation theory. Prerequisite: MAT 372 or instructor approval.

MAT 575 Theory of Ordinary Differential Equations and Dynamical Systems. (3)*not regularly offered*

Geometric approach to ODEs and dynamical systems; (un)stable, center manifolds; structural stability; normal forms; averaging; chaos; persistence. May be repeated for credit with instructor approval. Prerequisites: both MAT 452 and 475 or only MAT 574 or only instructor approval.

MAT 576 Theory of Partial Differential Equations. (3)*not regularly offered*

Existence and uniqueness theorems, boundary value and initial value problems, characteristics, Green's functions, maximum principle, distributions, and weak solutions. Prerequisite: knowledge of Lebesgue integration or instructor approval.

MAT 577 Theory of Partial Differential Equations. (3)*not regularly offered*

Continuation of MAT 576. Prerequisite: MAT 576 or instructor approval.

MAT 578 Functional Analysis. (3)*not regularly offered*

Locally convex, normed, and Hilbert spaces. Linear operators, spectral theory, and application to classical analysis. Prerequisite: MAT 472 or 571 or instructor approval.

MAT 579 Functional Analysis. (3)*not regularly offered*

Continuation of MAT 578. Prerequisite: MAT 578 or instructor approval.

MAT 591 Seminar. (1–12)

not regularly offered

Possible topics:

- (a) Algebra. (1–3)
- (b) Analysis. (1–3)
- (c) Applied Mathematics. (1–3)
- (d) Combinatorial Mathematics. (1–3)
- (e) Mathematical Logic. (1–3)
- (f) Numerical Analysis. (1–3)
- (g) Topology. (1–3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

MATHEMATICS EDUCATION (MTE)

MTE 482 Methods of Teaching Mathematics in Secondary School. (3)

fall

Examines secondary school curricular material and analyzes instructional devices. Teaching strategies, evaluative techniques, diagnosis, and remediation and problem solving. Prerequisite: instructor approval.

MTE 483 Mathematics in the Secondary School. (3)

spring

Topics in geometry, number theory, algebra, and analysis. Emphasis on unifying principles. Prerequisite: MAT 310 or instructor approval.

MTE 585 Modern Geometry for Teachers. (3)

once a year

Euclidean, projective, and non-Euclidean geometries. Prerequisite: instructor approval.

MTE 587 Analysis for Teachers. (3)

not regularly offered

Subject matter in mathematics appropriate for accelerated programs in secondary schools, including analytic geometry and calculus. Prerequisite: instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

STATISTICS AND PROBABILITY (STP)

STP 420 Introductory Applied Statistics. (3)

fall, spring, summer

Introductory probability, descriptive statistics, sampling distributions, parameter estimation, tests of hypotheses, chi-square tests, regression analysis, analysis of variance, and nonparametric tests. Prerequisite: MAT 117 (or its equivalent).

General Studies: CS

STP 421 Probability. (3)

fall

Laws of probability, combinatorial analysis, random variables, probability distributions, expectations, moment-generating functions, transformations of random variables, and central limit theorem.

Prerequisites: MAT 272 and 300 and STP 420 (or their equivalents).

STP 425 Stochastic Processes. (3)

spring

Markov chains, stationary distributions, pure jump processes, 2D order processes, and other topics in stochastic processes. Prerequisites: MAT 342; STP 421.

STP 427 Mathematical Statistics. (3)

spring

Limiting distributions, interval estimation, point estimation, sufficient statistics, and tests of hypotheses. Prerequisites: STP 420, 421.

STP 429 Experimental Statistics. (3)

spring

Statistical inference for controlled experimentation. Multiple regression, correlation, analysis of variance, multiple comparisons, and nonparametric procedures. Prerequisite: STP 420 (or its equivalent).

General Studies: CS

STP 525 Advanced Probability. (3)

not regularly offered

Measure-theoretic foundations of probability, distribution functions and characteristic functions, laws of large numbers and central limit theorems, conditional probabilities, martingales, and topics in stochastic processes. Prerequisites: both MAT 571 and STP 421 or only instructor approval.

STP 526 Theory of Statistical Linear Models. (3)

fall

Multinormal distribution, distribution of quadratic forms, full and nonfull rank models, generalized inverses, unbalanced data, variance components, and the large sample theory. Prerequisites: STP 427; knowledge of matrix algebra.

STP 530 Applied Regression Analysis. (3)

fall

Method of least squares, simple and multiple linear regression, polynomial regression, analysis of residuals, dummy variables, and model building. Prerequisite: STP 420 (or its equivalent).

STP 531 Applied Analysis of Variance. (3)

spring

Factorial designs, balanced and unbalanced data, fixed and random effects, randomized blocks, Latin squares, analysis of covariance, and multiple comparisons. Prerequisite: STP 420 (or its equivalent).

STP 532 Applied Nonparametric Statistics. (3)

fall

One-sample test, tests of 2 or more related or independent samples, measures of correlation, and tests of trend and dependence. Prerequisite: STP 420 (or its equivalent).

STP 533 Applied Multivariate Analysis. (3)

spring

Discriminant analysis, principal components, factor analysis, cluster analysis, and canonical correlation. Prerequisite: STP 420 (or its equivalent).

STP 534 Applied Discrete Data Analysis. (3)

not regularly offered

Models for discrete and count data, measures of association, and log-linear and regression models for contingency tables. Prerequisite: STP 420 (or its equivalent).

STP 535 Applied Sampling Methodology. (3)

spring

Simple random, stratified, cluster sampling; variance estimation in complex surveys; nonparametric superpopulation approaches; nonresponse models; computational methods. Prerequisite: STP 420 (or its equivalent).

STP 591 Seminar. (1–12)

not regularly offered

Possible topics:

- (a) Probability. (1–3)
- (b) Statistics. (1–3)

STP 593 Applied Project. (1–12)

not regularly offered

STP 599 Thesis. (1–12)

not regularly offered

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Mechanical Engineering

Master and Doctoral Programs

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PROFESSORS

BOYER, DAVIDSON, EVANS, FERNANDO, JANKOWSKI,
 KRAJCINOVIC, PECK, ROY, SHAH, SIERADZKI,
 TSENG, YAO

ASSOCIATE PROFESSORS

CHEN, KUO, PHELAN, SQUIRES

ASSISTANT PROFESSORS

CHAPSKY, FUSSELL, MCNEILL, PERALTA, SUGAR

The faculty in the Department of Mechanical and Aerospace Engineering offer graduate programs leading to the degrees of M.S., M.S.E., and Ph.D. in Mechanical Engineering. A number of areas of study may be pursued, including design and manufacturing, dynamics and control, energy systems, engineering mechanics, and thermo-sciences.

The faculty also offer graduate degree programs in Aerospace Engineering.

All of the department's graduate programs stress a sound foundation in fundamentals leading to a specialized area of study.

Graduate Record Examination. All applicants are required to take the Graduate Record Examination; the subject test in engineering is highly recommended but not required.

MASTER OF SCIENCE

See "Master's Degrees," page 100, for general requirements.

MASTER OF SCIENCE IN ENGINEERING

See "Master of Science in Engineering," page 200, for information on the Master of Science in Engineering degree.

MASTER OF ENGINEERING

The faculty also participate in offering the tri-university Master of Engineering program. See "Master of Engineering," page 200.

DOCTOR OF PHILOSOPHY

The Ph.D. degree is conferred upon evidence of excellence in research leading to a scholarly dissertation that is an original contribution to knowledge in the field of mechanical engineering.

See "Doctoral Dissertations," page 102, for general requirements.

Program of Study. The program of study must be established no later than the first semester after successfully completing the qualifying examination.

Qualifying Examinations. The purposes of the qualifying criteria are to assess if the student is qualified to continue in the doctoral program and to detect deficiencies in the student's background that can be corrected by appropriate course work and individual study. Within the first year of graduate studies at ASU, a graduate student pursuing a Ph.D. program of study in Mechanical Engineering must complete three 500-level core courses, preferably in the major area of interest, and one 500-level mathematics course, both with an average GPA of 3.25 or higher. Specific qualifying course requirements for each major area are available from the department.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral comprehensive examinations are required. The examinations are administered by the program committee.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

The Department of Mechanical and Aerospace Engineering is organized informally into four disciplinary research groups. The Design Automation Lab of the Design and Manufacturing Group engages in research and education related to the planning and manufacture of mechanical and aerospace engineering products. Research projects include CAD/CAM; geometric modeling; process planning; knowledge-based systems; design theory; engineering data management; creativity techniques; machine intelligence; computational techniques; and engineering analysis. This group is also involved in the development of models for geometric tolerances and dimensioning, a collaboration with the Department of Psychology to develop models for human pursuit strategies, and the design and development of systems of robots.

The Fluid Dynamics and Aerodynamics Group conducts numerical analyses on the modeling of particle-laden turbulent flows; development and assessment of methods for predicting high Reynolds number separated flows; simulation and modeling of the flow and thermal fields in gas-turbine vane-endwall passages; large-eddy simulations; wall-layer modeling of complex boundary layers; boundary-layer transition and flow control; hypersonics; micro-propulsion; and low-chord-Reynolds-number aerodynamics. Theoretical work is carried out on multi-phase and multi-component flows, hydrodynamic stability, polymeric materials processing and fluid behavior in micro-machined systems. Numerical and laboratory modeling and theoretical approaches are used to apply the basic principles of fluid dynamics to geophysical and environmental flows, such as air pollution dispersion, turbulence in the oceans and atmosphere, and topography effects on atmospheric and oceanic currents. Detailed experimental research is conducted on transition and flow control of 2-D and 3-D boundary layers, flow fields

measurements and drag reduction on micro-aerial vehicles, and vortex generation in time dependent internal flows. The department faculty are also closely involved in low-cost space experimentation and satellite design.

Members of the Thermodynamics and Heat Transfer Group are investigating cryogenic heat transfer, including thermal contact resistance and mesoscale cryo-cooler development; energy systems engineering, including energy efficiency of manufacturing facilities and commercial buildings, refrigeration, and indoor air quality; nanoscale and microscale transport processes, using biomolecular motors; FT-IR spectroscopy for gas and other material characterization; turbulent combustion; remote monitoring of pollutants; gas-turbine/spray combustion; fuel systems safety; combustion in porous media; emission control; thermal systems design/optimization; experiments and modeling of multi-phase flow and thermal fields; experiments and simulation of flow and heat transfer in gas turbine components; and thermodynamic analysis of combined-cycle power plants.

Research in the Dynamics and Solid Mechanics Group includes the determination of the forced response of turbomachinery blades, including defects (mistuning), as well as the optimization of the blade properties; vibration testing for sensor optimization; the determination of the random response and fatigue life of thermally buckled panels subjected to a transverse acoustic excitation; the assessment/optimization of a flutter exciter, the nonlinear dynamic response of structural systems (e.g., aircraft) stabilized by internal friction; the vibration monitoring of power plant components; the integrated orbit, attitude, and structural control design for large spacecraft; rapid multi-target pointing control of agile spacecraft using control moment gyros and singularity analysis for redundant single-gimbal control moment gyros. This group also has a strong research effort on the modeling, analysis and design synthesis of composite structures, smart materials and integrated systems; application areas include vibration, noise and shape control, and structural health monitoring. Research in mechanics of materials includes the understanding of brittle behavior in ductile metals; the stress-corrosion cracking problem using the molecular dynamic technique; corrosion and passivation in alloys; fracture of solids with random porosity; elastic properties of superlattices; and thin-film growth to demonstrate that local surface defect interactions control global film morphology. Studies are also conducted in kinematics of fatigue crack propagation, indentation mechanics of monocrystalline substrates, and deformation and fracture of alloyed molybdenum silicides.

Computer Resources and Facilities

Mechanical Engineering graduate education and research is supported by an extensive array of college- and university-supported computer hardware and software, in addition to laboratory workstations.

CEAS Engineering Technical Services (ETS) provides a significant amount of computer equipment, hardware engineering staff, and system staff dedicated to supporting research activities within the college. The central computers, PCs, and distributed workstations in offices and laboratories in the Engineering Research Center (ERC), Barry Goldwater Center (GWC), and many adjoining engineering buildings all link together to form the Engineering Network Support System (ENSS). ENSS utilizes the standard TCP/IP protocol on an ethernet local area network. Faculty and labs

connect their PCs directly to ENSS via ethernet. Ethernet is offered in two speeds: 10 mbs and 100 mbs. Central computers accessible via ENSS include these distributed systems:

1. 300 to 400 Unix workstations (Sun, Silicon Graphics, DEC, HP, IBM, Intel);
2. 2500 to 3000 PCs running mostly Windows NT;
3. 13 to 15 Novell PC LANs ultimately being converted to Windows NT LANs or re-centralized; and
4. 8 to 10 Windows NT LANs, many of which are being re-centralized.

MECHANICAL AND AEROSPACE ENGINEERING (MAE)

MAE 402 Introduction to Continuum Mechanics. (3)

once a year

Applies the principles of continuum mechanics to such fields as flow-in porous media, biomechanics, electromagnetic continua, and magneto-fluid mechanics. Prerequisites: ECE 313; MAE 361 (or 371); MAT 242 (or 342).

MAE 404 Finite Elements in Engineering. (3)

once a year

Introduction to ideas and methodology of finite element analysis. Applications to solid mechanics, heat transfer, fluid mechanics, and vibrations. Prerequisites: ECE 313; MAT 242 (or 342).

MAE 406 CAD/CAM Applications in MAE. (4)

once a year

Solution of engineering problems with the aid of state-of-the-art software tools in solid modeling, engineering analysis, and manufacturing; selection of modeling parameters; reliability tests on software. 3 hours lecture, 3 hours lab. Prerequisites: MAE 441; instructor approval.

MAE 415 Vibration Analysis. (4)

fall

Free and forced response of single and multiple degree of freedom systems, continuous systems; applications in mechanical and aerospace systems numerical methods. Lecture, lab. Prerequisites: ECE 212; MAE 319, 422 (or 425); MAT 242 (or 342).

MAE 417 Control System Design. (3)

once a year

Tools and methods of control system design and compensation, including simulation, response optimization, frequency domain techniques, state variable feedback, and sensitivity analysis. Introduction to nonlinear and discrete time systems. Prerequisite: MAE 317.

MAE 433 Air Conditioning and Refrigeration. (3)

once a year

Air conditioning processes; environmental control; heating and cooling loads; psychrometry; refrigeration cycles. Prerequisite: MAE 388 or MET 432 or instructor approval.

MAE 434 Internal Combustion Engines. (3)

once a year

Performance characteristics, combustion, carburetion and fuel-injection, and the cooling and control of internal combustion engines. Computer modeling. Lab. Prerequisite: MAE 388.

MAE 435 Turbomachinery. (3)

once a year

Design and performance of turbomachines, including steam, gas and hydraulic turbines, centrifugal pumps, compressors, fans, and blowers. Pre- or corequisite: MAE 361 or 371.

MAE 436 Combustion. (3)

once a year

Thermochemical and reaction rate processes; combustion of gaseous and condensed-phase fuels. Applications to propulsion and heating systems. Pollutant formation. Prerequisite: MAE 388.

MAE 442 Mechanical Systems Design. (3)

once a year

Applies design principles and techniques to the synthesis, modeling, and optimization of mechanical, electromechanical, and hydraulic systems. Prerequisites: MAE 422 (or 425), 441.

MAE 446 Thermal Systems Design. (3)*once a year*

Applies engineering principles and techniques to the modeling and analysis of thermal systems and components. Presents and demonstrates optimization techniques and their use. Prerequisite: ECE 300; MAE 388.

MAE 447 Robotics and Its Influence on Design. (3)*once a year*

Robot applications, configurations, singular positions, and work space; modes of control; vision; programming exercises; design of parts for assembly. Prerequisite: MAE 317.

MAE 455 Polymers and Composites. (3)*fall*

Relationship between chemistry, structure, and properties of engineering polymers. Design, properties, and behavior of fiber composite systems. Cross-listed as MSE 470. Credit is allowed for only MAE 455 or MSE 470. Prerequisite: ECE 350.

MAE 460 Gas Dynamics. (3)*spring*

Compressible flow at subsonic and supersonic speeds; duct flow; normal and oblique shocks, perturbation theory, and wind tunnel design. Prerequisites: ECE 384; MAE 361 (or 371).

MAE 462 Space Vehicle Dynamics and Control. (3)*fall*

Attitude dynamics and control, launch vehicles, orbital mechanics, orbital transfer/rendezvous, space mission design, space structures, spacecraft control systems design. Prerequisite: MAE 317.

MAE 463 Propulsion. (3)*fall*

Fundamentals of gas-turbine engines and design of components. Principles and design of rocket propulsion and alternative devices. Lecture, design projects. Prerequisites: ECE 384; MAE 382 (or 460).

MAE 465 Rocket Propulsion. (3)*once a year*

Rocket flight performance; nozzle design; combustion of liquid and solid propellants; component design; advanced propulsion systems; interplanetary missions; testing. Prerequisite: MAE 382 or 460.

MAE 466 Rotary Wing Aerodynamics and Performance. (3)*once a year*

Introduction to helicopter and propeller analysis techniques. Momentum, blade-element, and vortex methods. Hover and forward flight. Ground effect, autorotation, and compressibility effects. Prerequisites: both ECE 384 and MAE 361 or only instructor approval.

MAE 467 Aircraft Performance. (3)*once a year*

Integration of aerodynamic and propulsive forces into aircraft performance design. Estimation of drag parameters for design. Engine, airfoil selection. Conceptual design methodology. Lecture, design projects. Prerequisite: MAE 361 or 371. Pre- or corequisite: MAE 444.

MAE 469 Projects in Astronautics or Aeronautics. (3)*fall and spring*

Various multidisciplinary team projects available each semester. Projects include design of high-speed rotocraft autonomous vehicles, liquid-fueled rockets, microaerial vehicles, satellites. Prerequisite: instructor approval.

MAE 471 Computational Fluid Dynamics. (3)*once a year*

Numerical solutions for selected problems in fluid mechanics. Prerequisites: ECE 384; MAE 361 (or 371).

MAE 504 Laser Diagnostics. (3)*spring*

Fundamentals of optics and the interaction of light with matter. Laser sources, laser spectroscopy, velocimetry, particle sizing, and surface characterization.

MAE 505 Perturbation Methods. (3)*not regularly offered*

Nonlinear oscillations, strained coordinates, renormalization, multiple scales, boundary layers, matched asymptotic expansions, turning point problems, and WKBJ method. Cross-listed as MAT 505. Credit is allowed for only MAE 505 or MAT 505.

MAE 506 Advanced System Modeling, Dynamics, and Control. (3)*spring*

Lumped-parameter modeling of physical systems with examples. State variable representations and dynamic response. Introduction to modern control. Prerequisite: ASE 582 or MAT 442.

MAE 507 Optimal Control. (3)*fall*

Optimal control of systems. Calculus of variations, dynamic programming, linear quadratic regulator, numerical methods, and Pontryagin's principle. Cross-listed as EEE 587. Credit is allowed for only EEE 587 or MAE 507. Prerequisite: EEE 482 or MAE 506.

MAE 509 Robust Multivariable Control. (3)*spring*

Characterization of uncertainty in feedback systems, robustness analysis, synthesis techniques, multivariable Nyquist criteria, computer-aided analysis and design. Prerequisites: MAE 417, 506.

MAE 510 Dynamics and Vibrations. (3)*fall*

Lagrange's and Hamilton's equations, rigid body dynamics, gyroscopic motion, and small oscillation theory.

MAE 511 Acoustics. (3)*fall*

Principles underlying the generation, transmission, and reception of acoustic waves. Applications to noise control, architectural acoustics, random vibrations, and acoustic fatigue.

MAE 512 Random Vibrations. (3)*spring*

Review of probability theory, random processes, stationarity, power spectrum, white noise process, random response of single and multiple DOF systems, and Markov processes simulation. Prerequisite: MAE 510 or instructor approval.

MAE 515 Structural Dynamics. (3)*spring*

Free vibration and forced response of discrete and continuous systems, exact and approximate methods of solution, finite element modeling, and computational techniques. Prerequisite: MAE 510 or instructor approval.

MAE 518 Dynamics of Rotor-Bearing Systems. (3)*spring*

Natural whirl frequency, critical speed, and response analysis of rigid and flexible rotor systems. Bearing influence and representation. Stability analysis. Methods of balancing.

MAE 520 Solid Mechanics. (3)*fall*

Introduction to tensors: kinematics, kinetics, and constitutive assumptions leading to elastic, plastic, and viscoelastic behavior. Applications.

MAE 521 Structural Optimization. (3)*not regularly offered*

Linear and nonlinear programming. Problem formulation. Constrained and unconstrained optimization. Sensitivity analysis. Approximate techniques. FEM-based optimal design of mechanical and aerospace structures. Cross-listed as CEE 533. Credit is allowed for only CEE 533 or MAE 521. Prerequisite: instructor approval.

MAE 523 Theory of Plates and Shells. (3)*fall*

Linear and nonlinear theories of plates. Membrane and bending theories of shells. Shells of revolution. Prerequisite: MAE 520.

MAE 524 Theory of Elasticity. (3)*spring*

Formulation and solution of 2- and 3-dimensional boundary value problems. Prerequisite: MAE 520.

MAE 527 Finite Element Methods in Engineering Science. (3)*fall*

Discretization, interpolation, elemental matrices, assembly, and computer implementation. Application to solid and fluid mechanics, heat transfer, and time-dependent problems. Prerequisite: ASE 582.

MAE 536 Combustion. (3)*not regularly offered*

Thermodynamics; chemical kinetics of combustion. Explosion and ignition theories. Reactive gas dynamics. Structure, propagation, and stability of flames. Experimental methods. Prerequisite: MAE 436 or instructor approval.

MAE 540 Advances in Engineering Design Theory. (3)*fall*

Survey of research in engineering design process, artifact and design, knowledge, formal and informal logic, heuristic and numerical searches, theory of structure and complexity. Prerequisite: graduate standing.

MAE 541 CAD Tools for Engineers. (3)*fall*

Elements of computer techniques required to develop CAD software. Data structures, including lists, trees, and graphs. Computer graphics, including 2- and 3-dimensional algorithms and user interface techniques.

MAE 542 Geometric Modeling in CAD/CAM. (3)*spring*

Geometric and solid modeling, curve and surface design, CAD database architectures, and integration of solid modeling into engineering processes. Prerequisite: MAE 541 or instructor approval.

MAE 544 Mechanical Design and Failure Prevention. (3)*fall*

Modes of mechanical failure; application of principles of elasticity and plasticity in multiaxial state of stress to design synthesis; failure theories; fatigue; creep; impact. Prerequisite: MAE 443.

MAE 546 CAD/CAM Applications in MAE. (4)*fall*

Solution of engineering problems with the aid of state-of-the-art software tools in solid modeling, engineering analysis, and manufacturing; selection of modeling parameters; reliability tests on software. Open only to students without previous credit for MAE 406. 3 hours lecture, 3 hours lab. Prerequisite: instructor approval.

MAE 547 Mechanical Design and Control of Robots. (3)*not regularly offered*

Homogeneous transformations, 3-dimensional kinematics, geometry of motion, forward and inverse kinematics, workspace and motion trajectories, dynamics, control, and static forces.

MAE 548 Mechanism Synthesis and Analysis. (3)*spring*

Algebraic and graphical methods for exact and approximate synthesis of cam, gear, and linkage mechanisms; design optimization; methods of planar motion analysis; characteristics of plane motion; spatial kinematics.

MAE 557 Mechanics of Composite Materials. (3)*spring*

Analysis of composite materials and applications. Micromechanical and macromechanical behavior. Classical lamination theory developed with investigation of bending-extension coupling.

MAE 560 Propulsion Systems. (3)*not regularly offered*

Design of air-breathing gas turbine engines for aircraft propulsion; mission analysis; cycle analysis; engine sizing; component design.

MAE 561 Computational Fluid Dynamics. (3)*spring*

Finite-difference and finite-volume techniques for solving the subsonic, transonic, and supersonic flow equations. Method of characteristics. Numerical grid-generation techniques. Prerequisite: MAE 571 or instructor approval.

MAE 563 Unsteady Aerodynamics. (3)*spring*

Unsteady incompressible and compressible flow. Wings and bodies in oscillatory and transient motions. Kernel function approach and panel methods. Aeroelastic applications. Prerequisite: MAE 460 or 461.

MAE 564 Advanced Aerodynamics. (3)*fall*

Perturbation method. Linearized subsonic and supersonic flows. Thin wing/slender body theories. Lifting surface theory. Panel method computation. Prerequisite: MAE 460 or 461.

MAE 566 Rotary-Wing Aerodynamics. (3)*fall*

Introduction to helicopter and propeller analysis techniques. Momentum, blade-element, and vortex methods. Hover and forward flight. Ground effect, autorotation, and compressibility effects. Prerequisite: MAE 361.

MAE 571 Fluid Mechanics. (3)*fall*

Basic kinematic, dynamic, and thermodynamic equations of the fluid continuum and their application to basic fluid models.

MAE 572 Inviscid Fluid Flow. (3)*spring*

Mechanics of fluids for flows in which the effects of viscosity may be ignored. Potential flow theory, waves, and inviscid compressible flows. Prerequisite: MAE 571.

MAE 573 Viscous Fluid Flow. (3)*fall*

Mechanics of fluids for flows in which the effects of viscosity are significant. Exact and approximate solutions of the Navier-Stokes system, laminar flow at low and high Reynolds number. Prerequisite: MAE 571.

MAE 575 Turbulent Shear Flows. (3)*fall*

Homogeneous, isotropic, and wall turbulence. Experimental results. Introduction to turbulent-flow calculations. Prerequisite: MAE 571.

MAE 577 Turbulent Flow Modeling. (3)*spring*

Reynolds equations and their closure. Modeling of simple and complex turbulent flows, calculations of internal and external flows, and application to engineering problems. Prerequisite: MAE 571.

MAE 581 Thermodynamics. (3)*fall*

Basic concepts and laws of classical equilibrium thermodynamics; applications to engineering systems. Introduction to statistical thermodynamics.

MAE 582 Statistical Thermodynamics. (3)*once a year*

Kinetic and quantum theory. Statistical mechanics; ensemble theory. Structure and thermodynamics of noninteracting and interacting particles. Boltzmann integro-differential equation. Prerequisite: graduate standing.

MAE 585 Conduction Heat Transfer. (3)*fall*

Basic equations and concepts of conduction heat transfer. Mathematical formulation and solution (analytical and numerical) of steady and unsteady, one- and multidimensional heat conduction and phase change problems. Prerequisite: MAE 388.

MAE 586 Convection Heat Transfer. (3)*spring*

Basic concepts and governing equations. Analysis of laminar and turbulent heat transfer for internal and external flows. Natural and mixed convection. Prerequisite: MAE 388.

MAE 587 Radiation Heat Transfer. (3)*fall*

Advanced concepts and solution methodologies for radiation heat transfer, including exchange of thermal radiation between surfaces, radiation in absorbing, emitting, and scattering media and radiation combined with conduction and convection. Prerequisite: MAE 388.

MAE 588 Two-Phase Flows and Boiling Heat Transfer. (3)*spring*

Pool and flow boiling heat transfer, condensation heat transfer, various models of vapor-liquid mixture flows, gas-solid mixture flows, and experimental measurement techniques.

MAE 589 Heat Transfer. (3)*fall*

Basic concepts; physical and mathematical models for heat transfer. Applications to conductive, convective, radiative, and combined mode heat transfer. Prerequisite: MAE 388.

MAE 594 Graduate Research Conference. (1)*fall and spring*

Topics in contemporary research. Required every semester of all departmental graduate students registered for 9 or more semester hours. Not for degree credit.

MAE 598 Special Topics. (1-4)*fall and spring*

Special topics courses, including the following, which are regularly offered, are open to qualified students. Possible topics:

- (a) Advanced Spacecraft Control. (1-3)
- (b) Aeroelasticity. (1-3)
- (c) Aerospace Vehicle Guidance and Control. (1-3)
- (d) Boundary Layer Stability. (1-3)
- (e) Hydrodynamic Stability. (1-3)
- (f) Plasticity. (1-3)
- (g) Polymers and Composites. (1-3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Medieval and Renaissance Studies

Interdisciplinary Certificate Programs

Robert E. Bjork
Director
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 Fax 480/965-1681
 acmrs@asu.edu
www.asu.edu/clas/acmrs/cert.html

American Studies (ASU West)

Associate Professor: Moulton

Architecture

Professor: Meunier

Art

Associate Professors: Schleif, Wolfthal

Barrett Honors College

Senior Lecturer: Facinelli

English

Professors: Bjork, Brink, Gutierrez;
 Associate Professors: Corse, Mahoney, Perry;
 Assistant Professors: Stevens, Voaden;
 Senior Lecturer: Obermeier

History

Professors: Batalden, Burg, Tillman, Warnicke;
 Associate Professors: Barnes, Soergel, Thornton

Languages and Literatures

Professors: Alexander, Losse, Wixted;
 Associate Professors: Hendrickson, Sanchez,
 Senner, Vitullo;
 Assistant Professors: Candela, George

Law

Professors: Brennan, Rose

Music

Professor: Metz;
 Associate Professors: Haefer, Rave

Philosophy

Professor: White

Religious Studies

Associate Professors: Clay, Coudert

Theatre

Professor: Knapp

Graduate students admitted to a degree program in any field may earn one of two M.A.- or Ph.D.-level certificates: the Certificate in Medieval Studies or the Certificate in Renaissance Studies. Since medieval and Renaissance studies are by nature interdisciplinary, students in the certificate program receive interdisciplinary training. Besides the course work and examinations required in their major field, students take six to nine semester hours outside their discipline and receive training in a medieval vernacular language or a modern European language.

The core of the program has two components: (1) Latin, the international language for both the Middle Ages and Renaissance, and (2) paleography, the study of the physical

medium through which Latin and other languages were transmitted.

The certificate program prepares students for advanced study or for academic positions by augmenting their skills and knowledge, thereby making them more equipped to handle the demands of their fields. For more information, contact the Arizona Center for Medieval and Renaissance Studies.

COURSES

For course information, contact the Arizona Center for Medieval and Renaissance Studies.

Microbiology

Master's and Doctoral Programs

Edward A. Birge

Chair

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microbiology@asu.edu

ls.la.asu.edu/microbiology/text/grad.htm

PROFESSORS

BURKE, JACOBS, MOSSMAN, SCHMIDT

ASSOCIATE PROFESSORS

BIRGE, HOFFMAN, MISRA, STOUT

ASSISTANT PROFESSORS

CHANG, GARCIA-PICHEL

The faculty in the Department of Microbiology offer programs leading to the M.S. and the Ph.D. degrees in Microbiology.

The faculty also participate in the program leading to the Master of Natural Science degree when one of the concentrations is microbiology (see "Natural Science," page 278).

The Graduate Record Examination (GRE) is required for all applicants. Three letters of recommendation and a statement of personal goals must be submitted for admission to the graduate programs. Applicants are expected to have completed the requirements for an undergraduate major in Biology, Chemistry, or Microbiology or have an adequate background in related courses in biology, chemistry, mathematics, physics, and plant biology. Applicants without this background may be asked to take the GRE subject test. Applications are accepted throughout the year. To be considered for assistantships and fellowships, completed applications must be received by February 15 for the fall semester and by October 15 for the spring semester.

The graduate programs are designed to prepare students for careers in teaching and in research on various aspects of microbiology in educational institutions, industry, or government agencies. To ensure proper course selection, new students must have the department's approval for all course registrations.

MASTER OF SCIENCE

See "Master's Degrees," page 100, for general requirements.

Program of Study. A minimum of 30 semester hours of graduate credit are required, of which at least six hours must be thesis and research credit. The program is planned by the student in consultation with the supervisory committee.

Foreign Language Requirements. None.

Comprehensive Examinations. Students are expected to achieve, through course work, a fundamental understanding of the following subdisciplines: bacterial genetics, immunology, molecular biology, physiology and metabolism, and virology. Alternatively, the student may demonstrate this fundamental understanding by a comprehensive examination prepared by the student's supervisory committee.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination covering the thesis and related subject matter is required.

DOCTOR OF PHILOSOPHY

See "Doctor of Philosophy," page 103, for general requirements.

Program of Study. At least 60 semester hours of graduate credit, in addition to 24 hours of dissertation and research, are required; a minimum of 24 hours of this total is in formal course work. The program is planned in consultation with the supervisory committee.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral comprehensive examinations are required.

Dissertation Requirements. A dissertation based on original work of high quality, demonstrating proficiency in the student's area of interest, is required. (See "Doctoral Dissertations," page 102.)

Final Examinations. A final oral examination in defense of the dissertation is required.

MICROBIOLOGY (MIC)

MIC 420 Immunology: Molecular and Cellular Foundations. (3)

fall

Molecular and cellular foundations of immunology. Antibody/antigen interactions, cellular response, cytokines, immunogenetics, immunoregulation, autoimmunity, psychoneuroimmunology research/medical perspectives. Prerequisites: both CHM 231 (or 331) and MIC 205 (or 220) or only instructor approval.

MIC 421 Experimental Immunology. (2)

fall and spring

Introduction to the basic techniques, methods, and assays used in immunology. 6 hours lab. Fee. Prerequisites: a combination of CHM 231 and 331 and MIC 302 or only instructor approval.

MIC 425 Advanced Immunology. (3)

spring in odd years

Survey of recent advances in immunology, including lymphocyte membranes, lymphokines/biochemistry, molecular genetics, theoretical immunology, immunoregulation, neuroimmunology, and immunologic diseases. Prerequisite: MIC 420 or instructor approval.

MIC 441 Bacterial Genetics. (3)

spring

Survey of genetic exchange and regulatory processes in bacteria and their viruses. Bacteria and viruses as tools in genetic engineering. Prerequisites: both BIO 340 and MIC 205 (or 220) or only instructor approval.

MIC 442 Bacterial Genetics Laboratory. (1)

not regularly offered

Techniques of mutagenesis, mapping, and strain and genetic library construction. 4 hours lab. Prerequisites: MIC 206, 302. Pre- or corequisite: MIC 441.

MIC 445 Techniques in Molecular Biology/Genetics. (2)

fall and spring

Molecular genetic principles: plasmid construction, purification, and characterization; PCR; mutagenesis; hybridization and sequence analysis; protein quantitation; immunologic detection and electrophoresis. Cross-listed as MBB 445. Credit is allowed for only MBB 445 or MIC 445. Prerequisites: both BIO 340 and MIC 302 or only instructor approval.

MIC 446 Techniques in Molecular Biology/Genetics Lab. (2)

fall and spring

Molecular genetic techniques; plasmid construction, purification, and characterization; PCR; mutagenesis; hybridization and sequence analysis; protein quantitation; immunologic detection and electrophoresis. Cross-listed as MBB 446. Credit is allowed for only MBB 446 or MIC 446. Pre- or corequisite: MBB 445 or MIC 445.

MIC 470 Bacterial Diversity and Systematics. (4)

fall

Biology, classification, and enrichment culture of the nonpathogenic bacteria. 2 hours lecture, 6 hours lab. Fee. Prerequisite: MIC 302.

MIC 485 General Virology. (3)

fall

Fundamental nature of viruses, their replication, pathogenesis, and ecology. Prerequisites: both BIO 340 and CHM 331 or only instructor approval.

MIC 486 General Virology Laboratory. (2)

not regularly offered

Fundamentals of virus detection, isolation and assay; propagation of virus in mammalian cell culture; recombinant virus and vector construction. 6 hours lab. Prerequisite: MIC 302. Pre- or corequisite: MIC 485.

MIC 527 Neuroimmunology. (3)

spring in odd years

Studies mind's influence on immunity and the immune system's influence on the mind, neuroimmunologic diseases, and the neuroimmunological circuitry involved. Seminar. Prerequisite: MIC 420 or instructor approval.

MIC 581 Molecular Mechanism of Pathogenesis. (3)

not regularly offered

Pathogenic mechanisms and host responses in viral and/or bacterial diseases. Prerequisites: both MIC 381 and 420 or only instructor approval.

MIC 585 Molecular Virology. (3)

not regularly offered

Selected topics concerning molecular aspects of eukaryotic virus replication and pathogenesis. Prerequisite: instructor approval.

MIC 591 Seminar. (1-12)

fall and spring

Possible topics:

- (a) Bacterial Ecology. (1-3)
- (b) Current Research in Microbiology. (1-3)
- (c) Enzymology. (1-3)
- (d) Genetic Engineering. (1-3)
- (e) Genetics. (1-3)
- (f) Immunology. (1-3)
- (g) Molecular Virology. (1-3)
- (h) Neuroimmunology. (1-3)
- (i) Pathogenic Bacteriology. (1-3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Molecular and Cellular Biology

Interdisciplinary Master's and Doctoral Programs

Bertram L. Jacobs
Director
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 lsvl.la.asu.edu/mcb

Biology

Professors: Capco, Chandler, Hazel, McGaughey, Satterlie;
 Associate Professors: Goldstein, Smith;
 Assistant Professors: Kumar, Newfeld, Rawls

Chemistry and Biochemistry

Professors: Allen, Blankenship, Lohr, Rose, Woodbury;
 Research Professor: Bieber

Microbiology

Professors: Jacobs, Schmidt;
 Associate Professors: Hoffman, Misra, Stout;
 Assistant Professor: Chang

Plant Biology

Professors: Backhaus, Frasch, Hooper, Trelease,
 Vermaas, Webber;
 Associate Professors: Roberson, Stutz

The interdisciplinary M.S. and Ph.D. degrees in Molecular and Cellular Biology are administered by the Interdisciplinary Committee on Molecular and Cellular Biology. The participating faculty are drawn primarily from four core departments (the Departments of Biology, Chemistry and Biochemistry, Microbiology, and Plant Biology), with additional faculty from the Department of Anthropology and the Department of Physics and Astronomy. One striking aspect of studies in this broad area of biological science is the interdisciplinary nature of the field. Similar approaches and techniques are used for studies of biological systems whether they are viral, bacterial, plant, or animal.

The graduate degrees offered by the faculty through this program prepare students for careers that span traditional disciplinary boundaries. The broad-based training provides the necessary skills for professional careers in academic institutions, governmental institutions, and industry, particularly those related to health and chemical sciences.

Graduate Record Examination. All applicants are required to take the Graduate Record Examination (GRE). Submission of scores on the verbal, quantitative, and analytical sections of the GRE is required for admission to the M.S. and Ph.D. degree programs. The subject test in the sciences is highly recommended.

TOEFL and SPEAK Test. Students whose native language is not English are required to take the Test of English as a Foreign Language (TOEFL). A TOEFL score of 630 (paper) or 267 (computer) is required for admission to the MCB program. Students whose native language is not English must pass the Speaking Proficiency English Assessment Kit (SPEAK) test with a score of at least 55 if they wish to be considered for teaching assistantship support.

MASTER OF SCIENCE

See "Master's Degrees," page 100, for general requirements.

Program of Study. Thirty semester hours are required. A minimum of 10 designated semester hours of MCB courses and six hours of Research and Thesis are required. The remaining courses are selected by the student in consultation with the supervisory committee.

Thesis Requirements. A written thesis based on original research is required.

Final Examinations. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

See "Doctor of Philosophy," page 103, for general requirements.

Program of Study. Eighty-four semester hours are required. A minimum of 12 designated semester hours of MCB courses, six semester hours of elective course work, and 24 semester hours of Research and Dissertation are required. The remaining courses are selected by the student in consultation with the supervisory committee.

Comprehensive Examinations. Written and oral comprehensive examinations are required.

Dissertation Requirements. A written dissertation based on original research of high quality that demonstrates proficiency in the area of specialization is required.

Final Examinations. The final oral examination in defense of the dissertation is required. Evidence must be presented that the research contribution is publishable in the primary literature.

RESEARCH ACTIVITY

Research is primarily in the areas of molecular biology and basic cell processes. Specific bacteriology topics include the ecology and geochemistry of cyanobacteria in the Utah desert; the assembly of outer membrane proteins in *Escherichia coli*; pathogenesis and capsule regulation in *E. coli* and *Salmonella enterica*; control of acetate metabolism in *E. coli*; and systematics of the *Planctomyces-Selliberia* group of organisms. Specific virology topics include the action of interferon on vaccinia virus and the viral synthesis of potential interferon inhibitors. Specific immunology topics include the effect of substance P on autoimmunity and the mode of action of V(D)J recombination during the synthesis of antibody molecules.

For complete descriptions of research endeavors, access the departmental Web site at lifesciences.asu.edu/microbiology.

MOLECULAR AND CELLULAR BIOLOGY (MCB)

MCB 500 Research Methods in Molecular and Cellular Biology. (2)

fall and spring

Rotation laboratory experiences in which students participate in research under the direction of an MCB faculty member. May be repeated for credit.

MCB 501 Seminar: Molecular and Cellular Biology Colloquium. (1)*fall and spring*

Presentation of current research by noted researchers in the field. May be repeated for credit.

MCB 555 Advanced Molecular and Cellular Biology I. (3)*fall*

Study of structural and functional organization of biomolecules and cells, based on current literature. May be repeated once for credit. 3 hours lecture, discussion. Pre- or corequisites: BCH 461; BIO 543 (or its equivalent).

MCB 556 Advanced Molecular and Cellular Biology II. (3)*spring*

Continuation of MCB 555. May be repeated once for credit. 3 hours lecture, discussion. Pre- or corequisites: BCH 462; BIO 543 (or its equivalent).

MCB 591 Seminar: Current Literature in Molecular and Cellular Biology. (1)*fall and spring*

Presentation and discussion of current research in the areas of molecular and cellular biology. May be repeated for credit.

MCB 598 Special Topics. (1–4)*not regularly offered*

MCB 555 and 556 may be taken as one-semester-hour sections listed by the instructor.

MCB 700 Research Methods in Molecular and Cellular Biology. (2)*fall and spring*

Rotation laboratory experiences in which students participate in research under the direction of an MCB faculty member. May be repeated for credit.

MCB 701 Seminar: Molecular and Cellular Biology Colloquium. (1)*fall and spring*

Presentation of current research by noted researchers in the field. May be repeated for credit.

MCB 791 Seminar: Current Literature in Molecular and Cellular Biology. (1)*fall and spring*

Presentation and discussion of current research in the areas of molecular and cellular biology. May be repeated for credit.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Museum Studies

See "Certificate in Museum Studies," page 112.

Music

Master's, Doctoral, and Certificate Programs

Wayne A. Bailey

Director

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REGENTS' PROFESSORS

HICKMAN, PAGANO

PROFESSORS

BRITTON, COSAND, CROWE, DeMARS, DOAN,
DREYFOOS, FLEMING, HACKBARTH, HAMILTON, HILL,
HOFFER, HUMPHREYS, KLIEWER-BRITTON, KOONCE,
LOCKWOOD, MAROHNIC, MEIR, METZ, OLDANI,
PILAFIAN, REBER, ROGERS, RUSSELL, SELLHEIM,
SHINN, SKOLDBERG, SPRING, STAUFFER, STOCKER,
SUNKETT, SWAIM, THOMPSON, UMBERSON,
WILLIAMSON, WYTKO

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CARPENTER, HAEFER, HOLBROOK, KOPTA, LYMAN,
MARSHALL, MAY, PETERSON, RAVE, ROCKMAKER,
SMITH, SOLIS, WILSON

ASSISTANT PROFESSORS

BRYAN, BUSH, McLIN, MEIR, RIO, SCHURING, SULLIVAN

SENIOR LECTURERS

NORTON, SHELLANS

LECTURER

TONGRET

ACADEMIC PROFESSIONAL

CAMPBELL

The faculty in the School of Music offer graduate programs leading to the M.A. degree in Music with concentrations in ethnomusicology, music history and literature, and music theory.

The faculty also offer a graduate program leading to the professional Master of Music degree in Composition, Music Education, and Performance and the professional Doctor of Musical Arts degree in Music with concentrations in choral conducting, music composition, music education, and solo performance.

Graduate Diagnostic Examinations. All students admitted to graduate degree programs must satisfactorily complete these examinations before any comprehensive examinations may be scheduled. In music theory, the areas are as follows:

1. aural skills;
2. form;

3. analytical skills: 19th-century music; and
4. analytical skills: contemporary music.

In music history, the areas are (1) medieval, renaissance, and baroque and (2) classical, romantic, and contemporary.

Undergraduate Deficiencies. Deficiencies are determined by the school. Removal of all deficiencies is the responsibility of the student and is considered additional to the minimum hours for graduation.

Graduate Assistantships. The deadline is February 15 for teaching assistantship applications.

MASTER OF ARTS

See "Master's Degrees," page 100, for general requirements.

Prerequisites. Applicants are expected to have a B.A. degree in Music or its equivalent from an accredited institution.

Admission. Application must be accompanied by evidence of scholarly achievement or potential (e.g., a term paper), letters of recommendation from two persons qualified in the field, and a one- to two-page personal statement of the applicant's professional goals.

Program of Study

Ethnomusicology. A minimum of 30 semester hours of graduate credit is required, of which at least 20 semester hours must be in the field of ethnomusicology or related fields, including six semester hours of thesis, and at least six semester hours in music theory.

Music History and Literature. A minimum of 30 semester hours of graduate credit is required, of which at least two-thirds must be in the field of music history and literature and at least six semester hours in music theory.

Music Theory. A minimum of 32 semester hours of graduate credit is required, of which at least 18 must be in the field of music theory and at least 10 must be selected from the fields of music theory, music composition, and music history.

Course Requirements

Ethnomusicology. MUP 587 (two semesters), MHL 568, 591, 592, 599 (Thesis), and six semester hours of music theory.

Music History and Literature. MUP 582 (two semesters), MHL 532, 591 (two semesters), 599 (Thesis), and six hours of music theory.

Music Theory. MTC 520, 525, 527, 528, 599 (Thesis); six semester hours of music history.

Foreign Language Requirements. A passing grade on the foreign language reading examination in French or German is required.

Final Examinations. A final examination (written, oral, or both) is required. An oral examination in defense of the thesis is also required.

MASTER OF MUSIC

The faculty in the School of Music offer a graduate program leading to the professional degree Master of Music (M.M.). Three majors are available: Composition, Music Education, and Performance. For the Music Education major, concentrations are available in

1. choral music,
2. general music,
3. instrumental music, and
4. jazz studies.

For the Performance major, concentrations are available in

1. (music theatre/opera) musical direction,
2. (music theatre/opera) performance,
3. performance pedagogy,
4. piano accompanying, and
5. solo performance (voice, keyboard, instrumental).

Prerequisites. A Bachelor of Music degree or its equivalent from an accredited institution is required for admission to the M.M. program.

Admission. Admission to all concentrations under the major in Performance is dependent on a successful audition, either in person or by taped performance. For admission to the major in Composition, the applicant must submit three original works showing technical facility in composition, letters of recommendation from two qualified persons in the field, and a one- to two-page personal statement of the applicant's professional goals. For admission to the M.M. in Music Education degrees, the applicant must have completed all requirements for music teacher certification. Post-baccalaureate certification is available and may be completed concurrently with master's degree work.

Letters of recommendation from three qualified persons in the field are also required. For the jazz studies concentration, a video or audio tape of a recent jazz performance (solo or ensemble) by the applicant must be submitted, and a video or audio tape of a jazz ensemble directed by the applicant should also be submitted if available.

Students majoring in Performance with a concentration in solo performance (voice) and performance pedagogy (voice) are required to take a diction examination in French, German, and Italian during registration week of their first semester. Students who do not pass this examination are required to take the appropriate semester(s) of MUP 250.

For admission to the concentration in performance pedagogy (piano), a minimum of one semester of prior piano pedagogy study including significant intern teaching experience is required. In addition, the student must demonstrate evidence of teaching ability, either in person or by videotape.

Program of Study. The student must complete a minimum of 32 semester hours of graduate courses, of which at least one-third must be in the area of concentration.

Foreign Language Requirements. Solo performance (voice only) and performance pedagogy (voice only) require a total of 16 semester hours of college-level credit in more than one language chosen from French, German, or Italian. The concentration in piano accompanying requires two

semesters of college-level study in French, German, or Italian and two semesters of diction (or the equivalent) in the remaining languages in that group. These requirements may be fulfilled in whole or in part through language instruction in secondary and/or undergraduate school or by other means (for more information, see the *General Catalog*). These language requirements are not part of the 32-hour program of study. However, hours toward the requirements may be taken concurrently with the program of study if a deficiency exists.

Final Examination. A final examination (written, oral, or both) is required. An oral examination in defense of the thesis is required for the major in composition.

COURSE REQUIREMENTS

Composition

Composition. MTC 523 (six semester hours), 525, 599; six hours of music history, three hours of music theory.

Music Education

Choral Music. MUE 548, 549, 550 (or 579), 568, 570; two semester hours of ensemble; six semester hours of music history (including MHL 575); five hours of music theory. One MHL or MTC course must be in contemporary music.

General Music. MUE 548, 549, 550 (or 579), 551, 552; six semester hours of music history; five hours of music theory. One MHL or MTC course must be in contemporary music, and one MHL course or one ensemble must be in ethnomusicology.

Instrumental Music. MUE 548, 549, 550 (or 579), 564, 566; six semester hours of music history; five hours of music theory. One MHL or MTC course must be in contemporary music.

Jazz Studies. MUE 548, 549, 550 (or 579), 560, 562 (two semesters); MUP 509, 510, 517, 518, three semester hours of jazz ensemble; six semester hours of music history; five hours of music theory. One MHL or MTC course must be in contemporary music.

Performance

Solo Performance (Voice). MUP 527 (eight semester hours), 541, 551, 596, 597; performing ensembles (two hours); six hours of music history; five hours of music theory.

Solo Performance (Keyboard). MUP 527 (eight semester hours), 551 (or 581), 596, 597; performing ensembles (two hours); six hours of music history and literature; five hours of music theory.

Solo Performance (Instrumental). MUP 527 (eight semester hours), 551, 581, 596, 597; performing ensembles (two hours); six hours of music history; five hours of music theory.

Piano Accompanying. MUP 527 Studio Instruction (eight semester hours), 511 (or 521 Studio Instruction [four hours]), 588 (four hours), 596, 597; six hours of music history; five hours in music theory.

Performance Pedagogy. MUP 527 (eight semester hours), 541 (voice only), 551 and/or 581, 596, 597; performing ensembles (two hours), (piano only: MUP 440 [or proficiency], 507, 508, 581 [four hours]); six hours in music history; five hours of music theory.

(Music Theatre/Opera) Musical Direction. MUP 511 Studio Instruction: Piano (four semester hours), 551, 571 (two semester hours), 573, 574 (two semester hours), 591 (six semester hours), 596, 597; performance on stage in one production; musical direction of two productions; six hours of music history; five hours of music theory.

(Music Theatre/Opera) Performance. MUP 511 Studio Instruction (eight semester hours), 551, 570 (two semester hours), 571 (three semester hours), 596, 597; a three-hour graduate THP course designed for actors (as approved by supervisory committee); leading roles in two musical theatre productions; six hours of music history; five hours of music theory.

DOCTOR OF MUSICAL ARTS

The Doctor of Musical Arts (D.M.A.) is a professional degree program designed for students desiring high levels of performance, academic proficiency, and preparation for teaching positions at the university level. The major is Music with four concentrations: choral conducting, music composition, music education, and solo performance (instrumental, keyboard, piano pedagogy, voice).

Admission. Students seeking admission normally hold the Master of Music degree. Applicants with other degrees are considered if they have received graduate training similar to that normally expected in a Master of Music degree program. The application for admission must be accompanied by an applicant's statement relating to goals, preparation, and educational background. The applicant must submit scores for the GRE (quantitative, verbal, and analytical) or the MAT. Three letters of recommendation are required. Applicants must perform a satisfactory audition or submit a tape recording of performances or compositions as appropriate to the concentration. The deadline is February 15 for teaching assistantship applications.

Supervisory Committee. When the program of study is filed, the supervisory committee is appointed by the dean of the Graduate College upon recommendation of the director and the graduate committee of the School of Music. The committee consists of five members; at least three should be from the major field.

Program of Study. A total of 90 semester hours beyond the bachelor's degree is required. Only 36 hours from a master's degree or other postgraduate work will be counted toward the 90 hour requirement. For more information, call the School of Music, 480/965-3371.

Continuous Enrollment. Once admitted to a D.M.A. degree program, the student is expected to be enrolled continuously, excluding summer sessions, until all requirements for the degree have been fulfilled. This requirement applies to students admitted fall 1994 and thereafter. Continuous enrollment promotes steady progress toward the completion of the degree and an ongoing relationship between the student and faculty offering the program. If additional credit is not required toward the D.M.A. degree, the student may enroll for Continuing Registration 795. Continuing Registration does not carry credit; no grade is given. If a program of study must be interrupted for one or more semesters, the student may apply for leave status, not to exceed one calendar year. A student on leave is not required to pay fees, but

is not permitted to place any demands on university faculty or use any university facilities. A student who interrupts a program without obtaining leave status may be removed automatically from the Graduate College, under the assumption that the student has decided to discontinue the program. A student removed from the Graduate College for this reason may reapply for admission; the application is considered along with all other new applications to the degree program.

An application for leave status, endorsed by the members of the student's supervisory committee and the head of the academic unit, must be approved by the dean of the Graduate College. This request must be filed and approved no later than the last day of registration in the semester of anticipated absence.

Residency. In general, the D.M.A. degree student should expect to spend at least the equivalent of three academic years beyond the bachelor's degree in the program. At least two semesters following the first year (30–32 semester hours) of graduate study must be spent in continuous full-time residence at ASU. After the first year (30–32 semester hours), at least 54 hours must be completed in residence at ASU.

Foreign Language Requirements. Competency in at least one foreign language is required for solo performance and music composition concentrations. Some areas of study within solo performance require two foreign languages.

Comprehensive Examinations. Near the completion of course work, the student must request permission to take the comprehensive examinations through the supervisory committee and the school director. These written and oral examinations are designed to assess the student's competency in the major and supportive fields. Failure in the comprehensive examinations is considered final unless the supervisory committee recommends, and the dean of the Graduate College approves, a reexamination. A reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Only one reexamination is permitted.

Candidacy. Doctoral students should apply for admission to candidacy immediately after they have met all requirements for the degree, *except the dissertation*. These requirements include passing the comprehensive examinations and foreign language examination, if applicable, and meeting other requirements specified by the academic unit.

Dissertation, Research Papers, and Recitals. The music composition and music education concentrations require a dissertation of an original and creative nature. The choral conducting concentration requires a conducting recital plus either a dissertation or a series of projects and a research paper. The solo performance concentration requires at least three recitals following admission to the program and a research paper. All candidates must enroll for a total of 24 semester hours of credit in research (MUP 792), recital (MUP 796), and dissertation (MUP 799) as appropriate to the concentration.

Final Examinations. The final oral examination in defense of the dissertation or research paper is scheduled by the Graduate College. The exam is conducted by the supervisory committee and others appointed by the dean of the

Graduate College. All final oral examinations must be conducted at least one week before the degree conferral date.

Graduation. The student is eligible for graduation when the final oral examination has been passed, Graduate College scholarship requirements have been met, and the dissertation/research paper has been approved by the supervisory committee, the director of the school, and the dean of the Graduate College.

Applications for graduation should be made no later than the date specified in the Graduate College calendar.

Maximum Time Limit. D.M.A. candidates must complete all requirements within five years after the comprehensive exams have been passed.

POST-BACHELOR'S ARTIST DIPLOMA

The Post-Bachelor's Artist Diploma graduate certificate program is intended for a very limited number of the most gifted performers who demonstrate strong potential for successful careers in musical performance.

Admission. Students seeking admission must hold at least a bachelor's degree in music or an equivalent conservatory credential at the time of entrance. All applicants whose native language is not English must submit a score of at least 550 on the Test of English as a Foreign Language (TOEFL). For preliminary screening, every applicant must submit a letter of application, official transcripts, four letters of recommendation, and an audio recording containing works representing a variety of musical styles and composers. Those applicants recommended for a full audition must perform an audition recital and be interviewed on the ASU campus.

Program of Study. The Post-Bachelor's Artist Diploma program is a two-year course of study requiring at least two consecutive semesters of residence. A total of 32 semester hours, including four public recitals, is required. Three of the recitals must be presented on the ASU campus, and one at a venue outside of the metropolitan Phoenix area.

Course Requirements. MUP 527 (sixteen semester hours), 551 (four semester hours), and 581; performing ensembles (two semester hours) and four recitals (eight semester hours).

Related Requirements. The School of Music graduate diagnostic examinations in music theory and music history must be taken during the first semester of study, and all must be passed before the awarding of the Post-Bachelor's Artist Diploma. Students in voice must pass the graduate-level foreign language diction examination before completing the program. Concurrent enrollment in other degree programs during the course of study is not permitted. Transfer credits from other institutions and/or other degree programs within the ASU School of Music do not count toward the 32 required semester hours.

MUSIC HISTORY/LITERATURE (MHL)

MHL 532 Music Bibliography. (3)

fall

Major historical and analytical writings; systematic and historical collections of music. Reading knowledge of a foreign language recommended.

MHL 535 Medieval Music. (3)*spring in odd years*

Music of Europe in the Middle Ages, Gregorian chant, religious and secular monophony and polyphony to 1400.

MHL 536 Music of the Renaissance. (3)*spring in even years*

Music in Europe, with emphasis on stylistic concepts and changes, c. 1400–1580.

MHL 544 World Music I. (3)*fall in odd years*

Music of traditional and folk cultures of Africa, Europe, and the Americas.

MHL 545 World Music II. (3)*fall in even years*

Traditional, folk, and art music of the Pacific, Near East, and Asia.

MHL 547 Topics in American Music. (3)*not regularly offered*

Selected topics in the history of music. Composers working in the Americas with emphasis upon music since 1900.

MHL 557 Topics in Symphonic Literature. (3)*spring in even years*

Examines the evolution of the symphony and symphonic poem from the early classic era through the 19th century, with emphasis on the analysis of selected works.

MHL 564 History of Music Instruments. (3)*fall in even years*

Survey of the history and development of music instruments in traditional, folk, and art cultures.

MHL 566 Area Studies in Ethnomusicology. (3)*spring*

Study of the music of a particular culture, country, or area (e.g., music of Mexico, Latin America, China, Africa). May be repeated for credit.

MHL 568 Introduction to Ethnomusicology. (3)*fall in odd years*

Introduction to the theory and methodology of the discipline, including bibliography, fieldwork, transcription, analysis, and organology.

MHL 575 History of Choral Music. (3)*fall*

Major choral works.

MHL 591 Seminar. (1–12)*fall and spring***MHL 592 Research. (1–12)***fall and spring***MHL 599 Thesis. (1–12)***fall and spring***MHL 644 Notation of Polyphonic Music. (3)***spring in even years*

Music notation from the 15th through 17th centuries, including problems of transcription into modern notation.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

MUSIC THEORY AND COMPOSITION (MTC)**MTC 516 Baroque Music. (3)***spring in even years*

Detailed analysis of selected examples of music from the Baroque period.

MTC 517 Classic Music. (3)*spring in odd years*

Detailed analysis of selected examples of music from the Classic period.

MTC 518 Romantic Music. (3)*fall in even years*

Detailed analysis of selected examples of music from the Romantic period.

MTC 519 Late 19th-/Early 20th-Century Music. (3)*fall in odd years*

Detailed analysis of selected examples of music from the late 19th and early 20th centuries.

MTC 520 Analytical Techniques. (3)*spring and summer*

Analytical techniques systematically applied to music. Concentration on structural and compositional procedures.

MTC 523 Advanced Composition. (2–3)*fall and spring*

Advanced music composition, including complex techniques and larger structure. May be repeated for credit. Prerequisite: instructor approval.

MTC 525 Pedagogy of Theory. (3)*fall in even years*

Practices and principles of teaching music theory. Emphasizes most desirable and practical offerings possible. Comparative studies of existing practices.

MTC 527 History of Music Theory. (3)*not regularly offered*

Theory from Pythagoras to the 16th century. Need not be taken in sequence with MTC 528.

MTC 528 History of Music Theory. (3)*not regularly offered*

Theory from the 17th century to the present. Need not be taken in sequence with MTC 527.

MTC 555 Computer Music Notation. (2)*not regularly offered*

Instruction in preparing score and parts of music compositions using various music-notation software packages. Credit cannot be applied toward the graduate theory requirement. Lecture, lab. Prerequisite: instructor approval.

MTC 591 Seminar. (1–12)*fall and spring***MTC 592 Research. (1–12)***fall and spring***MTC 599 Thesis. (1–12)***fall and spring***MTC 647 Directions in New Music. (3)***not regularly offered*

Studies in contemporary idioms and aesthetics drawn from recent works of visiting composers; involves analytical discourse, critical writing, and applied concepts in composition. Lecture, discussion, exercise. Prerequisite: instructor approval.

MTC 723 Advanced Composition. (3)*fall and spring*

Special problems in writing in complex forms and textures. May be repeated for credit. Studio.

MTC 755 Music Composition Technology. (3)*not regularly offered*

Advanced study in digital sampling, synthesis, sequencing, computer-generated sound, and computer/performer interfaces. May be repeated for credit. Lecture, lab. Prerequisites: MTC 436 and 437 (or their equivalents).

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

MUSIC EDUCATION (MUE)**MUE 548 Introduction to Research in Music Education. (3)***fall and summer*

Introduction to historical, quantitative, and qualitative research methods and sources as they apply to research in music education.

MUE 549 Foundations of Music Education. (3)*once a year*

Historical/sociological survey of formal and informal music teaching and learning practices from the ancient Greeks to the present, including the evolution of philosophies and learning theories.

MUE 550 Studies in Music Curricula. (3)*once a year*

Scope and sequence of musical experiences. Development of criteria for the evaluation of music curricula.

MUE 551 Advanced Studies in Elementary School Music. (3)*once a year*

For experienced teachers; organization and content of the general music classes in kindergarten and the first 6 grades of elementary school. Emphasis on teaching music reading and ear training to young children.

MUE 552 Advanced Studies in Secondary General Music. (3)*once a year*

Organization and content of school music classes that are not performance oriented.

MUE 553 Contemporary Elementary Music. (3)*not regularly offered*

Identification and development of materials and techniques for teaching special units of music study to elementary (K–8) children.

MUE 560 Jazz Pedagogy. (3)*spring in odd years*

Study of pedagogy, repertoire, and technique of instruction in jazz styles, ensemble techniques, and performance practice for school ensembles. Lecture, lab, discussion, observation. Prerequisite: M.M., Music Education major.

MUE 562 Jazz Ensemble Rehearsal Techniques. (1)*fall and spring*

Conducting and rehearsal techniques for school jazz ensembles. Lab. Prerequisite: M.M., Music Education major.

MUE 564 Instrumental Music, Advanced Rehearsal Techniques. (3)*once a year*

In-depth analysis of instrumental techniques in preparation for a thorough discussion of band tuning problems and solutions. Discussion of productive conducting and rehearsal techniques for school music teachers.

MUE 566 Instrumental Literature for Schools. (3)*once a year*

Comprehensive study and analysis of all types of instrumental music.

MUE 568 Choral Music, Advanced Rehearsal Techniques. (3)*once a year*

Musical and vocal techniques necessary for presentation of choral literature. Analysis and experimentation with psychological, acoustical, and other problems of rehearsal and performance.

MUE 570 Choral Literature for Schools. (3)*once a year*

Comprehensive study and analysis of choral music for the high school with special emphasis on octavo literature.

MUE 579 Psychology of Music. (3)*once a year*

Nature of musicality and its evaluation. Review of recent research.

MUE 585 Vocal Acoustics and Production. (3)*once a year*

In-depth approach to the psychological/physiological workings of the vocal mechanism.

MUE 733 Contemporary Issues and Research in Music Education. (3)*once a year*

Emphasizes recent research relating to music instruction at all levels; current and historical issues in choral, general, and instrumental music.

MUE 744 Higher Education Instruction. (3)*once a year*

Philosophical and psychological principles of college/university teaching. Patterns of music teacher education and a projection of course outlines.

MUE 755 Historical Research in Music Education. (3)*summer*

Knowledge and insights related to conducting historical research in music education. Includes development of a mini-proposal for a dissertation on the history of music education.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

MUSIC PERFORMANCE (MUP)**MUP 507 Group Piano Practicum. (2)***fall*

Curricula, materials, and teaching techniques for group teaching at the university and community college levels. Observation/supervised teaching in group piano.

MUP 508 Studio Observation. (1)*fall and spring*

Weekly observation of studio teaching by various piano faculty. Paper as final requirement. Prerequisite: M.M. piano student in Performance major (performance pedagogy or solo performance concentration).

MUP 509 Jazz Keyboard Harmony. (1)*fall*

Emphasis on jazz chords and chord progressions, harmonization, voicing, and analysis of transcriptions. Lab. Prerequisite: M.M., Music Education student.

MUP 510 Jazz Keyboard Harmony. (1)*spring*

Continuation of MUP 509. Lab. Prerequisite: MUP 509.

MUP 511 Studio Instruction. (2)*fall and spring*

Bassoon, cello, clarinet, contrabass, cornet, euphonium, flute, guitar, harp, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, voice. Minimum contact of 1 hour plus studio class weekly. May be repeated for credit. May not be taken for audit. Fee. Prerequisites: graduate music major; placement examination; audition.

MUP 517 Advanced Improvisation. (1)*fall*

Improvisation techniques within the context of advanced jazz literature. Must be taken in sequence with MUP 518. Lab. Prerequisites: placement examination; audition.

MUP 518 Advanced Improvisation. (1)*spring*

Continuation of MUP 517. Lab. Prerequisite: MUP 517.

MUP 521 Studio Instruction. (1)*fall, spring, summer*

Secondary or minor instrument instruction. Bassoon, cello, clarinet, contrabass, cornet, euphonium, flute, guitar, harp, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, voice. Minimum contact of 1/2 hour per week. May be repeated for credit. May not be taken for audit. Fee. Prerequisites: graduate music major; instructor approval.

MUP 527 Studio Instruction. (2 or 4)*fall and spring*

Bassoon, cello, clarinet, contrabass, cornet, euphonium, flute, guitar, harp, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, voice. Minimum contact of 1/2 hour per week. May be repeated for credit. May not be taken for audit. Fee. Prerequisites: M.M., Performance major; placement examination; audition.

MUP 540 Advanced Conducting. (3)*fall*

Score preparation and conducting techniques for instrumental music. Concentration on study of historical styles. Required of D.M.A. students in Instrumental Music.

MUP 541 The Art Song. (3)*not regularly offered*

Seminar on solo song from its beginning to the present day.

MUP 544 Chamber Orchestra. (1)*fall and spring*

Important masterpieces from all periods of music are performed throughout the year. May be repeated for credit. Prerequisite: instructor approval.

MUP 545 Symphony Orchestra. (1)*fall and spring*

Masterpieces of symphony orchestra literature. 3 times per week. May be repeated for credit. Prerequisite: audition with director.

MUP 546 Sinfonietta. (1)*fall and spring*

Symphonic orchestra that presents approximately six concerts annually, performing masterpieces of the classical repertoire. 3 times per week. May be repeated for credit. Prerequisite: audition with director.

MUP 550 Choral Union. (1)*fall and spring*

Open to all students in the university and to interested singers in the community by audition. Preparation and performance of the larger choral works. 2 hours per week. May be repeated for credit. Prerequisite: audition with director.

MUP 551 Repertoire. (2)*fall and spring*

Literature available for performance in all performing media. May be repeated for credit.

MUP 552 Concert Choir. (1)*fall and spring*

Important masterpieces from all periods of music are performed. May be repeated for credit. Prerequisite: instructor approval.

MUP 553 University Choir. (1)*fall and spring*

4 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 555 Men's Chorus. (1)*fall and spring*

Rehearsal and performance of music for male voices. 3 hours per week. May be repeated for credit. Prerequisites: audition with director; instructor approval.

MUP 557 Women's Chorus. (1)*fall and spring*

2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 561 Marching and Concert Bands. (1)*fall and spring*

Staging of formations and drills for football games and other events (fall); masterpieces of symphonic band literature (spring). Meets daily. May be repeated for credit. Prerequisite: audition with director.

MUP 562 Wind Ensemble. (1)*fall and spring*

Rehearsal and performance of literature for wind ensemble. 2 hours per week in fall, 4 hours in spring. May be repeated for credit. Performing ensemble. Prerequisite: instructor approval.

MUP 563 Chamber Winds. (1)*fall and spring*

Rehearsal and performance of advanced literature for chamber winds. 2 hours per week. May be repeated for credit. Performing ensemble. Prerequisite: instructor approval.

MUP 570 Music Theatre: Techniques. (1)*fall and spring*

Exercises and improvisations for the singing actor emphasizing body awareness, isolations, and freedom of the vocal and breath mechanisms. Section 1 (Interpretation); Section 2 (Expression); Section 3 (Movement for Singers). Each Section: 3 hours per week. May be repeated for credit.

MUP 571 Music Theatre: Workshops. (1)*fall and spring*

Development of specific skills for the musical-dramatic interpretation. Section 1 (Role Preparation); Section 2 (Styles); Section 3 (Opera Scenes); Section 4 (Musical Comedy); Section 5 (Revue Ensembles). Each section: 1 hour lecture, demonstration, 1 lab per week. May be repeated for credit.

MUP 572 Music Theatre: Orchestras. (1)*fall and spring*

Participation in Lyric Opera Theatre productions. Section 1 (Orchestra); Section 2 (Chamber Orchestra); Section 3 (Chamber Ensemble). May be repeated for credit. Prerequisites: audition with director; instructor approval.

MUP 573 Music Theatre: Performance. (1)*fall and spring*

Participation in Lyric Opera Theatre productions. Section 1 (Principal Roles); Section 2 (Chorus). May be repeated for credit. Prerequisites: audition with director; instructor approval.

MUP 574 Music Theatre: Production. (1)*fall and spring*

Participation in Lyric Opera Theatre productions. Section 1 (Vocal Performance); Section 2 (Technical Music Theatre); Section 3 (Problems in Production) to be taken concurrently with MUP 573, Section 2. May be repeated for credit.

MUP 576 New Music Ensemble. (1)*fall and spring*

Rehearsal and performance of music written in the last 20 years. May be repeated for credit. Prerequisite: instructor approval.

MUP 579 Chamber Music Ensembles. (1)*fall and spring*

String, brass, woodwind, percussion, keyboard, vocal, and mixed ensembles. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 581 Performance Pedagogy and Materials. (2)*fall and spring*

Principles and methods of performance techniques for each performance field. May be repeated for credit.

MUP 582 Collegium Musicum. (1)*not regularly offered*

Singers and instrumentalists specializing in the performance of early and unusual music. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 585 Percussion Ensemble. (1)*fall and spring*

Rehearsal and performance of standard and original repertoire for the percussion ensemble and related instruments. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 586 Jazz Band. (1)*fall and spring*

Rehearsal and performance of new, traditional, and Latin literature for jazz bands. 4 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 587 Ethnomusicology Ensembles. (1)*fall and spring*

Performance learning experience for the music of various cultures of the world. May be repeated for credit. Prerequisite: knowledge of instrument or instructor approval.

MUP 588 Piano Accompanying. (1)*fall and spring*

Piano accompaniments found in vocal and instrumental literature; discussion of styles and performance practices; experience in public performance. 2 hours per week. May be repeated for credit. Prerequisite: Performance major with a concentration in piano accompanying or instructor approval.

MUP 591 Seminar. (1-12)*not regularly offered***MUP 595 Continuing Registration. (1)***fall and spring***MUP 596 Solo Performance. (1)***fall and spring*

May be full recital, major operatic role, solo performance with orchestra, ensemble, or lecture recital. Prerequisite: M.M. candidate in applied music.

MUP 597 Solo Performance. (1)*fall and spring*

See MUP 596.

MUP 671 Choral Repertoire. (3)*not regularly offered*

Examination of large choral/orchestral works to determine their musical and textual characteristics from a conductor's point of view.

MUP 727 Studio Instruction. (2 or 4)*fall and spring*

Minimum contact of 1 hour per week. May be repeated for credit. Fee. Prerequisite: D.M.A. candidate.

MUP 751 Seminar in Piano Literature. (2)*fall in odd years*

In-depth study of selected topics related to the standard piano literature. Requires research paper, bibliography, class presentation. Seminar.

MUP 792 Research. (1-12)*fall, spring, summer***MUP 796 Solo Performance. (1-15)***fall and spring*

May be repeated for credit. Prerequisite: D.M.A. candidate.

MUP 799 Dissertation. (1-15)*fall and spring*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Music Education

See "Music," page 271.

Natural Science

Master's Program

The Master of Natural Science (M.N.S.) degree offers the opportunity for interdisciplinary graduate training in the natural sciences (biological sciences, mathematics, and physical sciences) and cognate areas. The degree program is especially suited for individuals who desire professional training rather than research training. Because of designed flexibility, the degree also offers the opportunity for individualized professional graduate programs depending upon the backgrounds and goals of the students. The major is Natural Science; students are expected to emphasize course work in two or more areas of concentration. The program must be interdisciplinary. More information can be found under the various majors in the natural sciences and by contacting faculty offering these concentrations:

1. biology,
2. chemistry,
3. geological sciences,
4. mathematics,
5. microbiology,
6. physics, and
7. plant biology.

Admission. See "Admission to the Graduate College," page 92. A prerequisite for admission is the availability of resources for the proposed program and having a faculty member in one of the departments serve as a graduate advisor. The submission of scores on the GRE (verbal, quantitative, and analytical) is required of all applicants.

Supervisory Committee. The supervisory committee, consisting of three faculty members, is appointed by the dean of the Graduate College upon the recommendation of the chair of the academic unit in which the graduate advisor serves as a faculty member. The supervisory committee is formed soon after the student has been admitted to the degree program. The graduate advisor and student suggest names of persons to serve on the supervisory committee. The composition of the supervisory committee must reflect the interdisciplinary nature of the program.

Program of Study. A program of study is recommended by the supervisory committee after conferring with the student. The minimum number of semester hours required for the degree is 30. More may be required by the supervisory committee depending upon the background of the student and the nature of the proposed program. In some cases undergraduate courses may be required to remove deficiencies.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is optional.

Final Examinations. A final written or oral examination, or both, is required. Each examination is administered by the supervisory committee.

COURSES

For course information, refer to the catalog sections of the majors corresponding to the M.N.S.

Nonprofit Leadership and Management

Certificate Program

The certificate in Nonprofit Leadership and Management, offered through the College of Public Programs, is a graduate program that provides students with an understanding of the nonprofit sector's role in society and with the skills necessary for effective leadership and management of these organizations. The program is administered through an interdisciplinary faculty committee representing the Department of Recreation Management and Tourism, the School of Public Affairs, and other departments. The objective of this program is to provide students with professional skills needed by leaders in the nonprofit sector, including the understanding of the historical and philosophical context for nonprofit organizations in society, the management of human resources (paid and volunteer), the theory and practice of philanthropy, financial management practices, and other topical content areas.

The certificate program requires a minimum of 15 semester hours of course work. To qualify for the certificate, the student must complete three core classes and two classes from a selected list. A practicum experience is also required of students lacking direct experience in nonprofit sector work. The program is available to students who are pursuing their graduate degree in a chosen field of study and who have expressed interest in pursuing careers in the nonprofit sector. In addition, the program is well suited for working professionals who may or may not be pursuing a graduate degree but who wish to strengthen their skills and connections to the nonprofit community. All applicants must have two years of demonstrable nonprofit experience to obtain the certificate.

For more information, see "Center for Nonprofit Leadership and Management," page 39, or call 480/965-0607.

Nursing

Master's and Certificate Programs

Pamela Kidd

*Associate Dean for Graduate Programs
and Research*

(NUR 448) 480/965-3948

www.asu.edu/nursing

PROFESSORS

DURAND, KIDD, PERRY, THURBER

ASSOCIATE PROFESSORS

ADAMS, ALPERS, BAGWELL, BRILLHART, CESAROTTI,
DIRKSEN, ISMEURT, KILLEEN, KOMNENICH, MATTSON,
McCARTHY, PRIMAS, RODRIGUEZ

ASSISTANT PROFESSORS

LONG, McGRATH, PICKENS, SEHESTED,
SOUSA, ZUNKEL

CLINICAL ASSOCIATE PROFESSORS

BECK, BELL, FARGOTSTEIN, HAGLER, JASPER,
KASTENBAUM, MORRIS, STILLWELL, WHITE

CLINICAL ASSISTANT PROFESSORS

P. JOHNSON, W. JOHNSON, NUNEZ, SAYLES,
SHEARMAN, WOTRING

INSTRUCTOR

ROSDAHL

The faculty in the College of Nursing offer a graduate program leading to the M.S. degree in Nursing. Concentrations are available in one of the following areas:

1. adult health nursing,
2. community health nursing,
3. community mental health/psychiatric nursing,
4. family health nursing,
5. parent-child nursing with the tracks of the childbearing family and nursing of children, and
6. women's health nursing.

The purpose of the graduate program is to provide an academic environment that fosters scholarship, critical thinking, creativity, and prepares nurses for leadership as nurse specialists and beginning researchers. The graduate program offers advanced level courses that can be used as a base for doctoral study and for functional role development in teaching, management, or practice as a nurse practitioner.

The master's program is designed to prepare graduates to

1. synthesize advanced knowledge using concepts, theories, principles, and research from nursing, humanities, and sciences to develop advanced nursing practice knowledge which emphasizes the holistic approach;
2. demonstrate leadership, management, and teaching abilities in advanced nursing practice;
3. assume leadership, responsibility, and accountability for holistic therapeutic interventions within or across

levels of care for diverse clients including individuals, families, groups, or communities;

4. participate in professional nursing organizations and political arenas;
5. participate in research and utilize research findings;
6. communicate scholarly ideas and professional knowledge to colleagues, other disciplines, and the public;
7. provide leadership in collaboration with clients and other health care professionals in the planning and delivery of holistic health care that is responsive to changing needs and societal trends;
8. examine critically the health of populations and related health care issues; and
9. demonstrate lifelong personal and professional learning.

Functional Areas. The curriculum also provides creative study in teaching, management, and clinical nurse practitioner roles, including adult, pediatrics, women's health, psychiatric, and family. In addition, students may pursue special interests, such as health problems of selected groups, or unique aspects of the student's area of concentration.

A post-master's Nurse Practitioner certificate program is available.

MASTER OF SCIENCE

See "Master's Degrees," page 100, for general requirements.

Admission. See "Admission to the Graduate College," page 92.

Admission to graduate status in the College of Nursing is based upon meeting the following requirements:

1. junior or senior status or a cumulative GPA equal to 3.00 (4.00 = A);
2. a baccalaureate degree in nursing accredited by a nationally recognized accrediting agency;
3. current Arizona license to practice as a registered nurse and/or to enroll in some nursing practicum courses;
4. satisfactory completion of the Graduate Record Examination in the past five years with scores of 500 or higher in each of the three areas preferred;
5. one year of work experience in a relevant area of professional nursing (additional years may be required for nurse practitioner roles);
6. a descriptive statistics course in a college or university with a grade of "C" or higher, and an inferential statistics course with a grade of "B" or higher;
7. three professional recommendations from individuals knowledgeable about the applicant's academic and nursing leadership potential;
8. an interview with a representative of the specialty area;
9. eligibility for admission to the Graduate College;

10. completion of the TOEFL with a score of 550 or higher and of all requirements for the Commission on Foreign Graduate Nursing Schools (CFGNS) if considered an international student; and
11. completion of a baccalaureate level health assessment course within the preceding five years for all nurse practitioner programs.

Applicants who reside and work, or plan to reside and work, in rural or medically underserved areas are encouraged to apply for admission. Applications to the program are due February 1.

Supervisory Committee. The dean of the Graduate College, upon recommendation of the College of Nursing associate dean for Graduate Programs and Research, appoints the supervisory committee. The supervisory committee recommends the program of study, administers any special qualifying examinations, administers the final oral examination, and approves the thesis or the nonthesis option project.

Program of Study. The program of study for the M.S. degree consists of a minimum of 40 semester hours for the nursing administration and community health areas and from 47 to 53 hours for the nurse practitioner role specialty areas.

The program of study for the M.S. degree in Nursing requires the completion of a strong research component. This requirement can be accomplished by either of two pathways: (1) completion of the required research course and six hours of thesis or (2) completion of the nonthesis option that includes the required research course (three hours), the research utilization course (three hours), the applied project course (one hour), and a presentation of the completed requirements. The completed project and presentation are evaluated by the student's supervisory committee.

Foreign Language Requirements. None.

Degree Requirements. The student must successfully complete the following as defined by the supervisory committee and as approved by the dean of the Graduate College:

1. the program of study,
2. a comprehensive written examination as required,
3. a thesis and final oral examination in defense of the thesis *or* nonthesis option project.

RESEARCH ACTIVITY

Research within the College of Nursing focuses on understanding and addressing risk behaviors in vulnerable populations for the purpose of promoting health. Research interests of the College of Nursing faculty may be accessed by visiting www.asu.edu/nursing/facultystaff on the Web.

COMMUNITY HEALTH PRACTICE (CHP)

CHP 598 Special Topics. (1–4)

fall and spring

Possible topics:

- (a) Community Assessment and Analysis. (3)
spring
Provides training and experience in community assessment and analysis applicable to public health practice.
- (b) Community/Public Health Nursing Theory and Role. (3)
spring
Students analyze and synthesize the theoretical and conceptual basis of community and public health nursing applicable to cur-

rent and future nursing roles. Lecture, discussion, cooperative learning strategies.

- (c) Introduction to Community Health Practice. (3)

fall

First course in the community health practice and/or Nursing sequence. Introduces the student to the definition, philosophy, history, and principles of public health as well as the organization and structure of public health agencies, and the core functions and essential public health services. Includes a focus on health promotion, disease prevention, and the social, cultural, and environmental factors that influence health, disease, and illness.

- (d) Program Planning and Evaluation. (3)

fall

Presents a systems approach in the planning of effective health services to meet the needs of communities. Builds on theory and principles from previous courses in this concentration including information related to health deficits, community assets, and organizational capacity. Students apply planning, management, and evaluation theory in developing a viable, evidence-based plan in collaboration with community partners, organization, or policy makers. Plans include effective and culturally appropriate implementation strategies and utilize a state or national health objective as a framework for planning.

Prerequisite: admission to the graduate Nursing program or admission to the community health practice concentration of the Arizona graduate program in Public Health or instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

NURSING (NUR)

NUR 500 Research Methods. (3)

fall and spring

Research methods including research conceptualization and design in nursing. Prerequisites: admission to graduate Nursing program; graduate-level inferential statistics course.

NUR 501 Advanced Adult Health Assessment/Promotion:

Advanced Theory. (4)

fall

Expands adult health assessment/promotion skills through knowledge/strategies essential for developing and interpreting data. Lecture, demonstration. Prerequisite: all core and flexible core courses except thesis/project. Corequisite: NUR 580.

NUR 502 Management and Maintenance of Adults with Chronic Health Alterations: Advanced Theory. (4)

spring

Includes theory/research that guides the management/maintenance of adults with chronic health alterations. Emphasizes psychophysiological interrelationships of illnesses. Lecture, seminar. Prerequisites: NUR 501; all core and flexible core courses except thesis/project. Pre- or corequisite: NUR 580.

NUR 503 Management and Maintenance of Adults with Acute Health Alterations: Advanced Theory. (3)

spring

Emphasizes theoretical research foundations essential for advanced practice involving care of adults with acute episodic alterations in health. Lecture, seminar. Prerequisite: NUR 501. Pre- or corequisite: NUR 580.

NUR 521 Community Mental Health/Psychiatric Nursing: Advanced Mental Health Assessment. (3)

fall

Theories related to holistic health assessment for the promotion of physical/psychological health; develops skill in mental health assessments. Lecture, seminar, lab. Prerequisite: all core and flexible core courses except thesis/project.

NUR 522 Community Mental Health/Psychiatric Nursing: Advanced Theory I. (3)

fall

Analyzes issues, theories, and research in restoration and promotion of mental health. Emphasizes developing conceptual framework for psychiatric nursing. Prerequisites: NUR 521; all core and flexible core courses except thesis/project. Corequisite: NUR 580.

NUR 523 Community Mental Health/Psychiatric Nursing: Advanced Theory II. (3)*spring*

Focuses on development of theoretical basis for intervention and a knowledge base for collaboration and consultation in the mental health area. Prerequisites: NUR 522; all core and flexible core courses except thesis/project. Corequisite: NUR 580.

NUR 524 Psychoneuroimmunology Approaches to Practice. (3)*summer*

Overview of theories, concepts, and research in psychoneuroimmunology including physiological aspects and application to a holistic nursing model. Seminar. Prerequisite: admission to graduate Nursing program.

NUR 525 Neonatal/Pediatric Physiology and Embryology. (3)*fall*

Prepares advanced practice nurses to use embryology, genetics, and physiology concepts within the nursing process in the care of pediatric and neonatal patients. Lecture, discussion, participative dialogues, case studies. Prerequisites: undergraduate anatomy and physiology courses.

NUR 526 Advanced Neonatal Physical Assessment. (4)*fall*

Develops assessment skills related to neonate/infant, including history-taking, physical, developmental, behavioral, cultural, and genetics assessment to provide comprehensive advanced practice neonatal nursing care. Lecture, seminar, discussion, case studies. Prerequisite: instructor approval. Corequisite: NUR 525.

NUR 527 Neonatal and Pediatric Pharmacology in Nursing Practice. (3)*spring*

Examines and discusses the rationale, action, and therapeutic effect for using each class of medications employed in neonatal and pediatric health care. Lecture, seminar, discussion, case studies, clinical. Pre- or corequisites: both NUR 525 and 526 (or 558) or only instructor approval.

NUR 528 Advanced Developmental and Family-Centered Nursing Care. (4)*spring*

Provides the foundation for providing advanced nursing care of children that is developmentally supportive, family-centered, and culturally competent. Lecture, seminar, discussion, skills laboratory, clinical. Fee. Pre- or corequisites: both NUR 525 and 526 (or 558) or only instructor approval.

NUR 531 Nursing of Children: Advanced Theory I. (3)*fall*

Focuses on current practices, research, and issues related to health promotion and disease prevention for children and adolescents. Lecture, seminar. Prerequisite: all core and flexible core courses except thesis/project. Corequisite: NUR 580.

NUR 532 Nursing of Children: Advanced Theory II. (3)*spring*

Focuses on concepts, theories, and research as a basis for strategies related to management of illness and health maintenance for children. Lecture, seminar. Prerequisites: NUR 531; all core and flexible core courses except thesis/project. Corequisite: NUR 580.

NUR 533 Nursing of Children with Special Needs: Advanced Theory. (3)*spring*

Focuses on concepts, theories, and research related to acute and chronic health deviations of children. Lecture, seminar. Prerequisites: NUR 531 (or instructor approval); all core and flexible core courses except thesis/project. Corequisite: NUR 580.

NUR 534 Women's Health: Advanced Theory I. (4)*fall*

Focuses on theories, principles, and research related to managing the health of normal perinatal women and families. Cooperative learning strategies. Prerequisite: all core and flexible core courses except thesis/project. Corequisite: NUR 580.

NUR 535 Women's Health: Advanced Theory II. (4)*spring*

Focuses on management of nursing care for high-risk perinatal women and women with common health problems. Cooperative learning strategies. Prerequisites: NUR 534; all core and flexible core courses except thesis/project. Corequisite: NUR 580.

NUR 551 Theoretical Foundations of Advanced Practice Nursing. (3)*fall and spring*

Facilitates student exploration and examination of the foundations of advanced nursing practice. Lecture, seminar. Prerequisite: admission to graduate Nursing program.

NUR 552 Health Care Issues and Systems. (3)*fall and spring*

Analyzes organization, financing, service delivery and outcomes of the health system. Emphasizes policy issues, roles, and challenges for nurses. Lecture, seminar. Prerequisite: admission to graduate Nursing program.

NUR 553 Life Span Development. (3)*fall*

Critical examination of concepts, theories, issues, and research related to developmental periods throughout the life span. Analyzes biological and health, cognitive, psychological, and sociocultural influences. Lecture, discussion. Prerequisite: admission to graduate Nursing program.

NUR 554 Population-Based Health Care. (3)*fall and spring*

Identification and assessment of specific community health needs and health care patterns of target populations. Addresses promotion, protection, and improvement of health when planning health care services. Lecture, seminar. Prerequisite: admission to graduate Nursing program.

NUR 558 Advanced Pediatric Health Assessment. (3)*spring*

Expansion of basic health assessment skills and development of clinical problem-solving skills for advanced practice nurses. Includes assessments of infants, children, and adolescents. Lecture, lab. Prerequisites: admission to graduate Nursing program; undergraduate health assessment within the last five years.

NUR 559 Advanced Health Assessment. (3)*spring*

Expansion of basic health assessment skills and development of clinical problem-solving skills for advanced practice nurses. Includes assessments of infants, children, adolescents, and adults. Lecture, lab. Fee. Prerequisites: admission to graduate Nursing program; undergraduate health assessment within the last five years.

NUR 561 Advanced Practice Nursing Role. (2)*summer*

Focuses on the examination and implementation of the role of the advanced practice nurse, emphasizing major components and sub-components of the role. Lecture, seminar. Prerequisite: admission to graduate Nursing program or instructor approval.

NUR 562 Family Nurse Practitioner Advanced Theory I: Health Promotion, Management, and Maintenance. (4)*fall*

First didactic role specialty course. Focuses on concepts and strategies to promote, manage, and maintain health of child, adult, and family. Prerequisite: all core and flexible core courses except thesis/project. Corequisite: NUR 580.

NUR 563 Family Nurse Practitioner Advanced Theory II: Health Promotion, Management, and Maintenance. (4)*spring*

Second didactic role specialty course utilizing knowledge from previous courses to formulate therapeutic promotion, management, and maintenance for individuals across the life span. Prerequisites: NUR 562; all core and flexible core courses except thesis/project. Corequisite: NUR 580.

NUR 564 Applied Pharmacotherapeutics for Advanced Practice. (3)*spring*

Life span course for advanced nurse practitioners to expand knowledge of pharmacotherapeutic concepts and principles. Lecture, discussion, case studies. Prerequisite: admission to graduate Nursing program.

NUR 565 Applied Physiology/Pathophysiology in Advanced Practice. (3)*spring*

Advanced nurse practitioner course designed to expand previously acquired anatomy and physiology knowledge and discern pathological alterations across the life span. Lecture, seminar, case studies. Prerequisites: admission to graduate Nursing program; undergraduate anatomy and physiology.

NUR 566 Pediatric Physiology/Pathophysiology. (3)*spring*

Analyzes the patterns of heredity, cellular differentiation, and the development of systems in the infant to adolescent. Prerequisite: admission to graduate Nursing program.

NUR 571 Teaching in Nursing Programs. (3)*not regularly offered*

Analyzes theories, issues, and research related to teaching in nursing. Focuses on the process of teaching/learning. Seminar, cooperative learning. Prerequisite: graduate standing.

NUR 578 Gestalt Therapy I. (3)*fall*

Introduction to theory and methodology of Gestalt therapy and its uses for mental health promotion and restoration.

NUR 579 Gestalt Therapy II. (3)*spring*

Focuses on further development of Gestalt therapy and its application in working with various client populations. Prerequisite: NUR 578.

NUR 580 Practicum (Electives). (1-4)*not regularly offered*

Clinical application of theories, concepts, and principles such as health promotion, health management, health maintenance, teaching, management, and special clinical studies. Fee.

NUR 580 Advanced Nursing Practicum I, II. (1-12)*fall and spring*

Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Possible topics:

- (a) Adult Health Nursing. (2-6)
Fee.
 - (b) Community Health Nursing. (2-6)
 - (c) Community Mental Health/Psychiatric Nursing. (2-6)
 - (d) Family Health Nursing. (2-6)
Fee.
 - (e) Parent-Child Nursing with the Tracks of the Childbearing Family and Nursing of Children. (2-6)
Fee.
 - (f) Women's Health Nursing. (2-6)
- Prerequisite: admission to graduate Nursing program. Corequisite: NUR 501 or 502 or 503 or 522 or 523 or 531 or 532 or 533 or 534 or 535 or 562 or 563.

NUR 582 Advanced Human Physiology. (3)*fall*

Analyzes major theories and concepts of human physiology. Explores interrelationship of physiology and health. Prerequisite: admission to graduate Nursing program.

NUR 584 Community Health Nursing Internship. (3)*spring*

Students operationalize community health nursing/public health content in leadership roles in a variety of community agencies. Clinical internship. Prerequisite: NUR 580.

NUR 585 Stress Reduction. (3)*not regularly offered*

Theory, application, and evaluation of mind/body relaxation methods, including physiological effects. Emphasizes research findings. Daily student practice. Prerequisite: graduate standing or instructor approval.

NUR 586 Advanced Pathophysiology. (3)*spring*

Manifestation of altered human physiology and disease. Uses systems theory to analyze the relationships of disease and physiology. Prerequisites: NUR 582; admission to graduate Nursing program.

NUR 589 Research Utilization. (3)*fall and spring*

Emphasizes the synthesis and application of research to an identified clinical nursing problem. Prerequisite: all core and flexible core courses except thesis/project. Corequisite: NUR 593.

NUR 591 Seminar. (2-4)*not regularly offered*

Advanced topics, including curriculum development and health promotion. Prerequisite: instructor approval in selected courses.

NUR 593 Applied Project. (1)*fall and spring*

Preparation of a supervised applied project that is a graduation requirement in some professional majors. Prerequisite: all core and flexible core courses. Corequisite: NUR 589.

NUR 598 Special Topics. (1-4)*not regularly offered*

Special study, including issues in health care and organizations, management in nursing, ethical issues, and clinical nurse specialist role. Possible topics:

- (a) Advanced Neonatal Theory I. (4)
fall
Fee.
- (b) Advanced Neonatal Theory II. (3)
spring
- (c) Epidemiology. (2)
- (d) Nursing of Children with Development Disabilities. (3)
- (e) School Nursing Practice. (3)

NUR 599 Thesis. (1-6)*fall, spring, summer*

Research proposal development, data collection and analysis, thesis writing, and thesis oral defense. Six hours required. Prerequisite: all core and flexible core courses.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Nutrition

Master's Program

Linda A. Vaughan
Chair

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www.east.asu.edu/ecollege/nutrition

PROFESSORS

JOHNSTON, MANORE, VAUGHAN

ASSOCIATE PROFESSOR
MONTE

ASSISTANT PROFESSOR
HAMPL

SENIOR LECTURER
MARTIN

LECTURER
DIXON

The faculty in the Department of Nutrition, at ASU East, offer a graduate program leading to a M.S. degree in Human Nutrition. The department also offers a combined M.S./Dietetic Internship program, which is currently granted Developmental Accreditation by the

COMMISSION ON ACCREDITATION FOR
DIETETICS EDUCATION OF THE AMERICAN
DIETETIC ASSOCIATION (ADA)
216 W JACKSON BLVD
CHICAGO IL 60606-6995

The commission can be reached by phone at 312/899-4876.

Admission. Applications for admission and graduate assistantships are accepted until February 1 preceding the fall semester to which the applicant is seeking admission. In addition to meeting Graduate College requirements, students must submit an official record of their scores on the

Graduate Record Examination (verbal, quantitative, and analytical), three letters of recommendation, a résumé of employment and academic experiences, and the completed departmental Supplementary Information Form. Students wishing to be considered for graduate assistantships must also complete the Graduate College and departmental forms. The prerequisites for graduate work in Nutrition are as follows: anatomy and physiology with laboratory, biochemistry with laboratory, general chemistry with laboratory, general nutrition, introductory statistics, microbiology with laboratory, and organic chemistry with laboratory. Admission procedures for the Dietetic Internship are explained below.

Program of Study. The program of study consists of a minimum of 31 semester hours. Required courses are NTR 500 Research Methods in Nutrition (or an equivalent course, with advisor approval), three to six semester hours of 500-level statistics courses approved by an advisor, six semester hours of thesis/research credit, a one-semester-hour departmental seminar (NTR 591 S: Recent Developments in Food and Nutrition), and six semester hours of nutrition seminars selected from NTR 531, 532, and/or 598. Students completing the Dietetic Internship must also complete six semester hours of NTR 580 Dietetics Practicum; only three semester hours of NTR 580 may be applied toward the M.S. degree. Additional courses may be selected upon consultation with an advisor.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

Final Examination. A final oral examination in defense of the thesis is required.

RESEARCH ACTIVITY

The faculty in the Department of Nutrition are engaged in a broad range of research activities. Undergraduate students are encouraged to collaborate with faculty and graduate students in the research process. Department faculty are well recognized for their research in the areas of Vitamin C metabolism, nutrition and exercise, the nutrient intakes of children and young adults, and the nutritional status of free-living and homebound elderly. Nutrition faculty conduct controlled metabolic feeding studies, investigate food product stability, analyze national food and nutrient data sets, and assess the nutritional status of athletes and physically active adults. Interdisciplinary research is conducted in conjunction with anthropology, exercise science, food science, immunology, nursing, and other faculty. For more information access the Department of Nutrition Web site at www.east.asu.edu/ecollege/nutrition.

Dietetic Internship. Admission to the Dietetic Internship requires regular or unconditional admission to the Department of Nutrition's graduate program and submission of an official Verification Statement documenting successful completion of a Didactic Program in Dietetics (DPD). If DPD requirements have not been met at the time application to the Dietetic Internship is made, students must submit an Intent to Complete form and all DPD courses must be completed before entering the program. Students must provide documentation that a minimum of 150 hours of clinical experience has been completed within the past five years.

The Dietetic Internship does not participate in computer matching. Students must complete both the M.S. degree requirements and the Internship practicum requirements to satisfy the Dietetic Internship requirements and establish eligibility to sit for the Registration Examination for Dietitians.

NUTRITION (NTR)

NTR 440 Advanced Human Nutrition I. (3)

fall

Metabolic reactions and interrelationships of vitamins, minerals, and water. Prerequisites: BIO 202 and CHM 231 and NTR 241 (or their equivalents).

NTR 441 Advanced Human Nutrition II. (3)

spring

Metabolic reactions and interrelationships of carbohydrate, lipid, and protein. Prerequisites: BCH 361 and BIO 202 and NTR 241 (or their equivalents).

NTR 442 Experimental Foods. (3)

fall and spring

Food product development techniques, food evaluation and testing, and investigation of current research into food composition. 2 hours lecture, 3 hours lab. Fee. Prerequisites: CHM 231; NTR 142.

NTR 444 Diet Therapy. (3)

spring and summer

Principles of nutritional support for prevention and treatment of disease. Prerequisites: BIO 201 and 202 and NTR 241 (or their equivalents).

NTR 445 Quantity Food Production. (3)

fall and spring

Standardized methods of quantity food preparation, operation of institutional equipment, institutional menu planning, quantity food experiences. May require field trips. Lecture, lab. Fee. Prerequisites: NTR 100 (or 241) and 344 (or their equivalents).

NTR 446 Human Nutrition Assessment Lecture/Laboratory. (3)

spring

Clinical and biochemical evaluation of nutritional status. 2 hours lecture, 3 hours lab. Fee. Prerequisites: BCH 361, 367; NTR 440 (or 441).

NTR 448 Community Nutrition. (3)

fall and spring

Food-related behaviors; organization and delivery of nutrition services; program design, implementation, and evaluation strategies; nutrition assessment of populations. Prerequisite: NTR 241 (or its equivalent).

General Studies: L

NTR 450 Nutrition in the Life Cycle I. (3)

fall

Emphasis on nutritional needs and problems during pregnancy, lactation, infancy, and childhood. Prerequisite: NTR 100 or 241 (or its equivalent).

NTR 451 Nutrition in the Life Cycle II. (3)

spring

Nutritional requirements and nutrition-related disorders of adolescence, middle adulthood, and later life. Prerequisite: NTR 100 or 241 (or its equivalent).

NTR 500 Research Methods in Nutrition. (3)

fall

Experimental design; methods of data collection, laboratory analyses, and statistical analyses; development of thesis proposal. Lecture, lab. Fee. Prerequisites: 1 course each in advanced nutrition, biochemistry, and statistics.

NTR 531 Recent Developments in Nutrition. (1)

fall and spring

Selected topics addressing current issues in nutrition research. Prerequisites: 1 course each in advanced nutrition and biochemistry.

NTR 532 Current Research in Nutrition. (3)

spring

Vitamins and minerals. Prerequisites: 1 course each in advanced nutrition and biochemistry.

NTR 540 Advanced Micronutrient Metabolism. (3)*fall*

Metabolism of vitamins and minerals, primarily as applied to humans, with research literature emphasized. Prerequisites: 1 course each in basic nutrition and biochemistry.

NTR 541 Advanced Macronutrient Metabolism. (3)*spring*

Metabolism of protein, fat, and carbohydrate, primarily as applied to humans, with research literature emphasized. Prerequisites: 1 course each in basic nutrition and biochemistry.

NTR 542 Advanced Food Product Development. (3)*fall and spring*

Food product development techniques, food evaluation and testing, and investigation of current research into food composition. 2 hours lecture, 3 hours lab. Fee. Prerequisites: CHM 231 and NTR 142 (or their equivalents).

NTR 544 Therapeutic Nutrition. (3)*spring and summer*

Current theories of the nutritional prevention or treatment of various diseases. Prerequisites: 1 course each in basic nutrition, introduction to diet therapy, and physiology.

NTR 545 Recent Developments in Institutional Feeding. (3)*fall and spring*

Current practices in institutional feeding, including supervised practicum with local quantity food operation. 1 hour lecture, 6 hours lab. Fee. Prerequisites: NTR 142 and 344 (or their equivalents).

NTR 546 Assessment Techniques in Nutrition. (3)*spring*

Clinical and biochemical evaluation of nutritional status. 2 hours lecture, 3 hours lab. Fee. Prerequisites: 1 course each in advanced nutrition, biochemistry, and physiology.

NTR 548 Nutrition Program Development. (3)*fall and spring*

Planning, development, implementation, and evaluation of community nutrition programs, including the process of grant applications. Prerequisites: 1 course each in basic nutrition and sociology.

NTR 550 Advanced Maternal and Child Nutrition. (3)*fall*

In-depth review of metabolic characteristics and nutritional needs of the pregnant woman, lactating woman, infant, and child. Prerequisites: 1 course each in basic nutrition, biochemistry, and physiology.

NTR 551 Advanced Geriatric Nutrition. (3)*spring*

In-depth review of metabolic characteristics and nutritional requirements of the elderly. Prerequisites: 1 course each in basic nutrition, biochemistry, and physiology.

NTR 580 Dietetics Practicum. (3-9)*fall, spring, summer*

Structured practical experience in the Dietetic Internship, supervised by practitioners with whom the student works closely. Practicum. Prerequisite: acceptance into the Dietetic Internship.

NTR 591 Seminar. (1-12)*not regularly offered*

Possible topics:

- (a) Recent Developments in Food and Nutrition. (1)

NTR 592 Research. (1-12)*not regularly offered***NTR 593 Applied Project. (1-12)***not regularly offered***NTR 594 Conference and Workshop. (1-12)***not regularly offered***NTR 598 Special Topics. (1-4)***not regularly offered*

In-depth review of recent research in areas including nutrition and exercise, nutrition and immunology, energy balance, vegetarianism, nutritional pathophysiology. Fee. Prerequisites: 1 course each in advanced nutrition, biochemistry, and physiology.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Performance

See "Music," page 271.

Philosophy

Master's and Doctoral Program

Brad Armendt

Chair

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philosophy@asu.edu

www.asu.edu/clas/philosophy

REGENTS' PROFESSOR

MURPHY

PROFESSORS

COHEN, CREATH, FITCH, FRENCH, HUMPHREY,
MAIENSCHIN, WHITE

ASSOCIATE PROFESSORS

ARMENDT, BLACKSON, de MARNEFFE, GULESERIAN,
KOBES, MCGREGOR, REYNOLDS

ASSISTANT PROFESSORS

DEVLIN, MASON

LECTURER

BOLTON

The faculty in the Department of Philosophy offer a graduate program leading to the M.A. or Ph.D. degree in Philosophy. For the specific requirements of the Ph.D., contact the department.

MASTER OF ARTS

See "Master's Degrees," page 100, for general requirements.

Prerequisites. At least 15 semester hours of upper-division course work in philosophy, including history of philosophy, epistemology, metaphysics, and the equivalent of PHI 333 Introduction to Symbolic Logic are required. No course credits in which a grade of less than "B" has been earned may count toward meeting this 15-semester-hour requirement. Persons otherwise qualified for admission but lacking the above prerequisites may make up this deficiency by enrolling as a nondegree graduate student and taking those philosophy courses necessary to complete the prerequisite. If some or most of the prerequisites have already been met, the student may be admitted into the program under "provisional status" or under "regular status with deficiencies." All applicants for admission to the program must submit scores for the general section of the Graduate Record Examination.

Program of Study. The M.A. degree program in Philosophy is designed to prepare students either to teach philosophy at the community college level, to enter doctoral pro-

grams in philosophy at other institutions, or to be employed in any areas that require critical, analytical thinking (such as medicine, law, government, or publishing). The program seeks to maintain a balance between a breadth of course offerings in the traditional areas of philosophy—metaphysics, ethics, epistemology, logic, and history of philosophy—and opportunities for study in current philosophical developments, such as the philosophy of science, philosophy of language, and philosophical psychology. The program of study includes at least 30 semester hours of approved graduate-level courses, not including PHI 599 Thesis. An additional six hours of PHI 599 Thesis is required. The details of each student's program are worked out with the director of graduate studies.

Course Requirements. Each student is required to take an approved graduate-level course of three semester hours or more in each of the following areas and to obtain at least a "B" in each course: metaphysics/epistemology, value theory and logic; and any two of the following: history of early philosophy, history of modern philosophy, and history of contemporary philosophy.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required. This written work must demonstrate the ability to carry out independent research in philosophy.

Final Examinations. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

Prerequisites. At least 15 semester hours of upper-division course work in philosophy, including history of philosophy, epistemology, metaphysics, and the equivalent of PHI 333 Introduction to Symbolic Logic are required. No course credits in which a grade of less than "B" has been earned may count toward meeting this 15-semester-hour requirement. If some or most of the prerequisites have already been met, the student may be admitted into the program under "provisional status" or under "regular status with deficiencies."

Admission. All applications for admission to the Ph.D. degree program in Philosophy must be accompanied by complete transcripts, the applicant's scores in the GRE aptitude exam, three letters of recommendation from persons qualified to judge the applicant's potential for graduate work in philosophy, a sample of philosophical writing, and a statement of purpose.

Program of Study. The Ph.D. degree program in Philosophy is designed to prepare students for careers as philosophers and teachers of philosophy, and in areas that may benefit from advanced training in philosophy, such as law, civil service, and publishing. The program of study includes 60 semester hours (30 beyond the M.A.) of graduate credit plus 24 semester hours of research and dissertation. The student's program of study is selected by the student in consultation with the graduate director and the supervisory committee and is approved by the supervisory committee.

Course Requirements. To ensure breadth in the traditional areas of philosophy, students are required to pass these courses with a grade of "B" or higher:

1. Two graduate courses in history of philosophy. These courses must be in two different areas chosen from ancient, modern, and contemporary.
2. Two graduate courses in value theory.
3. Four graduate courses in metaphysics and epistemology (including areas such as philosophy of language, philosophy of science, and philosophy of mind).
4. One advanced course in symbolic logic (at the 400 or 500 level). Students may satisfy the logic requirement by examination.

Foreign Language Requirement. None.

Comprehensive Examination. Students will be examined in their area of specialization and competence. The written and oral examinations are based on a bibliography compiled by the student and approved by the student's advisory committee. Normally these examinations are taken after the student has completed at least 60 hours of graduate course work.

Dissertation Prospectus. Each doctoral candidate will prepare a prospectus of four to seven pages for the dissertation. The format and design of the prospectus will be determined by the candidate and committee chair. The prospectus should include a

1. thesis statement,
2. discussion of relevant literature,
3. discussion of the approach to the project, and
4. bibliography.

Dissertation. A dissertation based on original research is required. Research for the dissertation is supervised by a committee of at least three faculty members, appointed by the graduate director in consultation with the student. Students must enroll for a minimum of 12 semester hours of Research or Dissertation credit after admission to candidacy.

Final Examination. An oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

The department offers a solid program in traditional and contemporary philosophy. General areas of research include ethics, political philosophy, metaphysics, epistemology, philosophy of law, philosophy of science, philosophy of language, philosophy of religion, and the history of philosophy. The topics treated in recent and current faculty research include moral psychology and moral emotions, environmental ethics, feminist analysis of law, liberty and paternalism, causation, rational choice theory, contextualism in epistemology, perceptual knowledge, the nature of consciousness, the role of the *a priori* in science and philosophy, truth, reference, externalist theories of mental content, and free will.

PHILOSOPHY (PHI)

PHI 401 Rationalism. (3)

not regularly offered

Examines classical philosophical rationalism, as in Descartes, Spinoza, Malebranche, or Leibniz. Contemporary rationalist thought may also be examined. Prerequisites: PHI 302 and 305 (or 309 or 312 or 316 or 317).

PHI 402 Empiricism. (3)*not regularly offered*

Examines representatives of either classical or contemporary philosophical empiricism, e.g., Bacon, Hobbes, Locke, Butler, Berkeley, Reid, Hume, Mill, Carnap, and Ayer. Prerequisites: PHI 302 and 305 (or 309 or 312 or 316 or 317).

*General Studies: HU***PHI 403 Contemporary Analytic Philosophy. (3)***once a year*

Aims and methods of such 20th-century philosophers as Frege, Moore, Russell, Wittgenstein, Carnap, Ayer, Wisdom, Ryle, Austin, Strawson, Quine, and Sellars, with application to metaphysics and epistemology. Prerequisites: PHI 302 and 312 (or 314 or 315 or 316 or 317 or 401 or 402).

*General Studies: HU***PHI 413 Advanced Symbolic Logic. (3)***not regularly offered*

Properties of formal systems axiomatizing propositional and 1st-order predicate logic. May also include modal logic, number theory, and limits of logicism. Prerequisite: PHI 333.

PHI 420 Topics in Philosophy. (3)*once a year*

Course descriptions on file in department. May be repeated for credit.

Possible topics:

- (a) History of Philosophy
- (b) Metaphysics/Epistemology
- (c) Philosophy of Language/Logic
- (d) Philosophy of Science
- (e) Value Theory

Prerequisite: one relevant upper-division PHI course or instructor approval.

PHI 590 Reading and Conference. (1–12)*not regularly offered***PHI 591 Seminar. (1–12)***once a year*

Possible topics:

- (a) Aesthetics. (1–3)
- (b) Epistemology. (1–3)
- (c) Ethics. (1–3)
- (d) History of Philosophy. (1–3)
- (e) Logic. (1–3)
- (f) Metaphysics. (1–3)
- (g) Philosophy of Language. (1–3)
- (h) Philosophy of Law. (1–3)
- (i) Philosophy of Science. (1–3)
- (j) Social and Political Philosophy. (1–3)

PHI 592 Research. (1–15)*not regularly offered***PHI 599 Thesis. (1–12)***fall and spring***PHI 790 Reading and Conference. (1–12)***not regularly offered***PHI 792 Research. (1–15)***not regularly offered***PHI 799 Dissertation. (1–15)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Physical Education

See “Master of Physical Education,” page 217.

Physics

Master's and Doctoral Programs

Barry G. Ritchie

Chair

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REGENTS' PROFESSORS

SMITH, SPENCE

PROFESSORS

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RITCHIE, SANKEY, SCHEINFELD, SCHMIDT, STARRFIELD,
TILLERY, TSEN, TSONG, VENABLES,
WINDHORST, WYCKOFF

ASSOCIATE PROFESSORS

AANESTAD, ACHARYA, BENIN, CULBERTSON,
DRUCKER, HERBOTS, MARZKE

ASSISTANT PROFESSOR

LEBED

The faculty in the Department of Physics and Astronomy offer graduate programs leading to the M.S. and Ph.D. degrees in Physics. In the M.S. program, options are available in physics, physics with an emphasis in astronomy, interdisciplinary physics, technical physics, or physics teaching. In the Ph.D. program, options are available in physics, physics with an emphasis in astronomy, or applied physics.

The faculty in the Department of Physics and Astronomy also participate in the program leading to the Master of Natural Science degree (see “Natural Science,” page 278) when one of the concentrations is physics, and in the interdisciplinary program leading to the Ph.D. degree in the Science and Engineering of Materials (see “Science and Engineering of Materials,” page 307).

Students admitted to the Master of Education degree program with a major in Secondary Education may elect physics or science education as the subject matter field. A Doctor of Education degree program option is also available. The M.Ed. (see “Master of Education,” page 186) and Ed.D. (see “Doctor of Education,” page 187) are offered and administered through the College of Education.

The master's and doctoral programs are designed to prepare students for professional research careers in governmental, industrial, or academic institutions and for teaching at the university, college, or secondary school levels.

An evaluation of the progress of all graduate students is made during the spring semester by the Graduate Program Committee. Students whose progress is considered to be unsatisfactory are placed on probation. Failure to maintain a GPA of 3.00 in courses taken while enrolled as a graduate student, exclusive of research, thesis, and dissertation, is an indication of unsatisfactory progress and may result in dismissal from the program.

Courses can include up to six semester hours of 400-level courses (see “Graduate Credit Courses,” page 96). Timely attempts at examination are also required.

Teaching experience in undergraduate physics and astronomy laboratories and recitations is valuable training for graduate students and is considered part of the graduate program.

Departmental colloquia are an integral part of the graduate program. Regular attendance at colloquia is expected of all graduate students intending to earn graduate degrees.

MASTER OF SCIENCE

See “Master’s Degrees,” page 100, for general requirements.

Admission. To be admitted without deficiencies, entering graduate students should have adequate undergraduate preparation equivalent to an undergraduate major of 30 semester hours in physics and 20 semester hours in mathematics. Courses in analytic mechanics, electromagnetism, and modern physics, including quantum mechanics, are particularly important. Students applying for admission must submit scores for the verbal, quantitative, and analytical sections of the Graduate Record Examination (GRE).

Applicants for financial support must submit a score on the physics advanced examination of the GRE. Subsequent financial support in the form of teaching or research assistantships is contingent upon satisfactory performance in course work, timely completion of the final examination for the M.S. degree as described below, and need and availability of such support. Students on probation are offered financial support only under exceptional circumstances.

Program of Study. The faculty in the Department of Physics and Astronomy offer the M.S. degree under two options: Track I—emphasizing physics, and Track II—emphasizing one of the following related fields:

1. astronomy and astrophysics,
2. interdisciplinary physics (e.g., with chemistry),
3. technical physics, or
4. physics teaching.

A supervisory committee is formed for each student, usually during the first year of study. In each case an appropriate program of study is selected with the approval of the supervisory committee. A research project resulting in a thesis is required of all students enrolled in the M.S. program.

Track I

Physics. An individual program of study, including courses in physics, astronomy, mathematics, or related subjects, is selected with the approval of the supervisory committee to make up a coherent program of graduate study. The courses and research project are to be conducted primarily within the Department of Physics and Astronomy.

Track II

Astronomy and Astrophysics. The AST graduate courses are taken in addition to the required graduate physics courses for the Track II M.S. program. The research project must be in the area of astronomy and astrophysics, conducted under the supervision of one or more faculty members of the Department of Physics and Astronomy who specialize in this subject.

Interdisciplinary Physics. The courses taken are approximately half in physics and half in some other subject area. The research project must be in an interdisciplinary area and conducted under the joint supervision of one faculty member from the Department of Physics and Astronomy and one faculty member from another department.

Technical Physics. The research project involves active collaboration with an industrial or government laboratory under the supervision of a faculty member from the Department of Physics and Astronomy and may be conducted either in the Department of Physics and Astronomy or in the outside laboratory. At least half the courses taken must be in physics.

Physics Teaching. The course of study and research are designed to prepare students for a career in physics teaching, with appropriate modifications for teaching at the high school or community college level. At least half the courses taken must be in physics. Students participate in directed, evaluated teaching experiences.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required of all students obtaining the M.S. degree. Every student must complete at least six semester hours of PHY 592 or PHY 599. However, no more than nine semester hours in these courses can be counted toward the 30 semester hours required for the M.S. degree.

Final Examinations. The final examination for the M.S. degree is an oral examination on the subject of the student’s thesis and on graduate course work taken.

DOCTOR OF PHILOSOPHY

See “Doctor of Philosophy,” page 103, for general requirements.

Admission. This program is designed for students with a high-level of ability who show promise for independent research. An applicant holding a baccalaureate degree should have the same undergraduate preparation as for admission to the master’s program. An applicant presenting acceptable graduate credit, earned at this or another institution must demonstrate mastery of this material, see “Written Comprehensive Examination” and “Oral Comprehensive Examination,” page 288.

Students applying for admission must submit scores for the verbal, quantitative, and analytical sections of the GRE.

Applicants for financial support must submit a score on the physics advanced examination of the GRE. Subsequent financial support in the form of teaching or research assistantships is contingent upon satisfactory performance in course work, timely completion of examinations, including the written and oral Ph.D. comprehensive examinations, and need and availability of such support. Students on probation are offered support only under exceptional circumstances. The period for which a Ph.D. candidate may receive financial support through the Department of Physics and Astronomy does not normally exceed six years.

Program of Study. In order to accommodate the needs for training in preparation for the wide variety of occupations of professional physicists and astrophysicists, in areas ranging from academic faculty to industrial research to

administrative positions, doctoral degree programs are offered under two tracks: physics (Track I) and astrophysics, applied physics, or interdisciplinary physics (Track II). The goal is to provide, through course work and independent study, competence at advanced levels in fundamental, applied and interdisciplinary branches of physics and astronomy, and demonstrated ability in independent research.

Students enrolled in the Ph.D. program may obtain an "M.S. degree in passing" by satisfactorily filing and completing an M.S. Program of Study, obtaining a GPA of at least 3.00 in a set of core courses which total 24 semester hours, and passing a written comprehensive examination. The core courses shall be those designated for one of the tracks in the Ph.D. program. Graduate core courses satisfactorily completed at other institutions may be waived upon petition by the Graduate Program Committee. Up to nine semester hours of classroom-based courses may be substituted for core courses that are waived by the Graduate Program Committee.

Each student's progress is overseen by a supervisory committee appointed for the student usually during the first year of study. This committee also approves the student's program of study.

Track I

Physics. The student's individual program includes courses selected, with the approval of the supervisory committee, to make up a coherent program for the achievement of these goals. The program may be directed toward either theoretical or experimental aspects, and frequently includes courses in cognate fields, particularly mathematics, depending on the student's selected field.

Track II

Applied Physics. With advising from the supervisory committee, a program of study is selected with a major portion in physics and a minor portion (nine semester hours or more to be passed with at least a "B" average) in another area. The supervisory committee should include appropriate representation from the minor area.

Astronomy and Astrophysics. The following six AST 598 graduate courses are required for all students enrolled in the astronomy and astrophysics graduate program:

AST 598 ST: Astronomical Data Taking and Data Reduction
 AST 598 ST: Cosmology and High-Energy Astrophysics
 AST 598 ST: Extragalactic Astronomy
 AST 598 ST: Galactic Structure
 AST 598 ST: Interstellar Medium and Gaseous Astrophysics
 AST 598 ST: Stellar Interiors and Stellar Evolution

Course Requirements. The following basic core of courses, or their equivalents, is required of both Track I and Track II students:

PHY 501 Methods of Theoretical Physics.....	3
PHY 521 Classical Mechanics.....	3
PHY 531 Advanced Electricity and Magnetism.....	3
PHY 541 Statistical Physics.....	3
Total	12

In addition, the following courses are required of all Track I students:

PHY 502 Methods of Theoretical Physics.....	3
PHY 532 Electrodynamics.....	3
PHY 576 Quantum Theory.....	3
PHY 577 Quantum Theory.....	3
Total	12

Additional course work in both tracks is selected with the advisement and approval of the supervisory committee.

Foreign Language Requirements. None.

Comprehensive Examinations. The following examinations are required of all students intending to earn the Ph.D. degree.

Master of Science Degree in Passing. Students enrolled in the Ph.D. degree may be awarded an M.S. degree in passing.

Written Comprehensive Examination

Track I. The subject matter of this examination is classical and quantum mechanics, statistical mechanics, and electricity and magnetism, as represented by the courses PHY 521, 531, 532, 541, 576, and 577. The examination is given in two four-hour sessions on separate days, but there is no division of subject matter for the separate sessions.

Track II. This examination consists of parts A and B.

Part A emphasizes quantum mechanics, classical mechanics, and electricity and magnetism, as represented by the courses PHY 416, 521, and 531, and is written in a four-hour examination period.

For all Track II students except astronomy and astrophysics students, Part B is a written examination prepared by the student's supervisory committee and approved by the graduate examination committee. The Part B Track II examination for astronomy and astrophysics students is prepared by the astrophysics subcommittee of the graduate examination committee, and is based mostly on the course material presented in the AST courses. Part B of the Track II exam is given within three days after the Part A exam. The Part B exam for astronomy and astrophysics students is graded by the astrophysics faculty; Part B for all other Track II students is graded by their supervisory committee, under the supervision of the graduate examination committee.

The written comprehensive examination is normally given twice yearly, approximately during registration weeks of the fall and spring semesters. Ph.D. candidates must attempt the examination before the beginning of their fifth semester as full-time students in the physics graduate program and must pass the examination before the beginning of the sixth semester.

Oral Comprehensive Examination

Ph.D. candidates are required to pass the oral comprehensive examination by the end of their sixth semester as full-time students in the physics graduate program. The examination is administered and graded by the student's supervisory committee. It tests the student's general knowledge of one of the following four broad areas of current activity in physics:

1. astronomy and astrophysics,
2. atomic and molecular physics,
3. nuclear and particle physics, and
4. solid-state and many-body physics.

The area tested is to be chosen by the student at the time of scheduling of the examination. The student may request to be examined on specific subjects in addition to one of the areas. In all cases, a student's specific dissertation topic, should it exist at the time of the examination, is to be excluded from the material covered by the examination.

Dissertation Requirements. A dissertation representing an original contribution to the field, as a result of independent work suitable for publication in a refereed physics or astronomy journal, is required.

Final Examinations. A final oral examination that covers, but is not necessarily limited to, the subject of the dissertation is required.

RESEARCH ACTIVITY

Faculty in the Department of Physics and Astronomy perform frontier research that spans the largest and smallest scales—from the galaxies of the cosmos to the substructure of subatomic particles. Topics include investigations in areas such as astrophysics, condensed matter and material physics, medium energy physics, and biophysics. Faculty and students regularly conduct experiments using state-of-the-art instruments such as electron microscopes, lasers, computers, space-borne and ground-based observatories, and detector facilities at international accelerator laboratories. This experimental work is completed by theoretical investigations associated with the phenomena explored by these experiments as well as other cutting-edge topics. For more details, visit the department's Web site at phy.asu.edu.

ASTRONOMY (AST)

AST 421 Astrophysics I. (3)

fall

Selected astrophysical topics, including: stellar evolution, star formation, interstellar medium, galactic structure, extragalactic astronomy, high-energy astrophysics, and cosmology. Prerequisites: AST 321, 322; PHY 311, 314.

AST 422 Astrophysics II. (3)

spring

Same range of astrophysical topics as for AST 421 but different specific topics are emphasized in a given year. Prerequisites: AST 321, 322; PHY 311, 314.

AST 598 Special Topics. (1–4)

not regularly offered

Possible topics:

- Astronomical Data Taking and Data Reduction
- Cosmology and High-Energy Astrophysics
- Extragalactic Astronomy
- Galactic Structure
- Interstellar Medium and Gaseous Astrophysics
- Stellar Interiors and Stellar Evolution

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

PHYSICAL SCIENCES (PHS)

PHS 505 Energy and the Environment. (3)

summer

Current problems in energy resources, production, consumption, and conservation. Studio. Prerequisite: instructor approval.

PHS 510 Inquiry Physical Science I. (3)

summer

Inquiry approach to physical science, standards-based, intended for elementary school teachers. Topics selected: kinematics, dynamics, electricity, magnetism, light, astronomy. Studio. Prerequisite: instructor approval.

PHS 520 Inquiry Physical Science II. (3)

summer

Inquiry approach to physics and astronomy, standards-based, intended for middle school teachers. Emphasizes technology and modeling. Studio. Prerequisite: instructor approval.

PHS 530 Methods of Physics Teaching I. (3)

summer

Inquiry approach to high school physics teaching. Studio. Prerequisite: instructor approval.

PHS 531 Methods of Physics Teaching II. (3)

summer

Extension of modeling techniques introduced in PHY 580. Studio. Prerequisite: PHS 530 or instructor approval.

PHS 534 Methods of Teaching Physical Science I, II, III. (3)

summer

Design of curriculum and conduct of instruction for physical science courses. Studio. Prerequisite: instructor approval.

PHS 540 Integrated Physics and Chemistry. (3)

summer

Collaborative inquiry methods for teaching and coordinating physics and chemistry. Studio. Prerequisite: CHM 480 or PHS 530 or PHY 480 or instructor approval.

PHS 542 Integrated Mathematics and Physics. (3)

summer

Mathematical models and modeling as an integrating theme for secondary mathematics and physics. Studio. Prerequisite: instructor approval.

PHS 550 Physics and Astronomy. (3)

summer

Astronomy curricula and projects for secondary school, with emphasis on the role of physics in astronomy. Studio. Prerequisite: instructor approval.

PHS 556 Astrophysics. (3)

summer

Structure and evolution of stars, galaxies, and the universe. For secondary school teachers. Studio. Prerequisite: instructor approval.

PHS 560 Matter and Light. (3)

summer

Interactions of light with matter. Lasers and spectroscopy. Studio. Prerequisite: instructor approval.

PHS 564 Light and Electron Optics. (3)

summer

Principles and practice of electron-optical instruments. Studio. Prerequisite: instructor approval.

PHS 570 Spacetime Physics. (3)

summer

Special and general theories of relativity with implications for space and time travel. Studio. Prerequisite: instructor approval.

PHS 581 Structure of Matter and Its Properties. (3)

summer

Models of matter and its properties. Studio. Prerequisite: instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

PHYSICS (PHY)

PHY 412 Classical Particles, Fields, and Matter III. (3)

fall

Electromagnetic fields of moving charges, Maxwell's equations, harmonic phenomena, oscillations, waves, electromagnetic radiation, covariant electromagnetism, introduction to general relativity. Prerequisites: PHY 311, 333. Corequisite: PHY 416 or instructor approval.

PHY 416 Quantum Physics III. (3)

fall

Introduction to the quantum theory of atoms, molecules, solids and nuclei, Dirac's equation. Prerequisites: PHY 311, 315. Corequisite: PHY 412 or instructor approval.

PHY 420 Research Paper. (1)

fall and spring

Scientific report writing. Culminates in a paper based on library or laboratory research or both. Taken in conjunction with other courses as approved. Conference. Prerequisite: instructor approval.

General Studies: L

PHY 441 Statistical and Thermal Physics I. (3)*fall*

Statistical and experimental basis of heat, temperature, and entropy. Mechanical and statistical basis of the laws of thermodynamics. Applications of macroscopic thermodynamics. Phase equilibrium. Prerequisites: PHY 311, 315.

PHY 442 Statistical and Thermal Physics II. (3)*spring*

Principles and applications of statistical mechanics. Quantum statistics of ideal gases and simple solids. Equilibrium of phases and chemical species. Transport theory. Irreversible processes and fluctuation. Prerequisite: PHY 441.

PHY 452 Physical Optics. (3)*fall*

Principles of reflection, refraction, diffraction. Additional topics from contemporary optics may include Fourier transform spectroscopy, linear systems theory, holography. 2 hours lecture, 2 hours lab. Prerequisites: PHY 302, 311, 315. Corequisite: PHY 412.

PHY 462 Nuclear and Particle Physics. (3)*spring*

Static properties of nuclei, natural and induced radioactivity, nuclear reactions, nuclear models and energy levels, mesons and hyperons, and interaction of photons and electrons with matter. Prerequisites: PHY 311, 315.

PHY 465 Advanced Laboratory II. (2)*fall and spring*

Continuation of PHY 334. Students are encouraged to substitute laboratory research project in consultation with faculty sponsor. Prerequisite: PHY 334.

PHY 466 Advanced Laboratory III. (1–3)*fall and spring*

Continuation of PHY 465. Prerequisite: PHY 465.

PHY 480 Methods of Teaching Physics. (3)*spring*

Evaluation of various approaches to the teaching of high school physics. Preparation of demonstrations and experiments. Organization of a laboratory. Designed for secondary school physics teachers. Prerequisite: instructor approval.

PHY 481 Solid-State Physics. (3)*spring*

Structure, elastic properties, and dynamics of crystals; electron motions in crystals under applied fields. Prerequisites: PHY 311, 315.

PHY 501 Methods of Theoretical Physics. (3)*fall and spring*

Provides mathematical foundations for graduate students in basic and applied physics. Complex variables, vector spaces, operators, matrices, ordinary differential equations, integral equations and transforms, and special functions. May include additional topics.

PHY 502 Methods of Theoretical Physics. (3)*fall and spring*

Continuation of PHY 501. Prerequisite: PHY 501.

PHY 521 Classical Mechanics. (3)*fall*

Variational principles, Lagrange's and Hamilton's equations, rigid body motion, canonical transformations, Hamilton-Jacobi theory.

PHY 523 Relativity. (3)*not regularly offered*

Special and general theories of relativity. Prerequisite: PHY 532 or instructor approval.

PHY 531 Advanced Electricity and Magnetism. (3)*fall*

Electrostatics and magnetostatics; potential theory and theory of constitutive relations; Maxwell's equations; the wave equation, plane electromagnetic waves, cavities, and wave guides.

PHY 532 Electrodynamics. (3)*spring*

Special theory of relativity, covariant formulation of electromagnetic interactions; inhomogeneous wave equations, Lienard-Wiechert potentials, and radiation fields; interactions of charged particles and electromagnetic waves, scattering, dispersion. Prerequisites: both PHY 412 and 531 or only instructor approval.

PHY 541 Statistical Physics. (3)*fall*

Probability theory and principles of statistical inference; evaluating experimental data; foundations of statistical mechanics; general laws of thermodynamics from microscopic theories; calculation of specific properties of bulk matter.

PHY 551 X-ray and Electron Diffraction. (3)*spring*

Fresnel and Fraunhofer diffraction in integral formulation; diffraction of X-rays and neutrons by crystal lattices; structures of solids, including crystal structure analysis; theory and techniques of electron microscopy/diffraction of crystalline/noncrystalline specimens. Prerequisite: PHY 481 or instructor approval.

PHY 561 Nuclear Physics. (3)*fall and spring*

Two-nucleon interaction, Clebsch-Gordon coefficients, internucleon forces, meson theory and high-energy scattering, nuclear binding energy, nuclear models, transition probability estimates, nuclear reactions, and beta decay. Prerequisite: PHY 576 or instructor approval.

PHY 562 Nuclear Physics. (3)*fall and spring*

Continuation of PHY 561. Prerequisite: PHY 561 or instructor approval.

PHY 568 Elementary Particle Physics. (3)*not regularly offered*

Classification of particles; phenomenology of strong, electromagnetic, and weak interactions, cross sections, and decay rates; isotopic spin and higher symmetries; structure of reaction amplitudes. Prerequisite: PHY 577.

PHY 569 Elementary Particle Theory. (3)*not regularly offered*

Continuation of PHY 568. Prerequisite: PHY 568.

PHY 571 Quantum Physics. (3)*spring*

Reviews modern physics, chemistry, math. Differential equation, operator, matrix formulations. Free particle, bound-state problems. Examples across physics and astronomy. Prerequisites: a combination of modern physics and linear and complex algebra and differential equations or only instructor approval.

PHY 576 Quantum Theory. (3)*fall and spring*

Abstract approach to quantum mechanics in Hilbert space; observables and their corresponding operators, eigenstates, and eigenvalues; quantum dynamics; approximation methods; systems of identical particles; angular momentum and group representation theory; collision processes; relativistic quantum theory. Prerequisite: PHY 521.

PHY 577 Quantum Theory. (3)*fall and spring*

Continuation of PHY 576. Prerequisite: PHY 576.

PHY 578 Relativistic Quantum Theory. (3)*fall and spring*

Relativistic 1-particle equations, Klein-Gordon equation, Dirac equation, 2D quantization, theory of scattering, S-matrix, Feynman diagrams, quantum electrodynamics, and renormalization procedures. Prerequisite: PHY 577.

PHY 579 Relativistic Quantum Theory. (3)*fall and spring*

Continuation of PHY 578. Prerequisite: PHY 578.

PHY 580 Practicum. (1–12)*not regularly offered***PHY 581 Solid-State Physics. (3)***fall*

Quantum theory of solids, including phonons, lattice-specific heats, band-structure models, Fermi surfaces, thermal expansion, plasmons, electron-phonon interactions, and scattering by lattice defects. Pre- or corequisite: PHY 576.

PHY 582 Solid-State Physics. (3)*spring*

Elements of transport theory, thermal conduction, electronic conduction in metals, mobility in semiconductors, Hall effect, magnetoresistance, and selected topics of current research. Prerequisite: PHY 581.

PHY 587 Quantum Optics. (3)*fall and spring*

Quantization of the electromagnetic field. Quantum theory of coherence, photon counting, photon states, lasers, density operators, and atomic Raman scattering. Prerequisite: PHY 576.

PHY 588 Quantum Optics. (3)*fall and spring*

Continuation of PHY 587. Prerequisite: PHY 587.

PHY 592 Research. (1–12)*not regularly offered***PHY 598 Special Topics. (1–4)***fall and spring*

Possible topics:

(a) Quantum Mechanics. (3)

spring

(b) Quantum Physics. (3)

*spring***PHY 599 Thesis. (1–12)***not regularly offered***Omnibus Graduate Courses.** See page 50 for omnibus graduate courses that may be offered.

Plant Biology

Master's and Doctoral Programs

J. Kenneth Hooper

Chair

(LSE 218) 480/965-3414

lifesciences.asu.edu/plantbiology

PROFESSORS

BACKHAUS, FRASCH, HOOBER, KLOPATEK, NASH,
SOMMERFELD, TRELEASE, VERMAAS, WEBBER

ASSOCIATE PROFESSORS

BRIGGS, CLARK, DAY, MARTIN, PIGG, ROBERSON,
STROMBERG, STUTZ, SZAREK, TOWILL

ASSISTANT PROFESSOR

RHOADS

ACADEMIC PROFESSIONALS

BINGHAM, LANDRUM, LOBRUTTO, SHARP

RESEARCH PROFESSOR

WINICOV

The faculty in the Department of Plant Biology offer programs leading to the M.S. and Ph.D. degrees in Plant Biology. Among seven different research activity areas, two academic concentrations are available: ecology and photosynthesis.

Select faculty collaborate in the interdisciplinary program for the M.S. and Ph.D. degrees in Molecular and Cellular Biology (see "Molecular and Cellular Biology," page 270).

The faculty participate in the programs leading to the Master of Natural Science degree (see "Natural Science," page 278) when the primary or secondary area of concentration is in plant biology. Students interested in pursuing the M.N.S. degree through an interdisciplinary program emphasizing any of these areas should contact the Department of Plant Biology for additional information.

Applicants for these degree programs must submit scores on the Graduate Record Examination (GRE) (aptitude).

GRE scores in the advanced subject area are recommended.

The graduate programs are designed to prepare students for careers in research, teaching, industry, or governmental agencies.

MASTER OF SCIENCE

Prerequisites. Completion of the requirements for an undergraduate major in the plant sciences, biology, or related discipline, and an adequate background in related courses in chemistry, mathematical, and physical sciences.

Program of Study. A minimum of 30 semester hours of graduate credit is required. The program must include at least three semester hours of research, three semester hours of thesis, one semester of the core course PLB 502 Perspectives in Plant Biology and one hour of participatory seminar (PLB 591). The program is planned by the student in consultation with the supervisory committee.

Foreign Language Requirements. None.

Comprehensive Examinations. Not required.

Thesis Requirements. A thesis is required.

Final Examinations. A final research seminar and an oral examination covering the thesis and related subject matter are required.

DOCTOR OF PHILOSOPHY

See "Doctor of Philosophy," page 103, for general requirements.

Program of Study. A minimum of 84 semester hours of graduate credit is required. The program must include at least 24 hours of research and dissertation credit and at least 30 hours of formal graduate course work. One semester of the core course PLB 502 Perspectives in Plant Biology and two hours of participatory seminar (PLB 591) are included in the required course work. Courses numbered 590 or 790 (Reading and Conference) are not considered formal courses. The program is planned by the student in consultation with a program committee that also administers and evaluates the comprehensive examinations.

Foreign Language Requirements. Completion at the undergraduate level of a one-year course with a grade of "C" or higher is required.

The supervisory committee may require the student to complete additional study.

Comprehensive Examinations. Written and oral comprehensive examinations administered and evaluated by the student's program committee are required.

Dissertation Requirements. A dissertation based on original work of high quality, demonstrating proficiency in the student's area of interest, is required. (See "Doctoral Degrees," page 102.)

Final Examinations. A final oral examination in defense of the dissertation is required. It is administered by a dissertation committee consisting of four to five members who previously served on the student's program committee.

PLANT BIOLOGY (PLB)

PLB 400 Lichenology. (3)

spring in odd years

Chemistry, ecology, physiology, and taxonomy of lichens. 2 hours lecture, 3 hours lab. Prerequisites: preferably both PLB 200 and 201 or only BIO 182 (or its equivalent).

PLB 402 Mycology. (3)*spring*

Fungal morphology and systematics with an introduction to fungal cell biology, ecology, economic significance, and growth and development. 2 hours lecture, 3 hours lab. Prerequisites: preferably both PLB 200 and 201 or only BIO 182 (or its equivalent) or only MIC 206.

PLB 404 Phycology. (4)*spring*

Algae (both fresh water and marine forms), emphasizing field collection and identification of local representatives. Morphological, ecological, and economic aspects of the algae. 3 hours lecture, 3 hours lab. Fee. Prerequisites: preferably both PLB 200 and 201 or only BIO 182 (or its equivalent).

PLB 407 Plant Fossils and Evolution. (4)*spring in odd years*

Broad survey of plant life of the past, including the structure of plant fossils, their geologic ranges, geographic distribution, and paleo-environment. 3 hours lecture, 3 hours lab or field trip. Prerequisites: preferably both PLB 200 and 201 or only BIO 182 (or its equivalent).

PLB 410 Angiosperm Taxonomy. (3)*spring*

Principles underlying angiosperm phylogeny. 2 hours lecture, 3 hours lab. Prerequisite: PLB 310 or instructor approval.

PLB 411 Trees and Shrubs of Arizona. (3)*fall*

Identification of woody plants from desert, chaparral, and forest habitats in Arizona. 1 hour lecture, 3 hours lab, field trips. Prerequisites: preferably both PLB 200 and 201 or only BIO 182 (or its equivalent) or only instructor approval.

PLB 412 Cytogenetics. (3)*not regularly offered*

Chromosomal basis of inheritance. Cross-listed as BIO 441. Credit is allowed for only BIO 441 or PLB 412. Prerequisite: BIO 340.

PLB 413 Cytogenetics Laboratory. (2)*not regularly offered*

Microscopic analysis of meiosis, mitosis, and aberrant cell division. 6 hours lab. Cross-listed as BIO 442. Credit is allowed for only BIO 442 or PLB 413. Pre- or corequisite: BIO 441 or PLB 412.

PLB 414 Plant Pathology. (3)*spring*

Identification and control of biotic and abiotic factors that cause common disease problems to plants. Prerequisites: preferably both PLB 200 and 201 or only BIO 182 (or its equivalent) or only instructor approval.

*General Studies: L***PLB 502 Perspectives in Plant Biology. (3)***fall*

Introduces major areas of research within the department with the goal of broadening knowledge to enable multidisciplinary research and communication. Prerequisite: instructor approval.

PLB 583 OTS: Fieldwork in Tropical Biology. (6–8)*spring and summer*

Intensive field-orientated classes with Organization for Tropical Studies (OTS) in Costa Rica with emphasis on research in ecology and systematics. Lecture, lab, fieldwork. Cross-listed as BIO 583. Credit is allowed for only BIO 583 or PLB 583. Prerequisites: graduate standing; a course in basic ecology.

PLB 591 Seminar. (1)*fall and spring***ENVIRONMENTAL SCIENCE AND ECOLOGY****PLB 420 Plant Ecology: Organisms and Populations. (3)***spring in odd years*

Factors and controls on the physiological ecology and organization of plants and plant populations using empirical and theoretical approaches. 2 hours lecture, 3 hours lab. Fee. Prerequisite: BIO 320 or PLB 322 (or its equivalent).

PLB 421 Plant Ecology: Communities and Ecosystems. (3)*spring in even years*

Plant community organization, field sampling techniques and the structure and function of terrestrial ecosystems emphasizing the role of vegetation. 2 hours lecture, 3 hours lab. Fee. Prerequisite: BIO 320 or PLB 322 (or its equivalent).

PLB 422 Plant Geography. (3)*not regularly offered*

Plant communities of the world and their interpretation, emphasizing North American plant associations. Cross-listed as GPH 422. Credit is allowed for only GPH 422 or PLB 422. Prerequisites: preferably both PLB 200 and 201 or only BIO 182 or only GPH 111.

PLB 430 Statistical Analyses in Environmental Science. (3)*spring*

ANOVAS, 1-way classification of factorial and partially hierarchic designs; introductory multivariate statistics. Prerequisite: MAT 210 (or its equivalent).

*General Studies: CS***PLB 432 Computer Applications in Biology. (3)***fall*

Computer analysis techniques in biology emphasizing data entry, management and analysis, and graphic portrayal. Employs mainframe and microcomputers. 2 hours lecture, 3 hours lab. Cross-listed as BIO 406. Credit is allowed for only BIO 406 or PLB 432. Prerequisites: both BIO 182 and MAT 117 (or 210) or only instructor approval.

*General Studies: CS***PLB 434 Landscape Ecological Analysis and Modeling. (3)***spring in odd years*

Technical methods of landscape ecological analyses. Includes mathematical and statistical examination and modeling of landscape ecological patterns and processes. Prerequisites: both BIO 320 and 406 or only PLB 432 (or its equivalent).

PLB 520 Plant Structural Adaptation. (1–3)*not regularly offered*

Adaptive traits of leaf size/unique growth form on energy transfer efficiency; stomatal architecture and water-use efficiency; applications of stable isotopes. Prerequisite: BIO 320 or PLB 306 (or 308 or its equivalent).

PLB 522 Plant Photosynthetic Adaptation. (1–3)*not regularly offered*

Evolution and ecology of C4 and CAM; adaptive traits improving competitive ability in natural environments; comparative physiology of desert plants. Prerequisite: PLB 308 or instructor approval.

PLB 524 Methods in Environmental Plant Physiology. (3)*spring in odd years*

Techniques to measure and quantify microclimate and mass transfer. Supporting principles. 2 hours lecture, 3 hours lab. Prerequisite: BIO 320 or PLB 308.

PLANT BIOCHEMISTRY AND MOLECULAR BIOLOGY**PLB 440 Photobiology. (3)***not regularly offered*

Principles underlying the effects of light on growth, development, and behavior of plants, animals, and microorganisms. Cross-listed as BIO 464. Credit is allowed for only BIO 464 or PLB 440. Prerequisites: CHM 231 (or 331); 12 hours in life sciences.

PLB 444 Plant Growth and Development. (3)*spring*

Molecular basis of development, role of signal transduction pathways/gene regulation in control of organ formation, pollination, germination, and growth. Prerequisite: BIO 353 (PLB 340 recommended).

PLB 540 Plant Biochemistry. (3)*not regularly offered*

Structure/function relationships of molecules, emphasizing processes unique to plants: carbon fixation, synthesis of storage products, pigments, and secondary metabolites. Prerequisites: both BCH 361 and PLB 308 or only instructor approval.

PLB 550 Plant Molecular Biology. (2)*spring in odd years*

Biochemistry and molecular biology of plant organelles, including protein targeting, plant viruses, and molecular designs for plant improvements. Prerequisite: instructor approval.

PLB 552 Plant Genetic Engineering. (3)*spring*

Plant transformation utilization of transgenic plants, transient gene expression assays, and applications of plant genetic engineering. Prerequisite: instructor approval.

PLB 553 Plant Genetic Engineering Laboratory. (2)*spring*

Plant transformation, utilization of transgenic plants, transient gene expression assays, and applications of plant genetic engineering. 6 hours lab. Prerequisite: instructor approval.

PLB 554 Plant Biotechnology. (3)*not regularly offered*

Aseptic, clonal propagation of plants and in vitro culture of cells, organs, and tissues. 2 hours lecture, 3 hours lab. Prerequisite: PLB 308 or 340 or 370.

PLB 558 Molecular Mechanisms of Photosynthesis. (3)*spring*

Structure and function of photosynthetic complexes; mechanism of energy conversion in plants, bacteria, and model systems. Cross-listed as BCH 568. Credit is allowed for only BCH 568 or PLB 558. Prerequisite: instructor approval.

URBAN HORTICULTURE**PLB 472 Greenhouse/Nursery Management. (3)***spring in even years*

Greenhouse structures, environment, and nursery operation. Includes irrigation, nutrition, and other principles relative to container-grown species. Fee. Prerequisites: ERS 130 (or 225 or 226); PLB 260.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Political Science**Master's and Doctoral Programs****Robert L. Youngblood***Chair***(SS 412) 480/965-7667****www.asu.edu/clas/polisci****PROFESSORS**

BALL, BERMAN, CHAUDHURI, DAGGER, JONES,
McDONOUGH, McGOWAN, SIMON,
WALKER, YOUNGBLOOD

ASSOCIATE PROFESSORS

ASHLEY, CHIN, CRITTENDEN, DANTICO, DOTY, GOREN,
HERRERA, KAHN, KEATING, KENNEY, MITCHELL,
SIMHONY, SPRUYT, WARNER

ASSISTANT PROFESSORS

CHIN, C. ELMAN, M. ELMAN, GOREN, KRUTZ

The faculty in the Department of Political Science offer graduate programs leading to the M.A. and Ph.D. degrees in Political Science. Concentrations are available in American politics, comparative politics, international relations, and political theory.

Students admitted to the Master of Education degree with a major in Secondary Education may also elect political science as the subject matter field.

MASTER OF ARTS

See "Master's Degrees," page 100, for general requirements.

Admission. The M.A. degree provides advanced education for those students preparing for teaching, research, or applied careers in political science. It may be taken as a terminal program or as a step toward eventual fulfillment of the requirements for the Ph.D. Students may apply directly to the doctoral program or master's program.

In addition to the materials sent to the Graduate College, the following items should be submitted to the director of

graduate studies of the Department of Political Science by April 15 in order to ensure recommendations for admission to the M.A. program beginning the following fall:

1. scores from the verbal, quantitative, and analytical sections of the Graduate Record Examination (GRE);
2. three letters of recommendation from persons who can evaluate the applicant's academic performance and potential;
3. a career overview statement which describes the applicant's educational objectives; and
4. a writing sample that best represents the applicant's thinking and writing skills.

Applicants for financial aid should submit these items and complete the application form for graduate assistantships by February 15. The department also has an early admission deadline in late November. Candidates who have submitted a complete application by that date will be notified of their status by the end of the calendar year.

Undergraduate course work in political science is not a prerequisite for admission.

It is assumed, however, that M.A. students have a basic understanding of elementary statistics and the undergraduate content of the political science fields of concentration that they wish to study. Students without such a background should allow sufficient time to acquire it.

Program of Study. A minimum of 30 semester hours is required for the Master of Arts degree. All candidates must take POS 503 and the core course in the student's major and minor fields. Additional hours must be taken in graduate-level courses and seminars. Each student is expected to take seminars each semester in his/her major field, minor field, and an elective until course work is completed. If the thesis option is followed, the program must include a combination of at least six semester hours of research (POS 592) and thesis (POS 599) credit. A maximum of six semester hours in approved courses taken outside the department or six hours of reading and conference (POS 590) courses may count towards the 30-hour requirement.

Foreign Language Requirement. None.

Thesis Option Requirements. M.A. students seeking admission to the Ph.D. program are expected to complete the thesis early in their fourth semester. A copy of the *Format Manual* is available in the Graduate College. A careful review of this document well in advance of preparation for the final copy of the thesis is recommended. An oral examination in defense of the thesis is required.

Non-Thesis Option Requirements. The program of study must include 27-hours of approved course work and at least one three-hour reading and conference course (POS 590) in the fourth semester to enhance the student's research capabilities. A research paper must be defended by the end of the third semester before a faculty committee appointed by the director of Graduate Studies.

DOCTOR OF PHILOSOPHY

See "Doctor of Philosophy," page 103, for general requirements.

Admission. In addition to meeting Graduate College requirements, an applicant for the Ph.D. program must take the verbal, quantitative, and analytical sections of the GRE; supply a career overview statement that describes the applicant's educational objectives; submit three letters of recommendation from persons who can evaluate the applicant's undergraduate and graduate work; and provide a sample of writing. These items should be submitted to the director of graduate studies of the Department of Political Science by February 15. Applicants for financial aid should also complete and submit the application form for graduate assistantships by February 15. The department also has an early admission deadline in late November. Candidates who have submitted a complete application by that date will be notified of their status by the end of the calendar year.

It is assumed that Ph.D. students have a basic understanding of elementary statistics and the content of the areas of concentration that they wish to study. Students without such a background should allow sufficient time to acquire it.

Program of Study. A minimum of 60 semester hours of graduate courses beyond the baccalaureate degree and approved by the student's supervisory committee shall constitute the formal course preparation, followed by a minimum of 24 semester hours of research and dissertation work. The supervisory committee has three members, including the committee chair from the student's major field, and two members from a minor field. As part of the 60 semester hours, the student must take POS 503 and 603. A maximum of 12 semester hours of approved course work outside the department and 12 semester hours of approved reading and conference courses (POS 590 and 790) may count toward the 60 semester hours. Grades of "A," "B," or "Y," must be obtained in all course work counted for the Ph.D. degree.

Master's in Passing. For students without an M.A. who are admitted directly into the Ph.D. program, the department offers a Master's in Passing. Students opting for the Master's in Passing must, in the third semester of residence, pass an oral examination of their work. The examination will be conducted by a committee composed of members of the Graduate Committee who represent each student's primary and secondary subfields. Students who pass the oral examination and have completed 30 hours of course work toward the Ph.D. are then awarded the M.A.

Research Skills/Foreign Language Requirements. All Ph.D. students must show proficiency in research and methodological skills. This requirement may be met by showing proficiency in one or more of the following areas: foreign language, quantitative, or qualitative methods. Supervisory committees determine which among those research tools are appropriate for students in their fields of study.

Comprehensive Examination. The student is required to take three examinations from the fields and subfields of American politics, international relations, comparative politics, and political theory. In the major field, the student takes a written general examination. Additionally, the student takes a written field or subfield examination in one of the remaining fields of political science. An oral examination over the dissertation proposal follows the written examinations.

Dissertation Requirements. The dissertation must be an original contribution to knowledge and demonstrate the student's proficiency as an independent investigator. The dissertation proposal is approved by the chair of the department upon the recommendation of the student's dissertation committee. The department chair also approves the dissertation committee. This committee must have a minimum of three members from the department of political science, including a chair from the student's major field.

Final Examinations. A final oral examination is required. This examination is the occasion for the student to defend the dissertation, both as to methods and conclusions, and to demonstrate general competence in the area of concentration.

RESEARCH ACTIVITY

Political science faculty and the department's curriculum are organized into four areas of concentration. The faculty offer courses and conduct research from a variety of methodological orientations, all with a common thread of theoretically oriented scholarship.

American Politics. Faculty emphasize political behavior and use survey research, experimental designs, and content analysis to collect data and conduct statistical analyses of mass voting patterns, campaign strategies, party politics, the role of the media in political communication, agenda setting and policy development in Congress, and elite-mass linkages. Other faculty emphasize public law and policy with a focus primarily at the state and local levels of government.

International Relations. One group focuses on foreign policy theory and international security, using event chronologies, institutional differences, archival materials, and public records to guide comparative analyses of foreign policy decision-making by different types of regimes, case studies of leaders and their decision-making strategies, state and nation building, nationalism, and policy analyses of issues in the Asia-Pacific region. Another cluster of faculty emphasize critical theory and the international political economy, employing archival sources, statistical data, and texts of legal norms and state practices to conduct analyses of global inequalities in wealth and income, the evolution of statecraft, and the impact of hierarchically-ordered gender and race categories in North-South relations.

Political Theory. Faculty research interests in the area of political theory cover a range of topics in the history of political thought and contemporary political theory. Historical topics include Rousseau, conceptual history, and positive liberalism of the 19th and 20th centuries. Research in contemporary political theory focuses on such themes as autonomy and freedom, rights and obligations, civic virtues, and the idea of the common good; various issues in democratic theory (with particular attention to education), aspects of political and legal theory regarding corporate personality, conceptions of self in various cultures, analysis of myths in aboriginal societies and politics, social ecology, and peace and nonviolence.

Comparative Politics. Faculty in the area of comparative politics investigate a variety of topics in several regions of the globe. Research interests include the political economy of uneven development in Africa, democratization processes within formerly authoritarian regimes in Europe, Latin America, and East Asia, church and state relations in the

Philippines, ethnic minority problems in Brazil, problems of federalism in India, and party leadership in France and Italy.

POLITICAL SCIENCE (POS)

POS 501 Methods of Political Science. (3)

not regularly offered

Problems of method and knowledge in political science, strategies of political inquiry, and issues in philosophy of social science.

POS 502 Philosophy of Political Inquiry. (3)

once a year

Problems of knowledge and method in political science, with attention to both empirical and evaluative analysis.

POS 503 Empirical Political Inquiry. (3)

once a year

Research methods and techniques of the discipline, emphasizing empirical foundations and analytic methods employed in subfields. Prerequisites: POS 401 (or its equivalent); instructor approval.

POS 530 American Politics. (3)

once a year

Examines major debates in the study of American political processes and institutions. Covers parties, media, elections, public opinion, interest groups, and the three branches of government. Seminar.

POS 545 Themes in Political Thought. (3)

not regularly offered

Examines a particular theme or problem in political thought from both a historical and contemporary perspective. May be repeated with approval of the director of graduate studies. Seminar. Prerequisite: instructor approval.

POS 550 Comparative Politics. (3)

once a year

Surveys major approaches across topical areas such as revolutions, authoritarianism, policy processes, interest groups, and electoral politics. Focus varies with instructor. Seminar.

POS 560 International Relations. (3)

once a year

Surveys major theoretical approaches and debates in international relations. Seminar.

POS 563 Comparative Asian Security Policies. (3)

not regularly offered

Analyzes domestic and international constraints, belief systems, and economic components in security decisions by major powers and Asian nations. Seminar. Prerequisite: instructor approval.

POS 590 Reading and Conference. (1–12)

not regularly offered

POS 591 Seminar. (1–12)

once a year

Possible topics:

- (a) American Politics. (3)
- (b) Comparative Politics. (3)
- (c) Global Politics. (3)
- (d) Political Theory. (3)

POS 592 Research. (1–12)

not regularly offered

POS 598 Special Topics. (1–4)

once a year

Possible topics:

- (a) American Politics. (3)
- (b) Comparative Politics. (3)
- (c) Global Politics. (3)
- (d) Political Theory. (3)

POS 599 Thesis. (1–12)

not regularly offered

POS 601 Advanced Experimental Research. (3)

not regularly offered

Introduces experimental and quasi-experimental research designs in political research, including laboratory techniques and topics in the analysis of variance. Prerequisite: POS 503 (or its equivalent).

POS 602 Advanced Survey Research. (3)

not regularly offered

Presents design and conduct of political surveys, including sampling, instrument design, scaling, and statistical and graphical analysis of survey data. Prerequisite: POS 503 (or its equivalent).

POS 603 Polimetrics I. (3)

once a year

Introduces theory and practice of linear regression analysis. Provides skills to read, understand, and evaluate professional literature using regression analysis. Prerequisites: both POS 401 and 503 or only instructor approval.

POS 604 Polimetrics II. (3)

once a year

Applies quantitative techniques to research topics producing publishable papers through exposure to time-series, logit and probit, and simultaneous equations. Prerequisites: a combination of POS 401 and 503 and 603 or only instructor approval.

POS 606 Qualitative and Textual Analysis. (3)

spring in odd years

Method and theory for the analysis of qualitative materials, systematic approaches for case studies, content analysis, critical analysis of texts. Discussion, seminar.

POS 635 State Politics and Public Policy. (3)

not regularly offered

Introduction to comparative state policy emphasizing policy or performance differences among the states and the reasons for these differences. Seminar. Prerequisites: both POS 530 and 603 or only instructor approval.

POS 636 Electoral Behavior. (3)

not regularly offered

Introduces fundamental concepts of electoral behavior. Emphasizes presidential elections and examines why people vote and how their votes are determined. Seminar. Prerequisites: both POS 530 and 603 or only instructor approval.

POS 638 Law and Politics. (3)

not regularly offered

Emphasizes research into such topics as constitutional law, women and the law, American legal system, judicial process, and judicial selection. Seminar. Prerequisite: instructor approval.

POS 651 Politics of Change and Development. (3)

not regularly offered

Examines contending approaches to national, social, and political change. Seminar. Prerequisite: instructor approval.

POS 660 The Modern World System. (3)

not regularly offered

Theoretically driven, historical analysis of the organization and operation of the international political economy since the 16th century. Seminar. Prerequisite: instructor approval.

POS 661 The State. (3)

not regularly offered

Examines theories of state, state-society relations, and interstate politics emphasizing questions of sovereignty, territoriality, violence, representation, democracy, and change. Seminar. Prerequisite: instructor approval.

POS 662 International Organization. (3)

not regularly offered

History, practical political significance, and future of international institutions, transnational regimes, and other approaches to international organization. Seminar. Prerequisite: instructor approval.

POS 664 War, Peace, and Conflict Processes. (3)

not regularly offered

Systematic analysis of the causes of war, the preconditions for peace, and approaches to the resolution of conflict. Seminar. Prerequisite: instructor approval.

POS 665 Foreign Policy Theory. (3)

not regularly offered

Examines foreign policy theory and methods. Development and critique of research designs analyzing foreign policy processes within and among nations. Seminar. Prerequisite: instructor approval.

POS 691 Seminar. (1–12)

not regularly offered

POS 790 Reading and Conference. (1–12)

not regularly offered

POS 792 Research. (3)

fall and spring

Projects in various areas of political science. Prerequisite: doctoral student.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Post-Bachelor's Artist Diploma

See "Post-Bachelor's Artist Diploma," page 274.

Professional Accountancy

Certificate Program

ASU West offers a postbaccalaureate certificate in Professional Accountancy. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Psychology

Master's and Doctoral Programs

Darwyn E. Linder
Chair

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www.asu.edu/clas/psych/dinfo/gprograms.html

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PROFESSORS

AIKEN, BARRERA, BRAUN, BRAVER, CASTRO, CHASSIN, HOMA, KAROLY, KENRICK, KILLEEN, KNIGHT, LANYON, LINDER, MacKINNON, MILLSAP, NEUBERG, OKUN, PARKINSON, PRESSON, REICH, SADALLA, SANDLER, SOMERVILLE, VAN ORDEN, WEST, WOLCHIK, ZAUTRA

ASSOCIATE PROFESSORS

CASTANEDA, DAVIS, FABRICIUS, GOLDINGER, GONZALES, LESHOWITZ, NAGOSHI, NEISEWANDER, NEMEROFF, SAENZ, STONE

ASSISTANT PROFESSORS

E. AMAZEEN, P. AMAZEEN, KHOO, MCBEATH

SENIOR LECTURERS

BARTON, WEIGAND, WOSINSKI

LECTURER

PALMER

The faculty in the Department of Psychology offer graduate programs leading to the Ph.D. degree in Psychology. Concentrations are available in clinical, developmental, environmental, and social psychology, as well as in cognitive/behavioral systems, behavioral neuroscience, and quantitative research methods.

Although there is no formal M.A. program as such, doctoral students are required to complete an M.A. degree as part of their doctoral training.

All applicants are required to submit scores on the Graduate Record Examination (verbal, quantitative, and analytical sections; advanced section is required for clinical psychology), transcripts, three letters of reference, and a statement of purpose.

Program of Study. A minimum of 30 semester hours is required for the master's degree.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

See "Doctor of Philosophy," page 103, for general requirements.

Application Deadline. Completed applications for admission in the fall semester, including all letters and supporting documents, should be received by January 1.

The Department of Psychology requires all applicants to provide scores from the aptitude sections of the GRE for clinical psychology. A score from the advanced test in psychology is required. These scores are not used exclusively to determine admission but are viewed in the context of other supporting materials, such as GPAs and letters of recommendation.

Program of Study. At present the Department of Psychology offers the Ph.D. degree in the following research areas: clinical, developmental, environmental, cognitive/behavioral systems, behavioral neuroscience, quantitative, and social psychology. A minimum of 60 semester hours of course credit beyond the bachelor's degree is required, plus 24 semester hours of credit in research and dissertation.

In addition to a core curriculum, students take courses related to their area of interest as determined in consultation with their supervisory committees.

First-Year Evaluation. At the end of the first year of study, each student receives a comprehensive evaluation by the faculty based upon performance in courses and in professional or laboratory assignments and upon the evidence of professional responsibility and ethical behavior.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral examinations are required near the end or upon completion of all course work. After passing the comprehensive examinations and meeting other requirements (e.g., dissertation prospectus), the student is eligible to apply for candidacy.

Dissertation Requirements. The dissertation must be an original contribution to knowledge, demonstrating the student's proficiency as an independent investigator. (See "Doctoral Degrees," page 102.)

Final Examinations. A final oral examination in defense of the dissertation is required.

PSYCHOLOGY (PGS)**PGS 414 History of Psychology. (3)***fall and spring*

Historical development of psychology from its philosophical beginnings to the present. Prerequisites: PGS 101; PSY 230, 290.

*General Studies: L/SB***PGS 461 Interpersonal Influence. (3)***not regularly offered*

Principles and procedures that affect the process of social influence; consideration of attitudinal, compliance-inducing, and perceptual influences. Prerequisite: PGS 350.

General Studies: SB

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

PSYCHOLOGY (PSY)**PSY 420 Analysis of Behavior. (3)***not regularly offered*

Research, applications, and philosophy of the analysis and control of human behavior. Prerequisite: PSY 290.

*General Studies: L***PSY 424 Genetic Psychology. (3)***spring*

Introduction to the concepts, methodologies, and findings of behavioral genetics for Psychology majors. Prerequisites: PGS 101; PSY 230, 290.

*General Studies: L***PSY 425 Biological Bases of Behavior. (3)***not regularly offered*

Critical study of physiological psychology; brain mechanisms underlying motivation and learning. Prerequisite: PSY 325.

*General Studies: L***PSY 426 Neuroanatomy. (4)***not regularly offered*

Structure and function of mammalian brain, including sheep brain dissection. 3 hours lecture, 3 hours lab. Prerequisite: PSY 325 (or its equivalent).

*General Studies: L***PSY 434 Cognitive Psychology. (3)***spring*

Human organism as a processor of information, from perception to cognition. Abstract concepts, semantic memory, attention, and mental imagery. Prerequisite: PSY 323 or 324 or instructor approval.

*General Studies: L***PSY 437 Human Factors. (3)***fall*

Emphasizes human factors in high-technology systems. Specific topics include systems development, systems analysis techniques, displays, and controls. Prerequisites: both PSY 290 and upper-division standing or only instructor approval.

*General Studies: L***PSY 470 Psychopharmacology. (3)***fall and spring*

Basis of drug action at physiological and behavioral levels. Psychological and medical applications and limitations of drugs used in the treatment of mental illness. Prerequisites: PSY 325; 1 semester each of biology and chemistry.

PSY 501 Supervised Teaching. (4)*fall*

Experience in and examination of perspectives on teaching undergraduate psychology. Prerequisites: graduate standing in psychology; instructor approval.

PSY 506 Survey of Research in Environmental Psychology. (3)*fall*

Major topics and paradigms in the study of person-environment relationships. Prerequisite: instructor approval.

PSY 512 Advanced Learning. (3)*not regularly offered*

Principles and theories of learning, emphasizing research literature. Prerequisite: instructor approval.

PSY 524 Advanced Physiological Psychology. (3)*not regularly offered*

Contributions of physiological processes and brain function to fundamental behavioral processes. Prerequisite: instructor approval.

PSY 528 Sensation and Perception. (3)*not regularly offered*

Principles of sensory and perceptual processes, emphasizing research literature. Prerequisite: instructor approval.

PSY 530 Analysis of Variance in Psychological Research. (3)*fall*

One-way and factorial designs, contrasts, post-hoc tests, probing of interactions, mixed designs, power, computer applications. Prerequisite: undergraduate statistics or instructor approval.

PSY 531 Multiple Regression in Psychological Research. (3)*spring*

Multiple regression and correlation, hierarchical regression, interactions, curvilinear relationships, categorical predictors, ANOVA in regression, regression diagnostics, regression graphics. Prerequisite: PSY 530 or instructor approval.

PSY 532 Analysis of Multivariate Data. (3)*fall*

Matrix algebra for multivariate procedures, component and factor analysis, canonical and discriminant analysis, classification, MANOVA, logistic regression, hierarchical linear model. Prerequisites: both PSY 530 and 531 or only instructor approval.

PSY 533 Structural Equation Modeling. (3)*spring*

Path analysis; exploratory and confirmatory factor analysis; recursive and nonrecursive latent variable models; mean and covariance structures; latent growth models. Prerequisite: PSY 532 or instructor approval.

PSY 534 Psychometric Methods. (3)*fall and spring*

Theory and practice of psychological measurement using classical and modern test theories. Reliability assessment, test validation, test construction, test usage. Prerequisites: both PSY 530 and 531 or only instructor approval.

PSY 535 Cognitive Processes. (3)*not regularly offered*

Theoretical/empirical treatment of the human organism as a processor of information, including abstraction, memory structure, problem solving, and thinking. Prerequisite: instructor approval.

PSY 536 Statistical Methods in Prevention Research. (3)*fall and spring*

Statistical methods used in prevention research including epidemiological methods, logistic regression, program effect estimation, estimation, and mediation analysis. Prerequisites: both PSY 530 and 531 or only instructor approval.

PSY 537 Longitudinal Growth Modeling. (3)*not regularly offered*

Growth modeling methodology to describe individual variation in development over time. Employs multilevel and structural equation modeling frameworks. Prerequisite: PSY 533 or instructor approval.

PSY 538 Advanced Structural Equation Modeling. (3)*not regularly offered*

Mean and covariance structure analysis. Includes multiple-group modeling, two-level hierarchical modeling, longitudinal growth modeling, analysis with categorical outcomes. Prerequisite: PSY 533 or instructor approval.

PSY 539 Meta-Analysis I. (1)*fall*

Meta-analysis; searching the literature, coding study characteristics, computing effect sizes. Must be followed by PSY 540. Seminar. Prerequisites: both PSY 530 and 531 or only instructor approval.

PSY 540 Meta-Analysis II. (2)*spring*

Continuation of PSY 539. Meta-analysis; computing effect sizes, and analyzing the heterogeneity of effect sizes. Seminar. Prerequisite: PSY 539.

PSY 541 Research in Cognitive Development. (3)*not regularly offered*

Theoretical and empirical issues in the study of children's knowledge and cognitive processes. Comparison of research in Piagetian and other traditions. Prerequisite: admission to Psychology Ph.D. program or instructor approval.

PSY 542 Social Development. (3)*not regularly offered*

Reviews and critiques major issues in the area of social development. Covers theory, research, and content. Prerequisite: instructor approval.

PSY 550 Advanced Social Psychology. (3)*fall and spring*

Theory and research concerning interpersonal perception, decision making, attitude formation and change, group processes, social motivation, and interaction processes. Prerequisite: instructor approval.

PSY 551 Advanced Social Psychology. (3)*fall and spring*

Continuation of PSY 550. Prerequisite: PSY 550 or instructor approval.

PSY 553 Social Influence. (3)*not regularly offered*

Researches literature relevant to attitude formation and change, conformity, obedience, power, compliance, altruism, and others. Prerequisite: PSY 551 or instructor approval.

PSY 555 Experimental and Quasi-Experimental Designs for Research. (3)*not regularly offered*

Reviews research techniques. Analyzes laboratory and field research; applications to specific topics. Prerequisite: instructor approval.

PSY 569 Advanced Study of Personality. (3)*not regularly offered*

Personality as a theoretical concept in psychology, including definitional problems, behavioral and traditional approaches, the measurement of personality, and current research issues. Prerequisite: instructor approval.

PSY 572 Psychological Assessment. (3)*fall*

Theory and research on assessment of personality, psychopathology, and intelligence; construction of psychological assessment instruments. Prerequisite: admission to clinical Ph.D. program or instructor approval.

PSY 573 Psychopathology. (3)*fall*

Theory and research relating to the contribution of psychological, social, physiological, and genetic factors to the development and persistence of abnormal behavior. Prerequisite: admission to Psychology Ph.D. program or instructor approval.

PSY 574 Psychotherapy. (3)*spring*

Detailed survey of the theoretical and empirical literature relating to verbal psychotherapy and interviewing methods. Structured role-playing practice in the major procedures. Prerequisite: admission to the clinical Ph.D. program or instructor approval.

PSY 578 Child Psychopathology. (3)*not regularly offered*

Major theories and research related to the development of deviant behaviors in children, including some supervised experience in child assessment. Prerequisite: PSY 572 or instructor approval.

PSY 582 Community Psychology. (3)*summer*

Community systems, intervention techniques, consultation models, history and current status of community mental health movement, and conceptualization of the roles of community psychologists in social system intervention. Prerequisite: advanced standing in Psychology Ph.D. program or instructor approval.

PSY 588 Consultation Methods. (3)*not regularly offered*

Several theories and strategies of organizational consultation. Develops consultative skills through simulation and practical experience. Prerequisite: advanced standing in Psychology Ph.D. program or instructor approval.

PSY 624 Clinical Neuroscience. (3)*spring*

Examines the biological underpinnings of psychological disorders at the molecular, cellular, and system levels (schizophrenia, depression, anxiety, etc.). Lecture, pro-seminar. Prerequisites: graduate standing; instructor approval.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Public Administration

Master's Program**Larry Mankin***Director***(WILSN 208) 480/965-3926****mpa@asu.edu****spa.asu.edu/Acadprog/mpa.htm****PROFESSORS**

CAYER, CHAPMAN, COOR, J. DENHARDT,
R. DENHARDT, HALL, MANKIN, McGAW, PERRY

ASSOCIATE PROFESSORS

ALOZIE, BROWN, CAMPBELL, DeGRAW, LAN

ASSISTANT PROFESSORS

DELORENZO, McCABE

DISTINGUISHED RESEARCH FELLOW

PFISTER

The faculty in the School of Public Affairs prepare students and practitioners for leadership in public service. Faculty also engage in research and service programs that advance understanding of public affairs and serve the public's policymaking needs.

The School of Public Affairs offers a 42-semester-hour professional Master of Public Administration (M.P.A.) degree and participates in an interdisciplinary degree leading to the Ph.D. degree in Public Administration.

MASTER OF PUBLIC ADMINISTRATION

The M.P.A. is an interdisciplinary, professional degree designed to prepare students for public service, public management, and policy analysis at the local, state, and national levels of government. The M.P.A. degree is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA).

Admission. Applicants to the M.P.A. program are considered for admission irrespective of undergraduate major, although students may be required to complete additional courses and/or workshops to prepare themselves for the core courses.

The applicant's undergraduate GPA, GRE scores (verbal, quantitative, and analytical), letters of recommendation, statement of educational and career goals, and professional experience are all considered in the admissions process. In addition, TOEFL scores (550 or higher) are required for international students. Admission may be limited by space availability.

Applications for admission can be sent at any time. Students requesting graduate assistantships and tuition scholarships should have their application files completed by March 1.

All applicants must submit the following materials to the Graduate College:

1. an official application;
2. official transcripts of all undergraduate and graduate work;
3. scores on the GRE (verbal, quantitative, and analytical; special subject tests not required); and
4. TOEFL scores for international students.

All applicants must submit the following materials to the School of Public Affairs:

1. three letters of recommendation, at least two of which should be written by faculty who can evaluate the applicant's academic performance;
2. a written statement of applicant's educational and career goals, which also is used as a sample of the applicant's writing abilities; and
3. résumé or additional documents as the applicant sees fit.

Program of Study. The M.P.A. program consists of 42 hours of graduate credit. Students take 27 of these hours in nine core classes in the School of Public Affairs, and 15 additional hours in elective courses.

No more than nine semester hours of ASU graduate courses taken before admission to the school and approved by the M.P.A. Committee can be included in the Program of Study.

Students enrolling in core courses must demonstrate minimum competency in statistics, American government, and computer applications. Courses taken to fulfill the competency do not count toward the 42-hour degree program. Competency in statistics or American government is met with a grade of "B" or higher in approved courses, passing a diagnostic test approved by the M.P.A. Committee, or earning a grade of "B" or higher in such approved courses as PAF 401, POS 401, PSY 230, QBA 221, and SOC 390 for statistics and POS 310 for American government. Competency in computer applications is met by enrollment in university short courses and training seminars.

Internship. A public service internship is recommended for M.P.A. students without previous administrative experience in government. The purpose of the internship is to provide students with practical and professional experience in a specific career area. Students work in and for public organizations applying the knowledge, skills, and abilities acquired in their program of study. During the internship experience, students can develop a professional network that will aid them in their pursuit of a career in government or non-profit organizations. Students can apply three hours of internship credit to the degree program. To receive course credit for an internship, students are required to attend class sessions and submit a paper to the internship coordinator.

Foreign Language Requirements. None.

Comprehensive Examination. None.

Thesis Requirements. None.

Capstone Requirement. The M.P.A. degree requires students to demonstrate competency for public service by synthesizing and applying core course knowledge, skills, and abilities to public service problems. Students demonstrate their public service competency by earning an "A" or a "B" in the M.P.A. capstone course, PAF 509 Public Service.

Morrison Institute for Public Policy

As an integral part of the School of Public Affairs, the Morrison Institute is an applied public policy research center that conducts research on public policy, informs policy-makers and citizens about issues, and advises leaders on choices and actions. In partnership with government officials, university faculty, and the private sector, the Morrison Institute conducts research, policy forums, program evaluations, and strategic planning for public, private, and non-profit clients. The Institute produces publications on a wide range of topics, including urban growth, education, natural resources, governmental systems and relations, health care, social services, quality of life, and economic development.

Advanced Public Executive Program (APEP)

APEP is a continuing education program designed to provide public-sector executives with analytical approaches and skills in leadership, policy analysis, total quality management, media relations, organizational development, team-building, and communication. Located at the ASU Downtown Center, APEP sponsors the Certified Manager Program (CPM), the Institute for Public Executives, Total Quality Management in the Public Sector, the County Elected Officials' Certification Program, and presents custom-tailored professional development programs for public-sector managers.

PUBLIC AFFAIRS (PAF)

PAF 401 Statistics. (3)

fall and spring

Surveys statistical concepts and techniques with application to public administration. Does not count toward program of study. Satisfies statistics prerequisite requirement for PAF 501 and 502.

PAF 501 Public Service Research. (3)

fall and spring

Philosophy, scope, and methods; public service research design, values, and ethics. Prerequisite: an approved course in statistics.

PAF 502 Computer Applications. (3)

fall and spring

Computer applications in public affairs; software packages for data analysis, decision making, information dissemination, and problem solving. Prerequisite: PAF 501.

PAF 503 Public Affairs. (3)

fall and spring

Development and context of American public administration and policy, role of administration in governance, and values and ethics in administration.

PAF 504 Public Affairs Economics. (3)

fall and spring

Basics of public sector economics, microeconomic and macroeconomic concepts applied to public sector decisions and policies.

PAF 505 Public Policy Analysis. (3)

fall and spring

Institutional and formal analysis of policy processes, decision making, and problem solving; values, ethics, and the uses of policy analysis. Prerequisites: PAF 504; satisfaction of the statistics requirement.

PAF 506 Public Budgeting and Finance. (3)

fall and spring

Legal, social, economic, political, institutional, and ethical foundations of governmental finance, budgets, and budgeting. Prerequisites: PAF 502, 504.

PAF 507 Public Human Resource Management. (3)

fall and spring

Personnel systems, behavior and management of people in public organizations, collective behavior, unionism, conflict management, motivation, productivity, and ethics.

PAF 508 Organization Behavior. (3)

fall and spring

Theory and application in the management of organizational behavior with emphasis on leadership and the public service.

PAF 509 Public Service. (3)*fall and spring*

Capstone application of core course knowledge, skills, and abilities required for public service. Prerequisites: PAF 501, 502, 503, 504, 505, 506, 507, 508.

PAF 510 Governmental Budgeting. (3)*not regularly offered*

Theories, applications, and consequences of budget decision making. Prerequisite: PAF 504.

PAF 511 Governmental Finance. (3)*not regularly offered*

Sources of funding, management of funds and debts, and general pattern of expenditures in states, counties, cities, and districts. Prerequisite: PAF 504.

PAF 520 Public Management. (3)*not regularly offered*

Management process in government and public agencies, with emphasis on the executive leadership within the public sector.

PAF 521 Organization Theory. (3)*not regularly offered*

Organization theory and current research emphasis with application to public administrative organizations.

PAF 522 Public Labor Relations. (3)*not regularly offered*

Rise of public unionism, managerial policy toward unionism, conflict resolution; impact of unionism on budgets, personnel policies, and public policy.

PAF 523 The City and County Manager. (3)*once a year*

Manager's role and resources in the differing forms of administrative, legislative, and community sectors.

PAF 525 Public Program Management. (3)*not regularly offered*

Governmental service programming: formulating, financing, operating, evaluating, and reporting. Analyzes interagency relationships and the role and conduct of research in the programming process.

PAF 526 Public Sector Human Resource Development. (3)*not regularly offered*

Concepts and techniques of organizational development in the public sector, including staffing, supervisor training, executive development, resource planning, and employee training.

PAF 529 Organization Change and Development. (3)*not regularly offered*

Explores the nature and management of change and development as a tool to achieve organizational goals; effecting planned change.

PAF 530 Management of Urban Government. (3)*not regularly offered*

Administrative practices and behavior within the urban political administrative environment. Functional areas such as citizen participation, urban planning, urban transportation, and the conflicts between urban politics and administrative efficiency.

PAF 531 Community Conflict Resolution. (3)*not regularly offered*

Interdisciplinary approach to understanding the dynamics of community conflict. Strategic considerations in policy design and advocacy; potential reaction to conflict. Relevant models and research findings generated by both case studies and comparative methods.

PAF 532 Urban Planning Administration. (3)*not regularly offered*

Historical and present-day uses of urban planning and procedures for its implementation. Basic principles and practices.

PAF 533 Urban Growth Administration. (3)*not regularly offered*

Examines the process of urban growth and change. Emphasizes partnership roles played by public and private sectors in management.

PAF 535 Urban Housing Policy. (3)*not regularly offered*

Comprehensive consideration of the revitalization of American cities with major emphasis upon the housing process and related institutions and services.

PAF 536 Urban Policy Making. (3)*not regularly offered*

Analyzes the opportunities and costs of influencing public policy and the roles of officials and bureaucracies in decision making.

PAF 540 Advanced Policy Analysis. (3)*once a year*

Emphasizes the structure of policy problems, forecasting policy alternatives, optimizing resources, and reducing uncertainty in policy making. Prerequisite: PAF 505 or instructor approval.

PAF 541 Program Evaluation. (3)*not regularly offered*

Various methodologies available for the evaluation of public policies and programs. Prerequisite: PAF 501 or instructor approval.

PAF 546 Environmental Policy and Management. (3)*not regularly offered*

Analyzes environmental policy and planning issues and principles related to the analysis and management of natural and urban/regional resources.

PAF 547 Science, Technology, and Public Affairs. (3)*not regularly offered*

Influence of science and technology on governmental policy making, scientists as administrators and advisors, governmental policy making for science and technology, government as a sponsor of research and development.

PAF 548 Women, Politics, and Public Policy. (3)*not regularly offered*

Explores how political philosophy, politics, and public policy affect and are affected by women.

PAF 549 Diversity Issues and Public Policy. (3)*not regularly offered*

Examines public policy issues concerning or affecting women, black, Latino, Asian, and American Indian communities, as well as those groups' impact on the policy process.

PAF 550 Information Management. (3)*not regularly offered*

Concepts and theory of information and information technology in public sector organizations.

PAF 551 Computers in Administration. (3)*not regularly offered*

Experience in use of computer technology for public administration problem solving.

PAF 552 Public Information Systems. (3)*not regularly offered*

Systems analysis concepts and theory as applied to administration. Alternative modes of information organization and their impact on public decision making.

PAF 555 Research Data Management. (3)*not regularly offered*

Techniques and problems associated with data management in a research environment. Database management systems, security and integrity, accessibility, and cost.

PAF 556 Database Management Systems. (3)*not regularly offered*

Concept and use of modern database management systems in an administrative organization. Advantages and disadvantages of this approach.

PAF 561 Comparative Administration. (3)*not regularly offered*

Literature on comparative public administration theory. Bureaucracies and their impact on the political development process. Studies selected nations.

PAF 562 Intergovernmental Relations. (3)*once a year*

Evolution, growth, present status, and characteristics of the U.S. federal system of government. Federal-state relations, state-local relations, regionalism, councils of government, interstate cooperation, grants-in-aid, and revenue sharing.

PAF 563 Report Preparation. (3)*not regularly offered*

Intensive practice in written and oral presentation of reports to conferences with problems in public administration. Visual aid techniques.

PAF 564 Political Economy. (3)*once a year*

Classical and contemporary literature and historical development of governmental and economic arrangements, with special emphasis on the role of the state.

PAF 591 Seminar. (1–12)*fall and spring*

Possible topics:

- (a) Business and Government
- (b) Emergency Management
- (c) General Public Administration
- (d) Information Management
- (e) Public Finance Administration
- (f) Public Management
- (g) Public Policy Analysis
- (h) Urban Affairs and Urban Planning

PAF 600 Research Design and Methods. (3)*once a year*

Advanced methods of research design and data collection. Prerequisites: formal graduate-level course work in statistics and in research methods.

PAF 601 Seminar: Policy Analysis and Evaluation. (3)*once a year*

Normative and conceptual issues of policy formulation, implementation, and evaluation; methods of policy analysis and evaluation.

PAF 602 Seminar: Foundations of Public Administration. (3)*once a year*

Ethical, social, legal, and philosophical foundations of public administration.

PAF 603 Seminar: Organization and Behavior in the Public Sector. (3)*once a year*

Structure, organization, conduct, and performance of public sector institutions in the administration of public policy. Prerequisite: PAF 602.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Public Administration

Interdisciplinary Doctoral Program

N. Joseph Cayer

Director

(WILSN 207A) 480/965-3926

spa@asu.edu

spa.asu.edu/Acadprog/dpa.htm

Agribusiness

Professors: Edwards, Thor

Economics

Professor: Hogan

Geography

Professor: Burns

Health Administration and Policy

Professor: Johnson

Journalism and Telecommunication

Professor: Merrill

Justice Studies

Regents' Professors: Altheide, Palumbo;
Professors: Hepburn, Musheno, Schneider

Management

Professor: Bohlander

Planning and Landscape Architecture

Professors: Mushkatel, Pijawka

Political Science

Professor: Berman

Psychology

Associate Professor: Castro

Public Affairs

Professors: Cayer, Chapman, J. Denhardt, R. Denhardt, Hall, Mankin, McGaw, Montiel, Perry;
Associate Professors: Alozie, Brown, Campbell, Lan;
Assistant Professors: DeLorenzo, McCabe

Recreation Management and Tourism

Associate Professor: Virden

Social Work

Professors: Kettner, MacEachron

Sociology

Professor: Nagasawa;
Associate Professor: Benin

The School of Public Affairs offers an interdisciplinary graduate program leading to the Ph.D. degree in Public Administration.

The purpose of the degree program is to prepare skilled professional public administrators for high-level positions in the public sector, and to foster the next generation of public administration scholars in research and university teaching. The program is designed to emphasize both normative and conceptual content pertaining to value assessments, theoretical assumptions, ethics, and modes of decision making, as well as practitioner problem-solving skills in budgeting, public personnel management, public finance, planning, program evaluation, and policy analysis.

The degree program is interdisciplinary in nature and is offered by faculty from various colleges. One of the unique features of this interdisciplinary program is that, because it utilizes faculty research and teaching interests from a number of academic units, a student may tailor a course of study to fit individual needs and goals.

Admission. Applications are reviewed by an admissions committee appointed by the director of the program. Recommendations for admission are made by the director to the dean of the Graduate College. Minimum Graduate College admission requirements must be met. See "Admission to the Graduate College," page 92, for requirements. Additionally, each applicant must provide a letter of career goals and statement of reasons for seeking the degree, a GRE test score, a professional résumé, and six letters of recommendation (three from faculty and three from professional public administrators). International students must submit both TOEFL and TSE scores. Admissions recommendations are made only once each year, with admitted students beginning their studies in the fall semester. To assure consideration for the ensuing fall semester, submit applications for admission, graduate assistantship, and tuition waiver by February 15. Only applicants already holding a master's degree are considered. If deficiencies exist in public administration course work at the master's level, appropriate classes are prescribed.

Program of Study. When the program of study is filed, a supervisory committee consisting of at least three persons is appointed by the dean of the Graduate College upon the recommendation of the director of the program. The chair of the supervisory committee serves as the student's graduate advisor. The supervisory committee advises the student in developing a program of study and assumes primary responsibility in assessing the student's progress in the program.

The program consists of a minimum of 66 semester hours of graduate work beyond the master's degree. Of the 66 semester hours, at least 24 must be dissertation and research credit. A minimum of 30 semester hours of approved course work, exclusive of dissertation and research, must be taken at ASU after admission to the program. A sequence of four core courses is required of all students, followed by a screening examination. In addition to the four core courses, an approved program of study must have a course listed in each of the following areas: quantitative research methods, qualitative research methods, political economy, and democratic theory and governance.

Residency. See the graduate director with regard to the residency requirements for this program.

Comprehensive Examinations. Upon completion of course work, and before dissertation research, the student is given a written examination in each of the areas of specialization. The written examinations are followed by a single oral examination. If the student should fail one or more components of the examination, a reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Approval for this reexamination must be obtained from the supervisory committee, the director of the program, and the dean of the Graduate College. A second failure is considered final and dismissal from the program is recommended to the Graduate College.

Candidacy. Doctoral students should apply for admission to candidacy immediately after they have met all requirements for the degree, *except the dissertation*. These requirements include passing the comprehensive examinations and other requirements specified by the program.

Dissertation Requirements. A dissertation is required of each student. The dissertation must consist of a fully documented written analysis demonstrating a high level of skill and competence. Each student must register for a minimum of 24 hours of dissertation and research. The dissertation is supervised by a committee of at least three faculty members appointed by the dean of the Graduate College.

Final Examinations. The final oral examination in defense of the dissertation is scheduled by the dean of the Graduate College and conducted by the student's dissertation committee. A candidate must pass the final examination within five years after completing the comprehensive examination. Any exception must be approved by the dissertation committee, the director, and the dean of the Graduate College.

Graduation. The student is eligible for graduation when the Graduate College scholarship requirements have been met, the final oral examination has been passed, and the dissertation has been approved by the supervisory committee and accepted by the director and the dean of the Graduate College.

Applications for graduation should be made no later than the date specified in the Graduate College calendar.

COURSES

For courses, see "Public Affairs (PAF)," page 299.

Public Health

Master's Program

The School of Health Administration and Policy and the College of Nursing, at ASU, in conjunction with the University of Arizona and Northern Arizona University, offer courses leading to the Master of Public Health degree. Two concentrations are offered at ASU: (1) Community health practice is coordinated by the College of Nursing, and (2) health administration and policy is coordinated by the School of Health Administration and Policy. For general information see "Nursing," page 279, or contact the M.P.H. program coordinator at ASU at 480/965-6633.

Admission. Applicants must hold a bachelor's degree or equivalent from an accredited college or university, provide three letters of recommendation, and submit an official Graduate Record Examination (GRE) or Medical College Admissions Test (MCAT) score or the GMAT, if the applicant is applying to the health administration and policy concentration only. For applicants with a doctoral degree, test scores are recommended but not required. A minimum of two years of full-time, 40-hour workweek, postbaccalaureate work experience is required.

The GRE or MCAT must be taken within five years of the application date. Applicants whose native language is not English are required to submit a score on the Test of English as a Foreign Language. Students should submit their application to the University of Arizona by February 1 for fall admission. Applications are accepted only for fall admission.

Program of Study. The program of study for both concentrations requires 39 semester hours: 15 semester hours of core courses, and 12 semester hours of concentration courses, and six hours of electives. Both concentrations require the student to successfully complete an internship; the semester hours required for the internship may vary by concentration. In addition, each student is required to produce a comprehensive, analytical, problem-solving report integrating the in-class learning into the internship experience. The student is also required to make an oral presentation before a student and faculty colloquium, reporting on activities during the internship and relating those activities to broader public health issues.

Arizona Graduate Program in Public Health: Core Courses

EPI 596 Epidemiology*	3
HSA 560 Health Services Administration and Policy	3
HSA 561 Biostatistics	3
PHL 575 Environmental and Occupational Health*	3
PHL 577 Social and Behavioral Aspects of Public Health*	3
Total	15

* These courses, offered at ASU, are not ASU courses per se and are not found in this catalog.

COURSES

For courses, see "Health Services Administration (HSA)," page 231.

Public Programs

COLLEGE OF PUBLIC PROGRAMS (CPP)

- CPP 580 Practicum.** (1–12)
not regularly offered
- CPP 583 Field Work.** (1–12)
not regularly offered
- CPP 584 Internship.** (1–12)
not regularly offered
- CPP 590 Reading and Conference.** (1–12)
not regularly offered
- CPP 591 Seminar.** (1–12)
not regularly offered
- CPP 593 Applied Project.** (1–12)
not regularly offered
- CPP 594 Conference and Workshop.** (1–12)
not regularly offered
- CPP 598 Special Topics.** (1–4)
not regularly offered
- CPP 690 Reading and Conference.** (1–12)
not regularly offered
- CPP 691 Seminar.** (1–12)
not regularly offered
- Omnibus Graduate Courses.** See page 50 for omnibus graduate courses that may be offered.

Recreation

Master's Program

Randy Virden
Chair
(MOEUR 131) 480/965-7291
rmtgrad@asu.edu
www.asu.edu/copp/recreation/master

PROFESSORS

ALLISON, HALEY, YOSHIOKA

ASSOCIATE PROFESSORS

SCHNEIDER, TEYE, VIRDEN

ASSISTANT PROFESSORS

ASHCRAFT, BAKER, BROWN, LECLERC, MARTINEZ,
PRITCHARD, SONMEZ, TIMOTHY

MASTER OF SCIENCE

The faculty in the Department of Recreation Management and Tourism offer a program leading to the M.S. degree in Recreation.

The M.S. degree program prepares students to analyze and understand critical topics and issues pertinent to the field of leisure and recreation.

Students choose between two academic options: the thesis option or the professional option.

Admission. Students applying to the M.S. program must have achieved a GPA of 3.00 or the equivalent in the last two years of work leading to the bachelor's degree. Appli-

cants should submit their application, application fee, and all undergraduate transcripts to the Graduate College before February 15. To be considered for fall admission, candidates must have their Graduate Record Examination (or Miller's Analogy Test) scores, a statement of professional and academic goals, and three letters of recommendation sent to the Department of Recreation Management and Tourism by February 15. Only complete application files are reviewed or considered for admission. Students without undergraduate academic work in the recreation/tourism disciplines will be required to take six semester hours of deficiency course work in addition to the M.S. degree requirements. Deficiency course work may be taken in conjunction with M.S. degree classes.

Program of Study. Completion of the M.S. degree in Recreation on the average requires approximately two years of study. Students may select a thesis or professional option. The thesis option is a research-oriented degree and is recommended for students planning to continue graduate studies beyond the master's degree. The professional option is intended for students seeking additional knowledge and expertise relevant to professional career development. Advising and direction in both options are under the direct supervision of an assigned faculty member.

Program Requirements: Thesis Option. The thesis option consists of a minimum of 30 semester hours. The 30 semester hours include six hours of thesis (REC 599), which must be defended in an oral examination before a supervisory committee of at least three faculty members, one of which resides in another department.

REC 500 Research Methods.....	3
REC 552 Foundation of the Recreation and Tourism Professions.....	3
REC 555 Social and Psychological Aspects of Recreation and Tourism Behavior.....	3
Advanced inquiry skills	3
Electives	9
Introductory statistics (500-level)	3
Thesis	6
Minimum total	30

Program Requirements: Professional Option. The professional option consists of 30 semester hours including six hours of practicum (REC 580). The purpose of the Practicum is to provide graduate students with in-depth agency-based professional experiences. The student committee will consist of one department faculty member and one community/agency professional. At the end of the Practicum, the student is required to submit a written description and analysis of the project as well as present the results to the committee.

REC 501 Program Evaluation and Information Management.....	3
REC 530 Recreation and Tourism Service Management	3
REC 552 Foundation of the Recreation and Tourism Professions.....	3
REC 555 Social and Psychological Aspects of Recreation and Tourism Behavior	3
REC 580 Practicum	6
Electives	9
Introductory statistics (500-level)	3
Minimum total	30

Foreign Language Requirements. None.

Thesis Requirements. A thesis is an option.

Final Examinations. A final oral examination in defense of the thesis or a practicum is required.

RESEARCH ACTIVITY

The study of leisure, recreation, and tourism is a multidisciplinary field of research, scholarship, and program development. Recent scholarly activity of departmental faculty and students reflect this approach. Major research areas include the following: international travel and tourism; philosophy of leisure; recreation resource planning; social and psychological analyses of leisure behavior; leisure and youth development; travel and tourism policy and planning; urban recreation administration; outdoor recreation and wilderness management; cross-cultural analysis of play and leisure; gender differences in leisure behavior patterns; non-profit agency leadership/management.

RECREATION MANAGEMENT AND TOURISM (REC)

REC 500 Research Methods. (3)

once a year

Introduction to recreation research methods, with emphasis on methodological questions, research issues, and techniques relevant to contemporary social research. Prerequisite: 500-level or higher approved statistics course.

REC 501 Program Evaluation and Information Management. (3)

not regularly offered

Develops skills in several professional areas, including: evaluation, needs assessment, information and data collection, data management/analysis, computer applications, and report writing.

REC 530 Recreation and Tourism Service Management. (3)

spring in even years

Examines and applies organizational behavior, leadership, human resources, and development; planning and risk management to profession.

REC 552 Foundation of the Recreation and Tourism Professions. (3)

once a year

Examines the philosophical and conceptual foundations of play, leisure, recreation and tourism; history of the profession; professional and research issues.

REC 555 Social and Psychological Aspects of Recreation and Tourism Behavior. (3)

once a year

Theoretical review and empirical analysis of social, cultural, and psychological foundations of leisure behavior with practical implications.

REC 558 Integrative Seminar. (3)

once a year

Advanced exploration and assessment of current trends within the leisure studies profession. Variable topics, including, but not limited to: cross-cultural analysis of leisure, urban recreation, planning and resources, sociocultural dimensions of tourism development, wilderness management. Prerequisite: REC 552.

REC 569 Current Issues in Tourism. (3)

once a year

General survey of tourism literature with emphasis on relevant theories, concepts, and current research.

REC 570 Social Aspects of Outdoor Recreation Management. (3)

once a year

Analyzes the social aspects of natural resource recreation management and planning. Prerequisite: REC 370 (or its equivalent).

REC 580 Practicum. (1–12)

not regularly offered

REC 593 Applied Project. (1–12)

not regularly offered

REC 598 Special Topics. (1–12)

not regularly offered

REC 599 Thesis. (1–12)

not regularly offered

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Religious Studies

Master's Program

Joel D. Gereboff

Chair

(ECA 377) 480/965-7145

relstudy@asu.edu

www.asu.edu/clas/religious_studies/home/grad.html

PROFESSORS

CADY, COUDERT, FELDHAUS, FOARD

ASSOCIATE PROFESSORS

CLAY, FESSENDEN, GEREBOFF, MOORE, MORRISON,
SCHOBER, SWANSON, WOODWARD

ASSISTANT PROFESSORS

DAMREL, LEON, UMAR

The faculty of the Department of Religious Studies offer a graduate program leading to the M.A. degree in Religious Studies. This program is designed to serve three main purposes. It offers intensive training in research methods and in select special fields for students who seek to qualify for doctoral programs at leading universities. It serves as specialized training for those who plan to teach religious studies subject matter in colleges and high schools or who wish to bring cultural and cross-cultural analytical tools to professions such as business, social work, government, and journalism. It allows qualified persons in nonacademic occupations the opportunity to acquire competence in the study of religions, broadly defined, and in areas of special interest.

Course offerings and faculty appointments reflect the commitment of the department to a balance of Western and Asian, historical and conceptual, methodological, and subject-oriented areas of study. This programmatic diversity is maintained in a context of scholarly collegiality involving both faculty and graduate students.

MASTER OF ARTS

See "Master's Degrees," page 100, for general requirements.

The graduate program leading to the M.A. degree provides two options: (1) a thesis option and (2) a portfolio option. While admission requirements and procedures are identical for both options, requirements for degree completion vary as indicated.

Admission. In order to be eligible for admission to the graduate program in Religious Studies, an applicant must meet Graduate College requirements. See "Admission to the Graduate College," page 92, and provide the following:

1. The student must submit test scores from the Graduate Record Exam (older returning students may peti-

- tion the department to have this requirement waived).
- The student must have completed the equivalent of 15 hours of undergraduate work in the study of religions, including advanced courses in both Western and Asian or other non-Western religions. Students without the necessary background in religious studies may remove deficiencies by taking additional specified courses (which may or may not count toward the fulfillment of degree requirements) at the beginning of their program of study.
 - The student must request three academic letters of reference to be sent to the graduate coordinator of the department.
 - The student must submit an essay of approximately 1,000 words outlining the academic background, career goals, and specific area of interest in religious studies in relation to fields offered by the faculty.

Complete applications are due by February 1. Students will receive notification from the department by April 1. Graduate assistantship awards are also announced on or about April 1. Late applications and applications for spring semester are reviewed on an individual basis.

GRADUATE PROGRAM REQUIREMENTS

Thesis Option. This option is recommended for students intending to seek admission to a doctoral program upon completion of the M.A. degree or planning to teach in the discipline at community colleges. For the thesis option the student must satisfy the following requirements:

- reading knowledge of French, German, or another language relevant to the proposed thesis topic is normally required. At the discretion of the student's supervisory committee, the requirement may be waived for students who either are not planning to enter a doctoral program or are planning to pursue doctoral work that does not require proficiency in foreign languages;
- 24 hours of course work, including six hours in methods and theory (REL 501, 502); six hours of graduate seminar (REL 591), offered each semester on varying topics within the academic study of religion; and three hours of research (REL 592) in the field of the thesis topic;
- a thesis that earns six semester hours of 599 Thesis credit; and
- an oral defense of the thesis.

Portfolio Option. This option is recommended for students intending to augment their primary area of expertise and professional training in fields such as journalism, law, teaching K–12, counseling, social work, the ministry, and others. For the portfolio option, the student must satisfy the following requirements:

- reading knowledge of a foreign language relevant to the proposed area of concentration. At the discretion of the student's supervisory committee, the requirement may be waived;
- 30 hours of course work, including six hours in methods and theory (REL 501, 502); six hours of graduate seminar (REL 591); four courses in a major

area of concentration; and two courses in a minor area;

- a portfolio consisting of three papers: one on theory and method, one on the student's minor area of study, and one on the major area of study. Although portfolio papers may germinate from ideas generated in graduate seminars, they will be of publishable quality and make substantive contributions to the scholarship of the field. Credit towards completing the portfolio may be earned as part of the required credit hours outlined in (2); and
- an oral defense of the portfolio.

RESEARCH ACTIVITY

For information on current research activity, access the Department of Religious Studies Web site at www.asu.edu/clas/religious_studies.

RELIGIOUS STUDIES (REL)

REL 410 Judaism in Modern Times. (3)

not regularly offered

Variety of expressions of Judaism and Jewishness in the modern period. Topics may include American Judaism or religious responses to the Holocaust.

General Studies: HU, H

REL 415 The Jewish Mystical Tradition. (3)

not regularly offered

Examines some of the esoteric lore of Judaism. Studies movements and literature such as Hasidism and Kabbalah.

General Studies: HU

REL 420 Religion in American Life and Thought. (3)

not regularly offered

Influence of religion on American society, culture, and ideas; the distinctive character of religion in America. Prerequisite: REL 320 or 321 (or its equivalent).

General Studies: L/HU

REL 426 American Preachers and Preaching: The Sermon in America. (3)

not regularly offered

Life and work of notable American preachers. Emergence of the preacher as representative of American religion. Prerequisite: REL 320 or 321 (or its equivalent).

General Studies: L/HU

REL 427 American Religious Thought. (3)

not regularly offered

Thought of representative American religious thinkers, i.e., Jonathon Edwards, William Ellery Channing, Horace Bushnell, and Reinhold Niebuhr. Prerequisite: REL 320 or 321 (or its equivalent).

General Studies: HU, H

REL 444 Religion in Japan. (3)

once a year

Religion in Japanese history, especially the development of Japanese Buddhism, and religion in the modern transformation of Japan. Prerequisite: instructor approval.

General Studies: HU, G, H

REL 460 Studies in Islamic Religion. (3)

not regularly offered

Issues in the interpretation and understanding of Islamic texts, history, society, culture, and rituals. Prerequisites: both REL 365 and Religious Studies major or only instructor approval.

General Studies: HU, G

REL 470 Religion in the Middle Ages. (3)

not regularly offered

Religious aspects of medieval life and thought; variety of forms of dissent, heresy, and reform movements from the 4th to 13th centuries.

General Studies: HU, H

REL 471 Reformation and Modern Christianity. (3)*not regularly offered*

Protestant Reformation to contemporary Christian movements; includes factors in the dissolution of the Medieval Christian synthesis, variety of reform movements and reformation patterns, Catholic counter-reform measures, formation of liberal theology, ecumenical movement, and the World Council of Churches.

*General Studies: HU, H***REL 483 Religion and Science. (3)***spring*

Investigates the correlation between science and religion as an interdisciplinary study from a historical perspective. Readings, film, lecture, discussion. Prerequisite: junior standing or instructor approval.

REL 486 Modern Critics of Religion. (3)*not regularly offered*

Major theories and critiques of religion among modern social, philosophical, and religious thinkers.

*General Studies: HU***REL 494 Special Topics in Religious Studies. (3)***fall and spring*

Open to all students, freshmen by instructor approval only. Topics may be selected from various areas.

REL 498 PS: Pro-Seminar in Religious Studies. (3)*not regularly offered*

For students with a major or minor emphasis in Religious Studies.

REL 501 Research Methods in Religious Studies. (3)*fall*

Explores the major themes and methods in the study of religion, with primary focus on classical texts. Lecture, discussion.

REL 502 Research Methods in Religious Studies. (3)*spring*

Explores the major themes and methods in the study of religion, with primary focus on contemporary texts. Lecture, discussion.

REL 591 Seminar. (3)*fall and spring*

Topics on methodological issues in the study of religion. Prerequisite: Religious Studies graduate student or instructor approval.

REL 592 Research. (1–12)*fall and spring***REL 598 Special Topics. (1–4)***fall and spring*

May be repeated for credit. Possible topics:

- (a) Christianity. (3)
- (b) Islam. (3)
- (c) Judaism. (3)
- (d) Native American Religion. (3)
- (e) Problems in Religious Studies. (3)
- (f) Religion in America. (3)
- (g) Religion in East Asia. (3)
- (h) Religion in South and Southeast Asia. (3)
- (i) Study of Religion, Comparative Religion. (3)
- (j) Western Religious Thought, Ethics. (3)

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Renaissance Studies

See “Medieval and Renaissance Studies,” page 268.

Scholarly Publishing

Certificate Program**Beth Luey***Director***(SS 225H) 480/965-5775****www.asu.edu/clas/history/graduate/scholarlypub.html**

SENIOR INSTRUCTIONAL PROFESSIONAL LUEY

Graduate students in any discipline may pursue a Certificate in Scholarly Publishing in conjunction with their degree programs. The program is also open to students who already hold graduate degrees. Students gain an understanding of the structure of scholarly publishing (scholarly books, journals, reference books, college textbooks, and scholarly electronic media), its role and responsibility in society, the legal and ethical issues that impinge upon it, and its economics. They also learn to perform the responsibilities of editors, designers, or producers of scholarly publications. Course work includes a required core, required courses in editing or design, and electives from a variety of disciplines. The certificate requires 28 hours of course work, including six internship hours. Some courses may be applied to both the certificate and the student's degree program. Applicants are strongly urged to submit Graduate Record Examination aptitude scores; a writing sample is required. Application deadline is February 1. For more information, contact the director, Scholarly Publishing Program, SS 225H, 480/965-5775.

SCHOLARLY PUBLISHING (PUB)**PUB 501 Introduction to Scholarly Publishing. (3)***fall*

Introduction to the purpose, organization, and operation of scholarly publishing, including its history, societal role, and current issues. Lecture, discussion. Prerequisite: graduate standing.

PUB 502 Scholarly Editing. (3)*fall*

Publishing procedures, proofreading, and manuscript editing of scholarly books, textbooks and scholarly journals. Lecture, discussion. Prerequisite: admission to scholarly publishing certificate program. Pre- or corequisite: PUB 501.

PUB 503 Advanced Scholarly Editing. (3)*spring*

Advanced manuscript editing, acquisitions, developmental editing, and indexing of scholarly books, textbooks, and scholarly journals. Lecture, discussion. Prerequisites: PUB 501, 502.

PUB 510 Research in Scholarly Publishing. (3)*spring*

Individual or group research projects on issues in scholarly publishing, including legal, economic, design, technological, and related topics. Directed research, discussion. Prerequisites: PUB 501; admission to scholarly publishing certificate program.

PUB 584 Scholarly Publishing Internship. (1–6)*once a year*

Structured, supervised, practical experience with a scholarly publisher or other appropriate publishing enterprise. Internship. Prerequisites: PUB 501; 9 hours in scholarly publishing core; instructor approval.

PUB 598 ST: Special Topics in Scholarly Publishing. (1)
spring

One-week short courses covering special topics in scholarly publishing, to be taught by visiting publishing professionals. Lecture, discussion. Prerequisites: PUB 501; admission to scholarly publishing certificate program.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Science and Engineering of Materials

Interdisciplinary Doctoral Program

James Adams

William Petuskey

Codirectors

(PS A323) 480/965-2460

sem@asu.edu

www.asu.edu/graduate/SEM

Solid-State Science

Regents' Professor: Smith;

Senior Research Scientists: Crozier, McKelvy;

Research Scientist: McCartney;

Associate Research Scientists: Kim, Sharma

Chemical, Bio, and Materials Engineering

Professors: Adams, Dey, Krause, Mahajan;

Associate Professor: Alford

Chemistry and Biochemistry

Regents' Professor: Buseck;

Professors: Glaunsinger, Petuskey;

Associate Professors: Kouvetakis

Electrical Engineering

Regents' Professor: Ferry;

Professors: Goodnick, Kozicki, Schroder;

Associate Professor: Bird;

Assistant Professor: Zhang

Mechanical and Aerospace Engineering

Professor: Sieradzki

Physics and Astronomy

Regents' Professor: Smith;

Professors: Bennett, Ponce, Rez, Sankey, Tsong, Venables;

Associate Professors: Culbertson, Herbots, Marzke

The Committee on the Science and Engineering of Materials offers an interdisciplinary graduate program leading to the Ph.D. degree in Science and Engineering of Materials, with concentrations in high-resolution nanostructure analysis and solid-state device materials design. The members of the faculty comprising the program are from several academic research units in the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences: the Center for Solid-State Science; the Departments of Chemical, Bio, and Materials Engineering; Chemistry and Biochemistry; Electrical Engineering; Mechanical and Aerospace Engineering; Physics and Astronomy.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in the Science and Engineering of Materials is an interdisciplinary program of study that integrates courses offered by faculty representing various disci-

plines, along with courses in mathematics, to provide a sound foundation for research leading to a dissertation. Emphasis is placed upon applications of the core fundamentals for investigation of the relationships between microstructure and properties and performance of solids, and the dependence of microstructure on processing.

Admission. Admission to the SEM Program is a two-step process. First, all prospective students must satisfy the general admission requirements of the Graduate College. International students must submit a Test of English as a Foreign Language (TOEFL) score. The minimum TOEFL score required by the SEM Program is 600. Second, students must satisfy the requirements of the SEM Program. These requirements are: a GRE (verbal, quantitative, analytical), a professional résumé, a statement of purpose, and three letters of recommendation. International students who wish to be considered for teaching assistantships must provide the program with a Test of Spoken English (TSE) score. Application materials must be received by the SEM Program Office by the following established deadlines: for fall, documents must be received (postmarked) by February 1; for spring, by October 1.

Program of Study. The program consists of a minimum 84 semester hours beyond the bachelor's degree, at least 24 of which are research and dissertation credit. Programs of study for individual students are defined during discussions between the student and the faculty supervisory committee. At least 30 semester hours of the approved program of study, including the core, exclusive of research and dissertation, must be completed after admission to the Ph.D. at ASU.

A minimum of 10 graduate-level courses beyond the bachelor's degree is required.

The curriculum includes core courses that define the essential course work for all students, involving 21 semester hours of selected courses in materials, chemistry, and physics. Students who previously have taken courses fulfilling some of the core requirements may select electives.

Interdisciplinary Core Courses

CHM 471 Solid-State Chemistry	3
or CHM 453 Inorganic Chemistry (3)	
CHM 541 Advanced Thermodynamics	3
CHM 545 Quantum Chemistry I.....	3
or PHY 598 ST: Quantum Physics (3)	
MSE 514 Physical Metallurgy	3
MSE 550 Advanced Materials Characterization.....	3
PHY 481 Solid-State Physics.....	3
SEM 598 ST: Graduate Student Seminar.....	3
Total	21

Students may choose one of the following concentrations in their program of study: (1) high-resolution nanostructure analysis and (2) solid-state device materials design, or may tailor a program of study in the science and engineering of materials to meet their professional and academic needs. Students achieve the desired concentration by completing three or more of the courses in the appropriate concentration group of courses. The courses in these concentrations are a part of the elective portion of the degree course requirements.

High-Resolution Nanostructure Analysis. The courses comprising the high-resolution nanostructure analysis

concentration are the most comprehensive education in the theory and application of transmission electron microscopy in the U.S. This group of courses is highly interdisciplinary. Because of the strict and important correspondence between the properties of materials and their nanostructure, transmission electron microscopy plays a central role in modern materials science, far beyond its role in other fields of natural science and engineering. Nanostructure analysis is fully one-third the field of materials research and is often the critical knowledge necessary to understand the behavior of materials. The development and applications of high-resolution nanostructure analysis methods is one of ASU's strongest materials research and education specialities and is an important part of the SEM program. Required courses are as follows:

SEM 556 Electron Microscopy Laboratory	3
SEM 557 Electron Microscopy Laboratory	3
SEM 558 Electron Microscopy I.....	3
SEM 559 Electron Microscopy II	3
Total	12

Solid-State Device Materials Design. The courses specified for the solid-state device materials design concentration are materials applications and characterization courses that introduce SEM students to the culture of device engineering. Students apply their knowledge of basic materials science to contemporary problems of the solid-state electronics industry. Required courses are as follows:

EEE 435 Microelectronics	3
EEE 436 Fundamentals of Solid-State Devices	3
EEE 536 Semiconductor Characterization.....	3
IEE 572 Design of Engineering Experiments	3
MSE 598 ST: Growth and Processing of Semiconductor Devices.....	3
Total	15

Foreign Language Requirements. None.

Comprehensive Examinations. Near completion of course work and no later than three years after admission to the program, the student is given a comprehensive examination with oral and written components. The written component is a test that examines the student's knowledge in the core course subjects.

The examination is administered by the Curriculum and Examination Committee. The oral component requires the presentation of a research proposition to the student's faculty supervisory committee. The student must define a research problem of current relevance to the materials science field. The problem may be experimental, theoretical, or a combination of both. The presentation should be based on the study of literature and discussions with members of the supervisory committee and materials researchers. The student will define the problem, describe its significance in the field, propose a method of investigation leading to a solution of the problem, and defend the problem and proposed solution before the faculty supervisory committee. The proposed problem may be from any area of materials research but it may not be part of the student's dissertation topic. The student must prepare and deliver to the members of the supervisory committee the written proposal describing the research proposition not less than seven business days before the scheduled examination date. The comprehensive

exams may be taken no more than twice upon formal application to, and under conditions specified by, the student's faculty committee, the director of the supervisory program, and the dean of the Graduate College. Upon successful completion of this examination, the student is advanced to candidacy for the degree by the Graduate College.

Dissertation Requirements. The dissertation, which is the final and most important product of the student's effort in this program, must report original research in the field and demonstrate the student's ability to conduct creative, independent research. Each candidate must register for 24 semester hours of research and dissertation as part of the degree requirements; specifically 12 semester hours of SEM 792 Research and 12 semester hours of SEM 799 Dissertation. Dissertation credits should be taken in the semester(s) following the student's advancement to candidacy.

After the student passes the comprehensive examinations, and every semester up to the time the student defends the dissertation, the student must submit a one-page report on the dissertation proposal to his or her dissertation committee at the end of the semester.

Final Examinations. The final oral examination in defense of the dissertation is conducted by the student's dissertation committee and others appointed by the dean of the Graduate College.

SCIENCE AND ENGINEERING OF MATERIALS (SEM)

SEM 556 Electron Microscopy Laboratory. (3)

fall

Lab support for SEM 558. Cross-listed as MSE 556. Credit is allowed for only MSE 556 or SEM 556. Pre- or corequisite: MSE 558 or SEM 558.

SEM 557 Electron Microscopy Laboratory. (3)

spring

Lab support for SEM 559. Cross-listed as MSE 557. Credit is allowed for only MSE 557 or SEM 557. Pre- or corequisite: MSE 559 or SEM 559.

SEM 558 Electron Microscopy I. (3)

fall

Microanalysis of the structure and composition of materials using images, diffraction, X-ray and energy loss spectroscopy. Requires knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables. Cross-listed as MSE 558. Credit is allowed for only MSE 558 or SEM 558. Prerequisite: instructor approval.

SEM 559 Electron Microscopy II. (3)

spring

Microanalysis of the structure and composition of materials using images, diffraction, X-ray, and energy loss spectroscopy. Requires knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables. Cross-listed as MSE 559. Credit is allowed for only MSE 559 or SEM 559. Prerequisite: instructor approval.

SEM 594 Vacuum System Science and Engineering. (3)

not regularly offered

Vacuum concepts, equipment, and systems are studied to give the student an operational knowledge of modern vacuum technology. Equal emphasis is placed on theoretical and practical instruction. Class time is equally distributed between lecture and laboratory sessions. Lab sessions consist of exercises and tours to provide hands-on experience with and a working perspective of the vacuum techniques and systems principally used in industry, academia, and government laboratories. Undergraduates take two written exams; graduate students take two written exams and complete a vacuum system design project. Prerequisite: college algebra.

SEM 598 Special Topics. (1-4)

not regularly offered

Possible topics:

- (a) Graduate Student Seminar. (3)

SEM 700 Research Methods. (1-6)*not regularly offered***SEM 790 Reading and Conference. (1-6)***not regularly offered***SEM 791 Seminar. (1)***not regularly offered***SEM 792 Research. (1-12)***not regularly offered***SEM 799 Dissertation. (1-12)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Secondary Education

Master's Program

ASU West offers a Master of Education degree in Secondary Education. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Social and Philosophical Foundations of Education

Master's Program

Eric Margolis
Program Coordinator
 (ED 116E) 480/965-6357
eric.margolis@asu.edu

REGENTS' PROFESSOR

BERLINER

PROFESSORS

APPLETON, BARONE, GLASS, SMITH, WEBB, WILEY

ASSOCIATE PROFESSORS

CASANOVA, HARTWELL-HUNICUTT

ASSISTANT PROFESSORS

MARGOLIS, MOSES

MASTER OF ARTS

The faculty in the Division of Educational Leadership and Policy Studies offer a graduate program leading to the M.A. degree in Social and Philosophical Foundations of Education. Students may also select policy analysis as an area of study. The program offers students a thorough grounding in historical, social, and philosophical literature. The program is geared toward students seeking relevant and advanced preparation for doctoral-level study in one of the fields of education. The program is also appropriate for educational practitioners seeking terminal master's degrees and advanced intellectual development that will make them more thoughtful teachers and better informed decision makers. Students study both classic and leading contemporary

thought taken from educational, social, and philosophical literature. The program draws on intellectual sources and scholarly disciplines, including anthropology, curriculum theory, history, law, philosophy, sociology, and comparative international and multicultural perspectives.

Applicants for admission to the M.A. degree program must submit scores on the Graduate Record Examination. Candidates for the M.A. degree must pass a written comprehensive examination, in addition to writing a thesis or equivalent. An oral examination in defense of the thesis or equivalent is required.

RESEARCH ACTIVITY

Faculty are currently conducting research on hidden curricula in higher education, visual sociology and sociology of education, and the experience of Chicanos in higher education.

SOCIAL AND PHILOSOPHICAL FOUNDATIONS (SPF)

SPF 501 Culture and Schooling. (3)

fall and spring

Introduction to social science concepts of culture and the cultural milieu in which schooling takes place in the United States. Lecture, recitation.

SPF 510 Introduction to Organization and Administration of American Public Schools. (3)

fall and spring

Explores organizational structure and administration of public education through the application of legal and ethical concepts and relevant information of the social sciences. Cross-listed as EDA 510. Credit is allowed for only EDA 510 or SPF 510.

SPF 511 School and Society. (3)

fall, spring, summer

Interrelationship of school and society and the role of education in social change.

SPF 520 Cultural Diversity in Education. (3)

spring

Philosophic and sociological investigation of cultural diversity in the United States and how it relates to education.

SPF 530 Sociology of Education. (3)

fall

Explorations in the history of sociological thought, especially theories of the relations between educational systems and the social/cultural world.

SPF 533 Comparative Education in the Western World. (3)

not regularly offered

Educational practices and traditions in the leading nations of Europe and the Soviet Union.

SPF 544 Philosophical Foundations of Education. (3)

fall

Theories of education in ancient, medieval, and modern classical and contemporary philosophies.

SPF 566 History of Education. (3)

spring

Development of educational institutions and ideas in the Western world, from ancient times to the 20th century.

SPF 603 Visual Ethnography in Education. (3)

spring

Advanced qualitative methods class combining ethnography with the use of video and still photography in data gathering and presentation. Seminar. Corequisite: COE 503.

SPF 612 Evaluation Theory. (3)

fall

Explores the major theories of evaluation (inquiry leading to value judgments) in educational policy through examination of cases.

SPF 622 Organizational Theory. (3)

spring

Major views of organizations and their influence on role definition and participant behaviors in educational organization. Seminar, discussion. Cross-listed as HED 688. Credit is allowed for only HED 688 or SPF 622.

SPF 711 Social and Historical Foundations of Education. (3)
not regularly offered

Problems of American education and their sociohistorical context.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Social Work

Master's and Doctoral Programs

Leslie Leighninger
Director
 (WHALL 135) 480/965-3304
 social.work@asu.edu
 ssw.asu.edu

PROFESSORS

ASHFORD, COUDROGLOU, DALEY,
 FIGUEIRA-McDONOUGH, KETTNER, LECROY,
 LEIGHNINGER, MacEACHRON, MORONEY, SEGAL

ASSOCIATE PROFESSORS

BRZUZY, GERDES, GUSTAVSSON, MARSIGLIA,
 MONTERO, NICHOLS, PAZ, RISLEY-CURTISS, STEINER,
 YELLOW BIRD, WALLER

ASSISTANT PROFESSORS

HOLLEY, HOLSCHUH, HURDLE, LARSON, NAPOLI,
 OKAMOTO, STROMWALL

ACADEMIC PROFESSIONALS

GONZALEZ-SANTIN, JOHNSTON, KNUTSON-WOODS,
 ROUNTREE-ANTAR, YEPEZ

The faculty in the School of Social Work offer programs leading to the Master of Social Work degree and the Ph.D. degree in Social Work.

MASTER OF SOCIAL WORK

The professional program leading to the Master of Social Work degree prepares social workers for advanced direct practice or planning, administration, and community practice. The program is designed to prepare social workers capable of responding effectively to the needs of special populations in the Southwest. The Master of Social Work degree program is accredited by the Council on Social Work Education.

Application Procedures. Students applying to the graduate program in Social Work must follow the procedures for admission to the Graduate College (see "Admission to the Graduate College," page 92). In addition the applicant must submit the following to

ACADEMIC SERVICES
 SCHOOL OF SOCIAL WORK
 ARIZONA STATE UNIVERSITY
 PO BOX 871802
 TEMPE AZ 85287-1802

1. application to the graduate Social Work program;
2. statement of educational and career goals in sufficient detail to indicate compatibility with the educa-

tional objectives and capabilities of the School of Social Work;

3. three letters of reference using the reference letter forms provided by the School of Social Work;
4. test scores from either the GRE or the MAT; and
5. professional résumé that includes volunteer and paid work experience.

Admission

Regular Admission. The school also requires one of the following:

1. a liberal arts undergraduate degree;
2. a B.S.W. from a Council on Social Work Education accredited school of social work; or
3. another undergraduate degree, with 30 semester hours in liberal arts courses at the undergraduate or graduate level.

The 30 semester hours described in item three above must include course work from the social/behavioral sciences, natural sciences, and humanities. The distribution should approximate the current policy for the B.S.W. program: 18 hours in social and behavioral sciences, six hours in natural sciences with at least one course in human biology, and six hours in humanities.

All students are required to successfully complete a course in human biology before enrollment in the graduate program. Additionally, all students must have successfully completed a course in statistics before admission. If the statistics requirement has not been met, then an equivalent course must either be successfully completed by December 31 or before registering for SWG 519.

Provisional Admission. Applicants with lower test scores or grades below minimum levels may be considered for provisional admission if there is counterbalancing evidence suggesting the potential of outstanding performance in the M.S.W. program. Normally, final determination of removal of provisional status is made by the time the student has completed 12 hours of approved graduate study. The provisional student does not begin field work until this status has been changed. However, the student carries the same academic load as a regularly admitted student and is expected to meet the same standards for continuation in the program.

All students are required to successfully complete a course in human biology before enrollment in the graduate program. Additionally, all students must have successfully completed a course in statistics either prior to admission or by the end of the first year in the M.S.W. program.

Applications to the M.S.W. program are accepted from November 1 to March 1 preceding the fall semester to which the applicant is seeking admission, with priority given to completed applications received on or before February 1. All applicants are reviewed for admission for the fall semester only.

Program of Study. The standard program consists of 60 hours including both classroom instruction and field practicum. It is divided into a foundation year (core curriculum) and a concentration year. During both years, students spend two days a week in a practicum setting. The foundation curriculum is the same for all students and must be completed

before entering the concentration year. The following are the required foundation courses:

SWG 501 Human Behavior in the Social Environment I.....	3
SWG 502 Human Behavior in the Social Environment II.....	3
SWG 510 Foundation Practice I.....	3
SWG 511 Foundation Practice II.....	3
SWG 519 Research Methods in Social Work.....	3
SWG 531 Social Policy and Services I.....	3
SWG 533 Diversity and Oppression in Social Work Context.....	3
SWG 541 Field Practicum I.....	3
SWG 542 Field Practicum II.....	3
SWG 580 Community and Organizational Change.....	3

In the second year, students pursue a concentration in either (1) advanced direct practice or (2) planning, administration, and community practice. Six to twelve hours of electives are available for students either to take additional course work in their concentration or to increase knowledge and skill in such areas as health and mental health, family and child welfare, or aging.

The following are required concentration courses:

Advanced Direct Practice (ADP)

SWG 606 Assessment of Mental Disorders.....	3
SWG 611 Social Work with Families.....	3
SWG 619 Practice-Oriented Research.....	3
SWG 621 Integrative Seminar.....	3
SWG 632 Social Policy and Services II.....	3
SWG 641 Advanced Practicum: Direct Practice I.....	3
SWG 642 Advanced Practicum: Direct Practice II.....	3
One of the following five approved advanced courses.....	3
SWG 613 Social Work with Individuals (3)	
SWG 614 Social Work with Families in Transition (3)	
SWG 616 Social Work with Chemically Dependent Families (3)	
SWG 617 Social Work Practice with Children and Adolescents (3)	
SWG 618 Domestic Violence (3)	
Electives.....	6
Total.....	30

Planning, Administration, and Community Practice (PAC)

SWG 623 Agency and Community-Based Research in Social Work.....	3
SWG 632 Social Policy and Services II.....	3
SWG 643 Advanced Practicum: Planning, Social Work Administration, and Community Practice I.....	3
SWG 644 Advanced Practicum: Planning, Social Work Administration, and Community Practice II.....	3
SWG 680 Program Planning in Social Services.....	3
One of the following advanced courses.....	3
SWG 681 Social Work Administration	
SWG 682 Community Participation Strategies (3)	
Electives.....	12
Total.....	30

Electives may be selected from offerings at the School of Social Work or courses offered through other departments with the approval of the M.S.W. program coordinator. The total semester hours for each concentration equals 30.

Transfer Credit. Upon recommendation of the admissions committee, the first year of graduate study (up to 30 graduate semester hours) earned at another CSWE accredited school of social work may be transferred and applied toward the M.S.W. degree at ASU. Under these circumstances, the student must complete the second full year of graduate study (at least 30 semester hours of graduate work) at ASU,

resulting in a 60-hour program composed of the work from both schools. A full report from the school at which the intended transfer credit was obtained is required.

In other cases, with the approval of the M.S.W. program coordinator, up to six semester hours of graduate work completed at another university may be transferred as elective credit.

Consideration for acceptance of prior graduate credits must be applied for at the time of admission. The grades of all transfer credit must be a “B” or higher.

Nondegree Course Work. A maximum of nine graduate semester hours earned as a nondegree student in the ASU School of Social Work or six semester hours earned at another graduate degree program at ASU may be applied toward the program of study. A combination of credit earned as a nondegree student—at ASU or transferred from another university—may not exceed nine hours and of those nine hours, no more than six hours may be electives.

Course work toward a master’s degree must be completed within six consecutive years. The six-year period begins with the first course included on the student’s approved program of study.

Consideration for acceptance of nondegree work must be applied for at the time of admission.

Exemptions and Waiver Examinations. The number of hours required to complete the M.S.W. degree ranges from 36 to 60 semester hours, with 60 hours representing the standard program. In addition to transferring credit (see policy on transfer credit), admitted students may meet requirements of up to 24 hours of credit towards the degree by (1) exempting up to fifteen hours of foundation course work without examination or (2) successfully completing examinations in any of the foundation courses except field practicum.

Exemptions. Only students from B.S.W. programs accredited by the Council on Social Work Education can be considered for exemptions. In order to be eligible for an exemption from any course, students must have received their B.S.W. degree no more than five years prior to the date of admission or must demonstrate current continuing education credits. Admitted B.S.W. students from ASU are exempted from the courses listed below without examination if they meet the stated GPA requirements. B.S.W. students from other accredited programs may also be exempted from the same courses, but must submit their course content material (course description, syllabus, and outline) for review by the M.S.W. program coordinator for an equivalency review to determine exemption. B.S.W. students may be exempted from the following courses:

1. SWG 501, if the student has an “A” in SWU 301 or an equivalent social work course;
2. SWG 502, if the student has an “A” in SWU 340 or an equivalent social work course;
3. SWG 519, if the student has an “A” in SWU 320 or an equivalent social work course;
4. SWG 531, if the student has an “A” in SWU 271 and 432 or equivalent social work courses;
5. SWG 533, if the student has an “A” in SWU 374 or an equivalent social work course.

Waiver Examinations. Students who believe they have successfully completed equivalent undergraduate courses or have related work experience covering content taught in these courses can request to take a written waiver examination:

SWG 501 Human Behavior in the Social Environment I.....	3
SWG 502 Human Behavior in the Social Environment II.....	3
SWG 510 Foundation Practice I.....	3
SWG 511 Foundation Practice II*.....	3
SWG 519 Research Methods in Social Work.....	3
SWG 531 Social Policy and Services I.....	3
SWG 533 Diversity and Oppression in a Social Work Context.....	3
SWG 580 Community and Organizational Change.....	3

* Only students who successfully pass the waiver exam for SWG 510 Foundation Practice I are allowed to take the waiver exam for SWG 511 Foundation Practice II.

Comprehensive Examinations. ASU requires a comprehensive examination or thesis for graduation in all professional master's programs. All Social Work students must pass a comprehensive examination, administered by the school, or complete a thesis before graduation.

Academic Standing and Curriculum Sequencing. In order to remain in good academic standing, the student must maintain an overall GPA of 3.00 at the end of each semester. Most courses in the program are sequential; successful completion of the prior course in the sequence is required to enroll in the following course. Students may not enroll in any second-year required courses until all foundation courses, including the foundation field (SWG 541 and 542), have been successfully completed.

Tucson Component. The School of Social Work offers the full foundation year (30 semester hours of credit) and some concentration-year course work in Tucson. Students may be required to commute to Tempe during both semesters of their concentration year. Courses are scheduled, however, so that a minimum of travel time is required of students. For information about or application to the Tucson component, call 520/884-5507.

Part-Time Program. A limited number of students are admitted each year to a planned part-time program. Students interested in this option must specifically apply to the part-time program.

Financial Assistance. Recent federal reductions in support of human services and educational programs have severely limited the resources available for stipends. Therefore, it is important that applicants have a sound financial plan to cover expenses for the duration of the degree program.

Financial assistance information is available from Student Financial Assistance Office, Student Services Building, second floor, 480/965-3355.

DOCTOR OF PHILOSOPHY

The program seeks to prepare future social work scholars who are involved in the development and application of theories in social work practice, and who plan to enhance social work knowledge through the classroom and field settings.

The program introduces students to the range of roles and responsibilities of faculty leadership, to the challenging

expectations of critical thinking and creativity in research and teaching, and to the multiple ways of integrating research, teaching, and service in the social work profession.

The Social Work faculty advocate for and support the human potential in the distinct experiences and perspectives of the Southwest region. The cultural and economic diversity of the Southwest makes it possible for faculty and students to engage in many issues in their community-based research and practice.

Admission. Applicants must hold an M.S.W. degree from an accredited school of social work, preferably have a minimum of two years of post-M.S.W. professional social work paid employment, and apply to both the ASU Graduate College and the School of Social Work.

Admission to the Ph.D. program requires completion of all admission requirements and procedures set forth by the Graduate College and test scores from the Graduate Record Examination (GRE) (verbal, quantitative, and analytical). Applications are accepted up to March 1 preceding the fall semester to which the applicant is seeking admission, with priority given to completed applications received on or before February 1.

Application Procedure. The following should be submitted to

ADMISSIONS OFFICE
GRADUATE COLLEGE
ARIZONA STATE UNIVERSITY
PO BOX 871003
TEMPE AZ 85287-1003

1. the application for admission to the Graduate College;
2. one official transcript from each institution the applicant has attended previously; and
3. test scores from the GRE.

The following should be submitted to

ACADEMIC SERVICES
SCHOOL OF SOCIAL WORK
ARIZONA STATE UNIVERSITY
PO BOX 871802
TEMPE AZ 85287-1802

1. application to the Ph.D. program in Social Work;
2. writing sample-Social Problem Essay;
3. examples of written work. Students may submit samples of their professional and/or academic writing;
4. three letters of reference that must use the reference letter form provided by the School of Social Work; and
5. *curriculum vitae* or résumé.

Program of Study. Students must demonstrate scholarly competencies in several broad areas identified during the mentoring and advising process. These areas must include: micro/macro theories and perspectives on critical issues in social work and social welfare (24 semester hours), quantitative/qualitative research methodologies (12 semester hours), and professoriate training and mentoring in research, teaching, and service. The program requires a

minimum of 36 semester hours beyond the M.S.W. degree and 84 semester hours beyond the baccalaureate degree. Because students must achieve competency requirements, they may need to take additional course work to achieve these competencies.

The program emphasizes enhancement of scholarship through:

1. applied social work research in diverse community settings and populations of the Southwest;
2. teaching, from syllabus development to classroom teaching across the professional continuum;
3. participation in collegial decision making; and
4. participation in field education and community services.

Students are expected to participate fully in research, teaching, and field liaison activities during their course of studies.

Advisement. The individualized plan for becoming a social work scholar and for learning associated faculty roles is developed by students and their faculty advisors over time.

Residency. The minimum residency requirement for the Ph.D. program is 18 semester hours in courses relating to the program of study, exclusive of dissertation. The residency must be completed in two consecutive semesters, not including summer sessions.

Foreign Language Requirements. None.

Qualifying Examination. Students are given a qualifying examination in the semester following the completion of the first 18 semester hours of approved Ph.D. course work. Students who fail the examination may retake it the following semester. Students failing the qualifying examination twice will be dropped from the program.

Comprehensive Examinations. Upon completion of course work and the qualifying examination, but before beginning dissertation research, students are given a written examination covering research, theory, and methods in their substantive area. If students should fail one or more components of the examination, a reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Approval of the reexamination must be obtained from the supervisory committee and the dean of the Graduate College.

Dissertation Requirements. Each candidate must register for a minimum of 24 semester hours of credit for research and dissertation. The final copy of the dissertation must be received by the supervisory committee and the dean of the Graduate College at least three weeks before the degree conferral date.

Final Examinations. The final oral examination in defense of the dissertation is scheduled and conducted by the student's dissertation committee. A candidate must pass the final examination within five years after completing the comprehensive examination.

SPECIAL PROGRAMS

Tucson Component. The School of Social Work offers a part-time, cohort driven M.S.W. Program in Tucson in con-

junction with the College of Extended Education. See "Tucson Component," page 312, for more information.

RESEARCH ACTIVITY

Drug Resistance Strategies (DRS) Project

This is a school-based substance abuse program funded by the National Institute on Drug Abuse (NIDA). Dr. Flavio Marsiglia is the principal investigator for the project. The program is uniquely designed to reflect students' cultural norms and values. Presented to 7th grade classes throughout the City of Phoenix, DRS is impacting 50 schools and 5,500 students. Latino, Non-Latino and mixed versions of the drug prevention curriculum have been developed. This innovation enables students to recognize themselves in the prevention message and provides solutions that are sensitive to their unique cultural environment. The objective of DRS is to prevent and reduce substance abuse by teaching valuable communication and life skills.

Navajo Nation IGA—Family Preservation and Support Services Program

The School's Office of American Indian Projects worked in conjunction with the Navajo Nation, Division of Social Services to provide an evaluation of the services rendered under the Family Preservation and Family Support Program. January 1 to December 31, 1999.

Understanding the Cultural Context: Working with American Indian Children and their Families

The School's Office of American Indian Projects is working to develop a competency-based training curriculum. The curriculum is intended to assist both state and tribal child welfare staff in developing the necessary cultural competence to work with American Indian families. This grant is a collaborative effort with the Inter Tribal Council of Arizona and Diné College, the only American Indian College in Arizona.

The 1998 volume 2, number 4 special issue of the *Journal of Poverty* entitled "Pressing Issues of Inequality and American Indian Communities" was composed entirely of research articles by ASU School of Social Work faculty, students, and professionals in the field:

1. Brooks, A.J., Stuewig, J., and LeCroy, C.W. (1998). A Family-Based Model of Hispanic, Adolescent Substance Abuse.
2. Brzuzy, S., Stromwall, L., Sharp, P., Wilson, R., and Segal, E. A. (2000). The Vulnerability of American Indian Women in the New Welfare State.
3. Gerdes, K.E., Napoli, M., Pattea, C.M., and Segal, E.A. (1998). The Impact of Indian Gaming on Economic Development.
4. Gustavsson, N.S. and MacEachron, E.A. (1999). Teaching Diversity Through the Indian Child Welfare Act.
5. Hurdle, D. (1998). The Health of Alaska Native Women: Significant Problems, Emerging Solutions.
6. Marsiglia, F.F. and Holleran, L. (1999). I Have Learned So Much from My Mother: An Ethnography of a Group of Chicana High School Students.

7. Marsiglia, F.F. and Navarro, R. (1999). Acculturation Status and HIV/AIDS Knowledge and Perception of Risk Among a Group of Mexican-American Middle School Students.
8. McEachen, D., Van Winkle, M., and Steiner, S. (1998). Domestic Violence Among the Navajo: A Legacy of Colonization.
9. Murphy, S., Risley-Curtiss, C., and Gerdes, K.E. (2000). American Indian Women and Domestic Violence: The Lived Experience.
10. Nagda, B., Spearmon, M., Holley, L.C., Harding, S. Balassone, M.L. Moise-Swanson, D., and deMello, S. (1999). Intergroup Dialogues: An Innovative Approach to Teaching Diversity and Justice in Social Work Programs.
11. Napoli, M. (1999). The Non-Indian Therapist Working with the American Indian Client.
12. Patterson, S. and Marsiglia, F.F. (2000). Mi Casa es Su Casa: A Beginning Exploration of Mexican-Americans Natural Helping.
13. Robin, R., Rassmussen, J.K., Gonzalez-Santin, E., Goldman, M.D. (1999). Impact of Childhood out of Home Placement on a Southwestern American Indian Tribe.
14. Steiner, S., Brzuzy, S., Gerdes, K.E. and Hurdle, D. (2000). Using Structured Controversy to Teach Diversity Content and Cultural Competence.
15. Stromwall, L.K., Brzuzy, S., Sharp, P., and Andersen, C. (1998). The Implications of Welfare Reform for American Indian Families and Communities.
16. Vidal de Haymes, M., Kilty, K.M., and Segal, E.A. (Eds) (2000). Inequalities, Challenges, and Barriers: Latino Communities in the New Century.
17. Waller, M. (2000). Addressing Student Writing Problems: Applying Composition Theory to Social Work Education.
18. Waller, M., Brown, B., and Whittle, B. (2000). Mentoring At-Risk Teen Parents: A Positive Community Response.
19. Waller, M.A., Risley-Curtiss, C., Murphy, S., Medill, A., and Moore, G. (1998). Harnessing the Positive Power of Language: American Indian Women, a Case Example.
20. Yellowbird, M.J. (1999). Radical, Skewed, Benign, and Calculated: Reflections on Teaching Diversity.

SOCIAL WORK (SWG)

SWG 501 Human Behavior in the Social Environment I. (3)

fall
Analyzes theories of personality and life span development from methodological, ecological, and systems perspectives up to adolescence.

SWG 502 Human Behavior in the Social Environment II. (3)

spring
Life span development from middle childhood to maturity. Prerequisite: SWG 501.

SWG 510 Foundation Practice I. (3)

fall
Basic social work methods with emphasis on the problem-solving process as it pertains to individuals, families, and small groups. Prerequisite: Social Work major.

SWG 511 Foundation Practice II. (3)

spring
Theory and methods of direct practice with groups and selected practice models. Lecture, lab. Prerequisite: SWG 510.

SWG 517 Aging and Wellness. (3)

fall and spring
One-on-one service/experiential learning with seniors from the community. Lecture, lab. Cross-listed as GRN 540. Credit is allowed for only GRN 540 or SWG 517.

SWG 519 Research Methods in Social Work. (3)

spring
Conceptual foundations and methods of nomothetic research in social work. Includes problem identification, hypothesis formulation, measurement, sampling, and experimental design. Prerequisites: Social Work major; approved course in statistics.

SWG 531 Social Policy and Services I. (3)

fall
Conceptual, analytical, and historical perspectives on the social welfare institution. Emphasis on poverty and inequality. Principles of policy analysis.

SWG 533 Diversity and Oppression in a Social Work Context. (3)

fall and spring
Explores issues of social inequality related to disability, ethnicity, gender, race, and sexual orientation. Emphasis on populations of the Southwest.

SWG 541 Field Practicum I. (3)

fall and spring
With SWG 542, two consecutive semesters (480 hours) of supervised social work practice in an approved placement. Pre- or corequisite: SWG 510.

SWG 542 Field Practicum II. (3)

fall and spring
See SWG 541. Pre- or corequisite: SWG 511.

SWG 580 Community and Organizational Change. (3)

fall and spring
Examines communities and human service organizations as social systems. Introduces strategies for initiating planned change.

SWG 605 Substance Abuse. (3)

not regularly offered
Psychological and sociocultural determinants of substance abuse. Overview of social policies and treatment approaches.

SWG 606 Assessment of Mental Disorders. (3)

fall
Theories and concepts of mental health and illness. Attention to classification systems and nomenclature used in assessing mental disorders. Prerequisite: SWG 502.

SWG 611 Social Work with Families. (3)

fall
Theory, concepts, and skills for working with diverse family populations. Emphasis on a systems and integrative approach. Prerequisites: SWG 511, 542.

SWG 612 Social Work with Groups. (3)

not regularly offered
Practices applications of knowledge and skill to social work with groups.

SWG 613 Social Work with Individuals. (3)

spring
Treatment of prevalent disorders encountered by social workers, selected from the following: anxiety disorders, personality disorders, depression, and schizophrenia. Lecture, seminar. Prerequisite: SWG 611.

SWG 614 Social Work with Families in Transition. (3)

spring
Analyzes the psychosocial dynamics of families disrupted by divorce, separation, or death of a parent. Offers differential social work interventions. Prerequisite: SWG 611.

SWG 616 Social Work with Chemically Dependent Families. (3)

spring
Examines dynamics of the chemically dependent family and presents clinical approaches for intervening in the family system and sub-systems. Prerequisite: SWG 611.

SWG 617 Social Work Practice with Children and Adolescents. (3)

spring
Theory, research, and intervention that focus on children and adolescents. Prerequisite: SWG 611.

SWG 618 Domestic Violence. (3)

spring

Theory, research, intervention, and prevention strategies relevant to child maltreatment, partner abuse, and elder abuse. Prerequisite: SWG 611.

SWG 619 Practice-Oriented Research. (3)

fall

Accelerated course in application of scholarly and scientific principles to field practice, problem formulation, interventional procedures, and impact assessment. Prerequisite: SWG 519.

SWG 621 Integrative Seminar. (3)

spring

Explores the fit between theoretical frameworks and practice with clients. Requires presentation of empirical studies with clients. Prerequisite: SWG 611. Pre- or corequisite: SWG 641.

SWG 623 Agency and Community-Based Research in Social Work. (3)

spring

Research design techniques and data collection in human service agencies and communities. Analysis for program evaluation and needs assessment. Prerequisites: SWG 519, 541, 542. Corequisite: SWG 680.

SWG 632 Social Policy and Services II. (3)

spring

Develops advanced knowledge and skills in social welfare policy analysis, policy formulation, and advocacy and intervention for policy change. Prerequisite: SWG 531.

SWG 633 Child Welfare Services. (3)

fall

Examines, using ecological and system theories, services which supplement, support, and substitute for parental care of children. Prerequisite: SWG 542.

SWG 641 Advanced Practicum: Direct Practice I. (3)

fall and spring

With SWG 642, two consecutive semesters (480 hours) of supervised social work practice in an approved placement related to the student's career goal. Prerequisites: SWG 541, 542. Pre- or corequisite: SWG 611.

SWG 642 Advanced Practicum: Direct Practice II. (3)

fall and spring

See SWG 641. Prerequisites: SWG 541, 542, 611. Pre- or corequisite: SWG 614 or 616 or 617 or 618.

SWG 643 Advanced Practicum: Planning, Social Work Administration, and Community Practice I. (3)

fall and spring

With SWG 644, two consecutive semesters (480 hours) in social work practice in an approved placement related to the student's career goal. Prerequisites: SWG 541, 542. Pre- or corequisite: SWG 680.

SWG 644 Advanced Practicum: Planning, Social Work Administration, and Community Practice II. (3)

fall and spring

See SWG 643. Prerequisite: SWG 643. Pre- or corequisite: SWG 681 or 682.

SWG 680 Program Planning in Social Services. (3)

spring

Social services planning process; includes needs assessment, goals and objectives, program design, budgeting, management information systems, and program evaluation. Prerequisites: SWG 681, 682. Corequisite: SWG 623.

SWG 681 Social Work Administration. (3)

fall

Administrative skill building and theory application within human service nonprofit social work settings. Prerequisites: SWG 542, 580.

SWG 682 Community Participation Strategies. (3)

fall

Reviews strategies to involve citizens and the consumers of social and human services in community decision-making systems. Participation is viewed as means to facilitate the empowerment of oppressed peoples. Prerequisites: SWG 542, 580.

SWG 683 Developing Grants and Fund Raising. (3)

not regularly offered

Identification of potential funding sources, technical and interpersonal/political aspects of proposal development and fund raising.

SWG 720 Philosophy of Science Issues in Social Work. (3)

fall

Critical examination of social science, social work practice and policy in terms of philosophical assumptions and varying frames of reference.

SWG 721 Empirical Social Work Practice. (3)

spring

Applies scientific principles to problem formulation, assessment, and intervention procedures with emphasis on the direct use of scientific tools in the conduct and evaluation of practice at all levels.

SWG 730 Families Across the Life Span. (3)

fall

Policy and practice analysis of issues which affect families with a focus on the development of interventive strategies.

SWG 731 Social Welfare Policy Analysis and Development. (3)

fall

Methods of policy analysis, critique of social welfare policies against proposed models, and case studies of policy development emphasizing southwestern populations. Prerequisite: SWG 730.

SWG 732 Social Work Administration in a Systems Context. (3)

fall

Case studies of social work administration from initial conceptualization of policy through implementation at national, state, and local levels.

SWG 740 Community Research in Social Work. (3)

fall

Substantive, value, and methodological issues in community-based research as applied to social work topics.

SWG 741 Integrative Research Seminar. (3)

fall

Integrates theory, research methods, and statistics in community social work topics of specific interest to students.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Sociology

Master's and Doctoral Programs

Verna M. Keith

Chair

(SS 321F) 480/965-3735

sociology@asu.edu

www.asu.edu/clas/sociology/graduate

PROFESSORS

BOLIN, COBAS, GORDON, HACKETT, KRONENFELD, KULIS, LANER, NAGASAWA, THOMAS, WEITZ

ASSOCIATE PROFESSORS

BENIN, BLAIR, HARLAN, JACOBSON, KEITH, MILLER-LOESSI, QIAN, SULLIVAN

ASSISTANT PROFESSORS

AGADJANIAN, GLICK, PADILLA

SENIOR LECTURER

FINE

ACADEMIC PROFESSIONAL

WOLF

The faculty in the Department of Sociology offer graduate programs leading to the M.A. and Ph.D. degrees in Sociology.

MASTER OF ARTS

This degree program provides advanced training for those preparing for teaching, research, or applied careers in sociology, and may be taken either as a terminal program or as a step toward eventual fulfillment of requirements for the Ph.D. A detailed description of the graduate program (including opportunities in teaching and research assistantships) may be obtained from the department chair.

Admission. Admission to the program is determined by the following criteria: Graduate Record Examination (GRE) scores (verbal, quantitative, and analytical), three letters of appraisal from persons familiar with the applicant's academic background, valid transcripts of the student's academic record, and a biographical narrative provided by the applicant. Application deadline is February 15.

Program of Study. A master's degree in Sociology requires the successful completion of a minimum of 30 semester hours, including a 12-hour core curriculum, six hours of theory (SOC 585 and 586), and six hours of research methods (SOC 500 and 505), two hours of Sociology as a Profession (SOC 503 and 504), with the balance to be drawn from substantive courses and six hours earned through the M.A. thesis (SOC 599).

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required. This oral examination also tests the student's comprehension of the area of sociology exemplified by the thesis.

DOCTOR OF PHILOSOPHY

This degree provides advanced training in theory, research methodology, and substantive fields to prepare sociologists for teaching and research with special emphasis on urbanism, urbanization, and related issues. A detailed description of this program (including opportunities in teaching and research assistantships) may be obtained from the department chair.

See "Doctor of Philosophy," page 103, for general requirements.

Admission. Admission to the program is determined by the following criteria: GRE scores (verbal, quantitative, and analytical), three letters of appraisal from persons familiar with the applicant's academic background, valid transcripts of the student's academic record, and a biographical narrative provided by each applicant. Applicants should have an M.A. or its equivalent in Sociology or a related field. Application deadline is February 15.

Program of Study. The Ph.D. requires 54 semester hours beyond the master's degree. Three hours each of theory, methods, and statistics are required, and 24 hours are earned through dissertation and research. The remaining 21 hours are in substantive courses reflecting the student's specialization. First-year Ph.D. students are required to take Sociology as a Profession (503 and 504). A minimum of 30 semester hours of the approved Ph.D. program, exclusive of dissertation and research hours, must be completed after admission to the Ph.D. at ASU.

Foreign Language Requirements. None.

Comprehensive Examinations. Written comprehensive examinations focusing on two areas chosen by the student, and an oral defense of the dissertation proposal are required. After passing the comprehensive examinations and obtaining a formal approval of the dissertation proposal, the student is eligible to apply for candidacy.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

Research Facilities. Research facilities in the department consist of a survey research laboratory, small groups research laboratory, computer terminals and linkages to mainframe and the supercomputer, computational laboratory, and Gould Memorial Research Archive. The survey research laboratory conducts campus and community surveys. Among the topics studied are transportation, citizen attitudes, recreation, judicial evaluation, occupational destinies of graduate students, academic advisement, student, staff and faculty attitudes, student living arrangements, changing sex roles, and student activism and political involvement.

SOCIOLOGY (SOC)

SOC 500 Research Methods. (1-12)

not regularly offered

SOC 501 Practicum in Survey Research. (3)

fall and spring

Research practicum in survey field work, analysis, and reporting in the Phoenix Area Study. Prerequisite: SOC 391 (or its equivalent).

SOC 502 Practicum in Survey Research. (3)

fall and spring

Continuation of SOC 501. Prerequisite: SOC 501.

SOC 503 Sociology as a Profession I. (1)

fall

Becoming and working as a sociologist, including how to write a vita, choose a thesis topic, or find dissertation data. Prerequisite: graduate Sociology major.

SOC 504 Sociology as a Profession II. (1)

spring

Becoming and working as a sociologist, including how to write a vita, choose a thesis topic, or find dissertation data. Prerequisite: graduate Sociology major.

SOC 505 Applied Regression Analysis. (3)

fall and summer

Multiple linear regression topics relevant to sociological data analysis. Computer applications. Prerequisites: SOC 390 (or its equivalent); proficiency examination.

SOC 507 Social Statistics IIA: Categorical Data Analysis. (3)

fall

Logistic regression and related topics relevant to categorical data analysis in sociology. Computer applications. Prerequisite: SOC 505 or instructor approval.

SOC 508 Social Statistics IIB: Structural Equation Analysis. (3)

spring

Teaches structural equation models using LISREL and other computer packages. Topics include multiple group analyses and ordinal endogenous variable models. Prerequisite: SOC 505 or instructor approval.

SOC 509 Social Statistics IIC: Event History Analysis. (3)

fall and spring

Proportional hazards models and other methods for analyzing longitudinal data and establishing hazard rates of events for exploratory variables. Prerequisite: SOC 505 (or its equivalent).

SOC 515 Studies of the Family. (3)*spring*

Current developments in the study of marriage and the family. Prerequisite: instructor approval.

SOC 585 Development of Sociology. (3)*fall*

Major sociological theorists, including Durkheim, Weber, Marx, Parsons, Merton, Dahrendorf, Homans, and Mead. Prerequisite: instructor approval.

SOC 586 Contemporary Sociological Theory. (3)*spring*

Analyzes major theories, including structural-functional, conflict, social exchange, symbolic interaction, and role theory. Prerequisite: instructor approval.

SOC 587 Contemporary Issues in Sociology. (3)*spring*

Philosophy of social science. Contemporary issues in sociological theory and methods. Prerequisite: instructor approval.

SOC 588 Methodological Issues in Sociology. (3)*spring*

Basic methodological issues in the application of scientific methods to the study of human social life. Emphasis on limited number of major works, with contrasting approaches to issues.

SOC 599 Thesis. (1–12)*not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Spanish

See “Languages and Literatures,” page 247.

Special Education

Master’s Programs

(ED 316) 480/965-4602
 cnigrad@asu.edu
 coe.asu.edu/coe/candi

PROFESSORS

RUTHERFORD, ZUCKER

ASSOCIATE PROFESSORS

COHN, Di GANGI, McCOY, NELSON

The faculty in the Division of Curriculum and Instruction Special Education Program offer graduate programs leading to the M.A. and Master of Education degrees. M.Ed. degree concentrations are available in the education of gifted, mildly handicapped, the multicultural exceptional, and severely/multiply handicapped.

ASU West also offers a Master of Education (M.Ed.) degree in Special Education. For more information about the ASU West program, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

At the Ph.D. level, a concentration in special education is offered through the interdisciplinary Ph.D. degree program in Curriculum and Instruction. See “Curriculum and Instruction,” page 174, for more information on the interdisciplinary Ph.D. in Curriculum and Instruction.

To be considered for admission, applicants must meet all Graduate College requirements. The applicant for master’s degree program admission is required to provide the following:

1. Graduate Record Examination test scores or Miller Analogies Test scores, or a 3.00 or higher junior/senior GPA;
2. three letters of recommendation;
3. a summary of professional experiences; and
4. evidence of certification in special education for applicants to the M.Ed. program. (The M.Ed. Initial Teacher Certification sequence must be pursued concurrently with the M.Ed. degree by applicants not meeting this requirement.)

MASTER OF ARTS

The M.A. program in Special Education requires at least 36 hours of course work. A thesis is required for the M.A. degree. Candidates are required to take an oral examination in defense of the thesis. For students in the M.Ed. or M.A. program lacking prerequisite courses, additional course work is required.

MASTER OF EDUCATION

The M.Ed. degree in Special Education requires a minimum of 36 semester hours of course work and a written comprehensive examination paper. The program structure includes a 12-hour methods core, a 12-hour knowledge core, and a 12-hour elective block which includes four content/theme areas: learning and instruction, diversity, foundations and values, and research and technology.

M.Ed. initial teacher certification sequences leading to standard certificates by the State of Arizona in mental retardation; and learning and emotional disabilities, as well as an endorsement in gifted education, are available.

Concurrent admission to the M.Ed. initial certification sequence and the M.Ed. degree is required. Students seeking initial certification by the State of Arizona in special education who have already completed a master’s degree in another area may enroll for the M.Ed. initial certification sequence without enrolling in a second master’s degree program. Contact the Office of Student Affairs for more information about specific admission requirements for the initial certification option. Further information is available in the Special Education Program Office.

RESEARCH ACTIVITY

Current faculty research activities include family-centered early identification of children with learning disabilities and behavior disorders; partnerships in the medical home; bilingual/English as a second language/special education; Arizona behavior initiative creating school environments that support high academic standards for all students; a crossover model of leadership preparation in special education; six interdisciplinary options; and education, disability, and juvenile justice.

SPECIAL EDUCATION (SPE)

SPE 411 Parent Involvement and Regulatory Issues. (3)

fall and spring

Emphasis on parent and school relations through effective communication and state and federal regulations impacting services for the handicapped. Prerequisite: PTPP admission.

SPE 455 Early Childhood and the Handicapped. (3)

fall

Early childhood education as it applies to the handicapped child.

SPE 510 Inclusionary Curriculum for Special Education Teachers. (3)

fall and summer

Curricular practices used in inclusion classrooms.

SPE 511 The Exceptional Child. (3)

fall, spring, summer

Educational needs of exceptional children and adults. Not recommended for students who have completed SPE 311.

SPE 512 Individuals with Mental Retardation. (3)

fall, spring, summer

Etiology, diagnosis, and management of individuals with mental retardation. Current trends in prevention, programming, and teacher preparation. Not recommended for students who have completed SPE 312.

SPE 514 Bilingual/Multicultural Aspects of Special Education. (3)

fall, spring, summer

Theories and issues related to the education of bilingual and culturally diverse exceptional children.

SPE 515 Methods for the Remediation of Learning Problems of Exceptional Children. (3)

spring

Methods and materials for remediating the basic academic problems of exceptional children. Prerequisites: SPE 511; methods course in the teaching of reading and mathematics.

SPE 522 Academic Assessment of Exceptional Children. (3)

fall

Normative and criterion-referenced assessment of learning problems in exceptional children. Includes formative evaluation. Requires practicum. Lecture, practicum. Prerequisites: SPE 311 (or 511); elementary methods courses; program approval.

SPE 523 Prescriptive Teaching with Exceptional Children. (3)

fall

Language, reading, and arithmetic methods, techniques, and materials used in individualized instruction. Requires practicum. Lecture, practicum. Prerequisites: SPE 311 (or 511); elementary methods courses; program approval. Pre- or corequisite: SPE 522.

SPE 524 Effective Classroom Behavior Management. (3)

spring

Organization and delivery of instruction including formative evaluation and techniques of academic behavior management for exceptional children. Requires practicum. Lecture, practicum. Prerequisites: SPE 311 (or 511), 522, 523; program approval.

SPE 525 Social Behavior Interventions. (3)

spring

Analysis and intervention into social behavior problems of exceptional students. Focuses on strategies to change maladaptive social behavior. Requires practicum. Prerequisites: SPE 311 (or 511 or 522 or 523); program approval.

SPE 531 Behavior Management Approaches with Exceptional Children. (3)

fall and summer

Behavior management approaches for classroom behavior of exceptional children. Prerequisite: SPE 511 (or its equivalent).

SPE 536 Characteristics of Children with Behavioral Disorders. (3)

fall, spring, summer

Variables contributing to behavior patterns of behaviorally disordered children.

SPE 551 Teaching Young Children with Special Needs. (3)

spring

Methods, materials, and curriculum for preschool and primary-aged children with special needs. Prerequisites: SPE 455 and 511 (or their equivalents).

SPE 552 Management of Individuals with Severe Handicaps. (3)

spring

Instruction and management of school-aged and adult individuals with severe, physical, or multiple handicaps. Prerequisites: SPE 511 (or its equivalent); instructor approval.

SPE 553 Developmental/Functional Assessment. (3)

fall

Teacher-focused developmental/functional assessment of preschool and severely, physically, and multiply handicapped individuals.

Requires field experience. Prerequisites: SPE 511 and 512 and 574 (or their equivalents).

SPE 554 The Parent/School Partnership. (3)

spring

Includes knowledge and procedures for involvement and training of parents and caregivers of preschool and severely handicapped individuals. Requires field experience. Prerequisites: SPE 455 and 511 (or their equivalents).

SPE 561 Characteristics/Diagnosis of Learning Disabilities. (3)

fall, spring, summer

Theories related to learning disabilities, including identification and characteristics.

SPE 562 Methods of Teaching Students with Learning Disabilities. (3)

not regularly offered

Various methods and intervention strategies for remediating learning disabilities of children and youth. Prerequisite: SPE 361 or 561.

SPE 574 Educational Evaluation of Exceptional Children. (3)

fall

Design and statistical considerations of normative and criterion-referenced tests. Collection, recording, and analysis of data from formative evaluation. Prerequisites: SPE 511 (or its equivalent); methods course in teaching reading and mathematics.

SPE 575 Current Issues in the Education of Exceptional Children. (3)

fall

Mainstreaming, noncategorical, financing, legal diagnostic, labeling, legislative, and other critical and controversial issues related to the education of exceptional children.

SPE 577 Mainstreaming Methods. (3)

spring

Addresses successful mainstreaming methods, practical problem-solving sessions related to teacher's classroom needs, and individual contracts focusing on mainstreaming issues. General educators encouraged.

SPE 578 Student Teaching in Special Education. (9–15)

fall and spring

"Y" grade only. Fee. Prerequisites: completion of specified courses; approval by the special education program coordinator.

SPE 582 Classroom Research with Exceptional Children. (3)

summer

Introduction to interpreting research. Specific research techniques with primary emphasis on classroom research, including applied behavior analysis.

SPE 585 Creativity: Research and Development. (3)

spring

Explores nature of creativity in terms of philosophical underpinnings, empirical evidence, human development, self-actualization, and the ecology surrounding the creative event.

SPE 586 Advising the Gifted Child. (3)

once a year

Focuses on educational planning and guidance, social and emotional development, and family problem solving regarding needs of gifted children.

SPE 587 Controversies in Educating the Gifted. (3)

fall

In-depth analysis of major controversies in educating the gifted, including nature/nurture, the role of mental tests, and sex differences.

SPE 588 The Gifted Child. (3)

fall and summer

Gifted children's characteristics, identification, needs, school and home environments, definitions, and misunderstandings. Research by Pressey, Stanley, Terman, and others.

SPE 589 Methods in Teaching the Gifted. (3)*spring and summer*

Methods in teaching elementary and secondary school gifted children, including individualized and computer-assisted instruction, team teaching. Prerequisite: SPE 588.

SPE 774 Characteristics and Causation of Exceptionality. (3)*fall*

In-depth analysis of literature pertaining to causes of exceptionality and learning, educational, personal-social, and cognitive characteristics. Lecture, discussion.

SPE 775 Evaluation and Intervention in Special Education. (3)*spring*

In-depth analysis of research and literature on evaluation procedures and intervention approaches for exceptional individuals at all age levels. Lecture, discussion.

SPE 781 Research and Evaluation in Special Education. (3)*spring*

Issues and problems in conducting research and/or evaluation programs involving exceptional children.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Speech and Hearing Science

Interdisciplinary Doctoral Program

Don Sinex

Director, Executive Committee

(CSB 273A) 480/965-9396

shsgrad@asu.edu

www.asu.edu/clas/shs

Bioengineering

Associate Professor: Kipke

English

Professor: Adams;

Associate Professor: Bates

Family and Human Development

Professor: Roosa

Psychology

Professors: Braun, Killeen, Somerville;

Associate Professor: Goldinger

Speech and Hearing Science

Professors: Bacon, Case, Dorman, Ingram, Wilcox;

Associate Professors: Liss, Sinex;

Assistant Professors: Azuma, Sharma

The committee on Speech and Hearing Science offers an interdisciplinary graduate program leading to the Ph.D. degree in Speech and Hearing Science.

The program is designed to prepare scholars for careers of basic and applied research in educational, industrial, or health care delivery environments. The student pursues a program with the unifying theme of the influence of the neurologic system on human communication and its disorders. After a core curriculum, which may include aspects of neuroscience, methodology, or speech and hearing science, the student completes a program of study under the guidance of the program committee. As part of the interdisciplinary doctoral program, a programmatic research experience prepares the student for basic or applied research leading to the dissertation.

DOCTOR OF PHILOSOPHY

See "Doctor of Philosophy," page 103, for general requirements.

Admission Requirements. Admission to the program is competitive; therefore, applications are considered only for fall admission. Applicants typically have completed a master's degree or equivalent in speech and hearing sciences, psychology, linguistics, or a related discipline. Applicants with a bachelor's degree and a strong research background are also considered.

Applicants must submit the following materials for admission review:

1. application for admission to the Graduate College and official transcripts of undergraduate and graduate study;
2. verbal, quantitative, and analytical scores of the Graduate Record Examination (GRE);
3. professional résumé;
4. a statement describing academic and professional goals, specifying the focus of study desired in the Ph.D. program; and
5. three letters of recommendation.

All applicants whose native language is not English must submit a score from the Test of English as a Foreign Language (TOEFL) and the Test of Spoken English (TSE). Expected minimum scores are 600 on the TOEFL and 230 on the TSE.

Application materials are reviewed beginning February 1. Applications are reviewed by a three-member interdisciplinary admissions committee. Recommendations for admission or denial are forwarded to the dean of the Graduate College. Criteria for admission include the following:

1. evidence of high scholarship and research potential from GRE scores and previous academic records;
2. professional goals compatible with the degree program; and
3. scholarly interests compatible with one or more of the faculty active in the interdisciplinary degree program.

Areas of Concentration. Eighteen semester hours are taken in an area of concentration that focuses on some aspect of human communication. The student's program committee guides selection of these courses.

Program Committee. The purpose of the program committee is to guide the student through the completion of the program of study, the initiation of programmatic research, and the comprehensive examination. The program committee consists of a chair and at least two other members appointed by the dean of the Graduate College upon recommendation of the director of the Committee on Speech and Hearing Science. The committee must consist of members from more than one academic discipline. Upon completion of the comprehensive examination, the student may initiate forming a dissertation committee.

Dissertation Committee. Upon completion of the comprehensive examination and based on the recommendation of the director of the Committee on Speech and Hearing Science, the dean of the Graduate College appoints the stu-

dent's dissertation committee consisting of a chair and at least two other members. The dissertation committee must consist of members from more than one academic discipline. This committee approves the design and implementation of the dissertation. Members of the program committee also may serve as members of the dissertation committee.

Preliminary Examination. The preliminary examination is composed minimally of the first-year research project. This project, to be completed by the end of the second semester of the first year, consists of an oral presentation and defense of the research, as well as a written manuscript. The program committee decides whether an optional written examination is necessary. The format of that examination is determined by the program committee and depends, in part, upon the background of the student. Results of the preliminary examination are used to determine shortcomings that should be offset by course electives, the level at which the student is capable of pursuing various topic areas, and whether deficiencies are of sufficient magnitude to preclude recommendation for continued doctoral study.

Research Methods and Statistics. The student is required to demonstrate proficiency in research methods (research design, statistics, computer languages). Evidence of required proficiency may be demonstrated by examination or by successful completion of a sequence of courses designated by the program committee.

Program of Study. The program consists of a minimum of 54 semester hours of graduate work beyond the master's degree or 84 semester hours of graduate work beyond the bachelor's degree. Of the required semester hours, at least 24 must be research (SHS 792) and dissertation (SHS 799) credit completed at ASU. A minimum of 30 hours of the approved Ph.D. program, exclusive of dissertation and research hours, must be completed after admission to the Ph.D. at ASU.

Comprehensive Examinations. Near the completion of course work and before commencing dissertation research, the student is given a written examination covering the field of study. The written examination, when passed, may be followed by an oral examination.

Programmatic Research. Twelve semester hours of programmatic research (SHS 792) are required before the dissertation prospectus meeting. The student must conduct several studies, each representing a facet of a research problem or a step toward a progressive solution. Each component study must be reviewed by the program committee and conducted in collaboration with a faculty member of the interdisciplinary degree program. This research program allows the doctoral student to use different methodologies in various component studies, to exercise progressively tighter experimental controls as determined by serial investigations, or to pursue significant or unexpected outcomes of a study.

This systematic or serial research program engages the student and faculty in an ongoing research activity, the components of which allow increasing discretion and independence of the student investigator. The program is designed to prepare students for careers in basic or applied research and enhance the quality of the dissertation research.

Research and Dissertation Proposals. (1) Before conducting the programmatic research, the student is advised by the program committee on the appropriateness of the planned research. (2) Before conducting the research for the dissertation, each student must submit a dissertation proposal that is defended orally and approved by the dissertation committee.

Dissertation Requirements. The dissertation must consist of a fully documented written product of mature and original scholarship. It must be a significant contribution to knowledge that reflects the student's creativity and competence in independent research.

Final Examinations. A final oral examination in defense of the dissertation, conducted by the dissertation committee, is required.

COURSES

For courses, see "Speech and Hearing Science (SHS)," page 157.

Statistics

Interdisciplinary Master's and Certificate Programs

Richard K. Burdick
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 www.asu.edu/graduate/statistics

Accountancy and Information Management

Associate Professor: St. Louis

Biology

Associate Professor: Carroll

Economics

Professors: Burdick, Mayer;
 Associate Professors: Reiser, Wilson

Industrial Engineering

Professors: Hubele, Keats, Montgomery, Runger

Mathematics

Professors: Lohr, Young;
 Associate Professors: Driscoll, Prewitt;
 Assistant Professor: Zuo

Supply Chain Management

Associate Professor: Brooks

The Committee on Statistics offers a program leading to a graduate Certificate in Statistics and the M.S. degree in Statistics. The program is interdisciplinary in the sense that it draws upon faculty research and teaching interests from a number of academic units so that programs of study can be tailored to reflect individual needs and goals. The committee, which sets program requirements and supervises programs of study, is composed of faculty from several departments in the College of Business, the College of Engineering and Applied Sciences, and the College of Liberal Arts and Sciences.

Certificate in Statistics. This certificate provides statistical training to graduate students at ASU and professionals in the metro-Phoenix area. The certificate requires 15 semester hours of course work selected from approved courses offered in graduate programs at ASU.

To enroll in the certificate program, the applicant must have a bachelor's degree, an introductory applied statistics course, and one semester of calculus. The applicant is also required to have some computer literacy with knowledge of either a programming language, a spreadsheet program, or a statistical software program.

For more information, access the Web site at www.asu.edu/graduate/statistics.

MASTER OF SCIENCE

The program for the M.S. degree in Statistics provides preparation for either a research-oriented or a practice-oriented career. Requirements specific to this program (see "Master's Degrees," page 100, for general requirements) ensure balanced attention to the theoretical and applied aspects of the discipline of statistics. Flexibility in the program reflects the fact that statistical analysis is one of the most widely used tools of modern scientific reasoning.

Admission. Applicants must satisfy the general requirements for admission to the Graduate College (see "Admission to the Graduate College," page 92) and must, in addition, have three letters of academic recommendation submitted to the admissions subcommittee of the Committee on Statistics. Although most applicants earn the bachelor's degree in a quantitative area (such as statistics, quantitative business analysis, mathematics, engineering, or computer science), this is not required for admission to the program.

Applicants should have completed the following courses (equivalents at ASU are given in parentheses): calculus (MAT 270, 271, and 272), advanced calculus (MAT 371), linear algebra (MAT 342), computer programming (CSE 100 or 183), and introductory applied statistics (QBA 221 or STP 420). Applicants who lack more than two of these seven prerequisite courses should expect to be admitted with deficiencies or provisionally. The submission of the Graduate Management Admission Test or Graduate Record Examination test scores is strongly recommended.

Supervisory Committee. Upon entering the program, the student should contact the program director for assistance in selecting a three-member supervisory committee. (Typically, the student progress subcommittee of the Committee on Statistics serves as the student's initial supervisory committee.) The faculty member who directs the student's work on the thesis or applied project must be a member of the Committee on Statistics and serves as the chair of the student's final supervisory committee.

Program of Study. The student's program of study must contain at least 30 semester hours of credit, none of which may be from the prerequisites and at least 18 of which must be at or above the 500 level. The program must include the nine hours from three required theory courses: theory of probability (STP 421), mathematical statistics (STP 427), and theory of statistical linear models (STP 526). The program must also include either three hours of applied project

(IEE 593, QBA 593, or STP 593) or six hours of thesis (IEE 599, QBA 599, or STP 599).

The remaining 15 or 18 hours may come from elective courses chosen by the student with the approval of supervising faculty. A maximum of six hours may be chosen from a related field on which statistics relies (such as computer science) or in which statistics is an essential tool (e.g., biostatistics, quality control).

The required theory courses are fundamental to the education of statisticians and are necessary for more advanced graduate study. The elective courses allow the student to emphasize a particular area of statistical inference, culminating in an applied project report or a thesis on a topic in that area. The student has considerable flexibility in selecting an area of specialty. Possible areas of specialty include, among others, mathematical statistics, biostatistics, applied data analysis, design of experiments, statistical modeling, time series analysis, statistical process control, variance components analysis, statistical computing, and survey research. Sample programs of study for such areas of specialty may be obtained from the director of the program.

Foreign Language Requirements. None.

Comprehensive Examinations. None.

Thesis Requirements. Either an applied project or a thesis is required.

Final Examinations. An oral examination in defense of the applied project or thesis is required. The content of the applied project report or thesis must, in its final form, be suitable for submission to an academic journal or conference proceedings. The thesis must conform to Graduate College format requirements.

RESEARCH ACTIVITY

Research interests of current members of the Committee on Statistics include the following: nonparametric regression, variance components, generalized linear models; multivariate analysis, latent structure models, categorical data analysis; biostatistics, biomedical research; time series analysis and forecasting, econometrics, statistical process control, statistical decision support systems; statistical computing, statistical graphics; panel data analysis, complex sampling designs; decision-theoretic methods, risk assessment, robust statistical methods; design of experiments; process optimization; and response surface methodology. Students and faculty have access to excellent computing facilities, including servers, work stations, and personal computers running a broad selection of statistical software.

COURSES

For courses, see "Industrial Engineering (IEE), page 241, "Quantitative Business Analysis (QBA)," page 140, and "Statistics and Probability (STP)," page 263.

Taxation

Master's Program

Philip M.J. Reckers

Director

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www.cob.asu.edu/acct/graduate/prospective/mtax/index.cfm

PROFESSORS

J.R. BOATSMAN, BOYD, GOUL, JOHNSON, KAPLAN, PANY, PEI, PHILIPPAKIS, RECKERS, ROY, SCHULTZ, SMITH, STEINBART, VINZE, WYNDELTS

ASSOCIATE PROFESSORS

CHRISTIAN, GOLEN, GUPTA, HWANG, KEIM, KULKARNI, MOECKEL, O'DELL, O'LEARY, REGIER, ST. LOUIS, WHITECOTTON

ASSISTANT PROFESSORS

BHATTACHERJEE, CHEN, CHENOWETH, COMPRIX, DAVID, DOWLING, IYER, O'DONNELL, ROBINSON, SANTANAM, SHAO, WEISS

SENIOR LECTURERS

MacCRACKEN, SHREDNICK

LECTURERS

BALOGH, J.L. BOATSMAN, GEIGER, HAYES, TAYLOR

MASTER OF TAXATION

The faculty in the School of Accountancy and Information Management offer specialized professional programs leading to the Master of Taxation, Master of Accountancy and Information Systems (see "Accountancy and Information Systems," page 105), and Master of Science in Information Management, (see "Information Management," page 182) degrees. The M.Tax. degree is a specialized program providing students with skills required to succeed in careers in public accounting (consulting), as well as corporate accounting.

The faculty also participate in offering the program leading to the Master of Business Administration degree (see "Master of Business Administration," page 137) and Ph.D. degree in Business Administration (see "Doctor of Philosophy," page 137).

For more information on faculty, programs, and courses, visit the school's Web site www.cob.asu.edu/acct/graduate/prospective/mtax/index.cfm

Admission. All applicants are required to submit the supplemental application materials required from the school. A complete advising guide and application packet may be obtained from the school's Web site.

Students applying to this program must submit scores from the Graduate Management Admission Test (GMAT). International applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL) and the Test of Spoken English (TSE) exams. Preference in admission is given to those with

degrees in accounting and business, although other exceptional candidates are considered.

Prerequisites. Visit the School of Accountancy and Information Management's Web site for a current list of the program prerequisites.

Program of Study. The program of study consists of a minimum of 30 semester hours and is continually updated. The program of study must include a minimum of 15 semester hours of credit in graduate-level accounting courses and a minimum of 24 semester hours of resident credit in courses open exclusively to graduate students. A maximum of six hours may be taken outside the College of Business. Visit the school's Web site for a current program of study.

Course Load. Students are limited to 12 hours per trimester.

Foreign Language Requirements. None.

Thesis Requirements. None.

Final Examinations. A final comprehensive written examination is required of all candidates.

RESEARCH ACTIVITY

For current information about research activity, access the School of Accountancy and Information Management Web site at www.cob.asu.edu/acct and see "Publications and Working Papers."

COURSES

For courses, see "Accountancy (ACC)," page 106.

Teaching English as a Second Language

Master's Program

Roy C. Major

Director

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www.asu.edu/clas/english/linguistics

PROFESSORS

ADAMS, MAJOR, NILSEN

ASSOCIATE PROFESSORS

BATES, VAN GELDEREN

ASSISTANT PROFESSOR

JOHNSON

The faculty in the Department of English offer a professional program leading to the Master of Teaching English as a Second Language degree (M.TESL). The M.TESL degree is a specialized program providing students with the knowledge and the skills necessary to teach English as a second language.

Admission Requirements. All applicants must meet the general requirements for admission to the Graduate College (see "Admission to the Graduate College," page 92). International students must submit a TOEFL score of at least 580.

Program of Study. The program requires a minimum of 30 hours of approved graduate course work and must include LIN 500 Research Methods: Linguistics, LIN 510 English Linguistics, LIN 572 Theories Underlying the Acquisition of English as a Second Language, LIN 574 The Teaching of English as a Second Language, and a three-hour applied project (LIN 593) overseen by the supervisory committee.

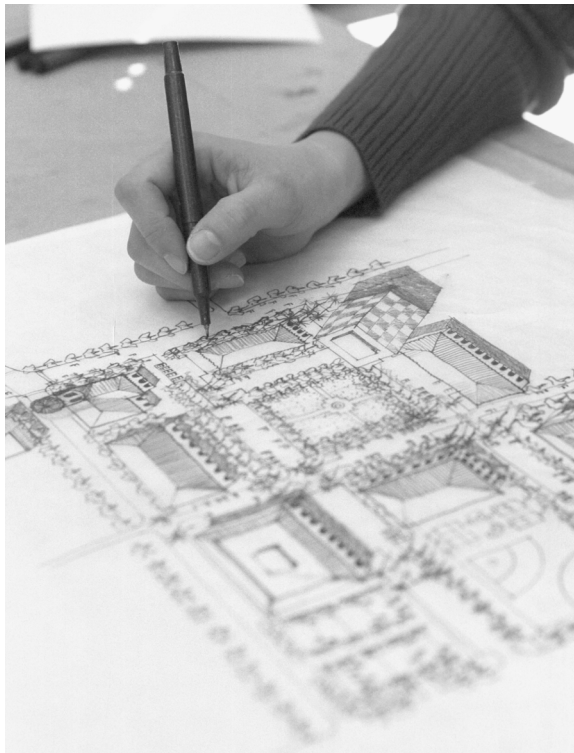
Foreign Language Requirements. A foreign language is required. International students whose native language is not English may fulfill the foreign language requirement by (1) providing evidence that English is not the medium of instruction at their native-language universities and (2) satisfactory completion of the TSE.

Applied Project. A three-hour applied project (LIN 593) which is overseen by the director, chosen from the English department linguistics/TESL faculty, is required. Two additional faculty members serve with the director to form a committee for the final oral examination on the project.

Final Examinations. An oral examination on the applied project is required.

COURSES

For courses, see "Linguistics (LIN)," page 206.



A student creates plans at the Urban Design Center

Tim Trumble photo

Technology

Master's Programs

Department of Aeronautical Management Technology

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Department of Electronics and Computer Engineering Technology

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Department of Manufacturing and Aeronautical Engineering Technology

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Aeronautical Management Technology

Professor: Gesell;
 Associate Professors: Jackson, McCurry, Turney;
 Assistant Professors: Karp, Pearson;
 Lecturer: O'Brien

Electronics and Computer Engineering Technology

Professors: Lindquist, McHenry, Munukutla;
 Associate Professors: Abuelyaman, Macia,
 Sundararajan, Zeng;
 Assistant Professors: Lipari, Peterson

Information and Management Technology

Professors: Duff, Hild, Sadowski, Schildgen;
 Associate Professors: Grossman, Hirata, Humble,
 Matson, Olson;
 Senior Lecturer: Wilson;
 Lecturer: Dolin

Manufacturing and Aeronautical Engineering Technology

Professor: Collins;
 Associate Professors: Danielson, Palmgren, Rajadas
 Rogers, Schmidt

The Master of Science in Technology (M.S.Tech.) degree program is offered by the faculty in four departments of the

College of Technology and Applied Sciences: Aeronautical Management Technology, Electronics and Computer Engineering Technology, Information and Management Technology, and Manufacturing and Aeronautical Engineering Technology. Courses are offered at ASU East. Both a thesis and applied project option are available.

The professional programs leading to the M.S.Tech. degree are intended as preparation for a career in a selected branch of technology or as the foundation for further advanced study. Graduates of this program are provided with technical and professional skills for use in leadership positions in industry and education.

Faculty members administering the program have been selected because of relevant backgrounds in industry and business along with their academic training and teaching experience.

Admission. Admission to the degree program requires the completion of all general admission requirements and procedures set forth by the Graduate College. The College of Technology and Applied Sciences also requires an appropriate baccalaureate degree from an accredited college or university, with a minimum of 30 semester hours in technology or equivalent and 16 hours of physical science and mathematics appropriate to the program pursued. The specific requirements vary within each department.

Graduate work presupposes an adequate technical preparation in a selected technology at the undergraduate level. Deficiencies for admission to the graduate program, if any, are specified at the time of admission. The applicant's past work and professional experience is also evaluated and taken into consideration when determining admission classification.

To be considered for regular admission, a 3.00 GPA is required.

Program of Study. The program of study is designed to promote greater depth of understanding and preparation in technology as it can be applied to industry and education. The program of study is planned in consultation with an appointed supervisory committee. It is designed for flexibility, permitting the student to select a combination of courses in a technological area and a supporting area to meet individual career goals.

A minimum of 33 semester hours is required for the degree program. Of these, a minimum of 15 semester hours must be 500-level courses and part of the approved program. Specific credit requirements vary within each department. The minimum requirements are as follows:

Thesis Option

Technical area of emphasis	18
Supporting area	6
Research course	3
Research	6
<hr/>	<hr/>
Total	33

Applied Project Option

Technical area of emphasis	18
Supporting area	9
Research course	3
Research	3
<hr/>	<hr/>
Total	33

A maximum of nine semester hours of appropriate course work completed before admission may be included in the program of study for the degree program.

A master's degree candidate forms a supervisory committee, the chair of which is from one of the four technology departments within the College of Technology and Applied Sciences. The chair and the committee members assist the student in selecting appropriate courses to meet the degree requirements and the student's goals. Specific program patterns are approved by the committee.

The Department of Aeronautical Management Technology provides students the opportunity to select courses, to be included in the technical area of their program of study, in aviation management technology and aviation human factors.

The Department of Electronics and Computer Engineering Technology offers concentrations in computer systems engineering technology, electronics systems engineering technology, instrumentation and measurement technology, microelectronics engineering technology, and instrumentation and measurement technology.

The Department of Information and Management Technology provides students the opportunity to study environmental technology management, fire service administration, information technology, and management of technology.

The Department of Manufacturing and Aeronautical Engineering Technology offers concentrations in aeronautical engineering technology, manufacturing engineering technology, mechanical engineering technology, and security technology.

The College of Technology and Applied Sciences offers a concentration in global technology and development (GTD). This concentration gives students a comprehensive understanding of technological systems, how they interface with society, and their role in global development and change. The GTD concentration integrates the study of economic, social, and political development with technology course work to explore issues critical to 21st-century globalization and the role and impact of technological innovations on societies around the world. Students completing the GTD concentration will gain the knowledge and skills to become "technology interpreters" for careers in technology-related public policy, government service, international development, and international management.

The GTD concentration consists of two seminars: global technology and development and technology and the international political system. It also includes one core course in each of the four GTD technology content areas: telecommunications, transportation, commerce, and sustainable development. Students may select elective courses from a wide range of topics in social science and/or technology to create their own individualized specialization. An emphasis is placed on the acquisition of solid research skills with a required sequence in applied research methodologies and tools. A minimum of 33 semester hours is required (24 of which must be at the 500 level or above), including an applied project or thesis. The exact program of study, including elective courses leading to an area of specialization, and the applied project or thesis, is planned in consultation with a faculty advisor from the GTD faculty committee.

Final Examination. A final oral examination in defense of the applied project or thesis is required.

COURSES

For courses, refer to the departmental listings that follow.

Department of Aeronautical Management Technology

Admission. Applicants are expected to satisfy all requirements for admission to the Graduate College. Industrial experience beyond completion of a baccalaureate degree is strongly recommended. Applicants having deficiencies or not meeting the prerequisites may be required to complete them before being admitted to the M.S.Tech. degree program.

Program of Study. All candidates for the degree program are required to complete a minimum of 33 semester hours of approved courses. Additional courses may be assigned by the supervisory committee depending on the background of the candidate.

An applied project or thesis is required. Upon completion of the approved course of study or during the last semester, an oral defense of the applied project or thesis is required.

The program is designed for flexibility, permitting the student to select a combination of courses in a technical area and supporting area to meet individual goals.

Students may take courses in two areas of interest: aviation management and aviation human factors. Students will work with a faculty advisor to define specific courses that satisfy degree requirements.

Final Examinations. A final oral examination in defense of the applied or research project is required.

RESEARCH ACTIVITY

The Department of Aeronautical Management Technology has established a broad research agenda including both technical and management disciplines. Current research initiatives include: aviation education and training; human factors in aviation; aviation physiology; hypobarics; hyperbarics; retention of women in aviation; air traffic control enhancement; runway incursion analyses; human factors in aviation maintenance; and the development of broad-based industrial partnerships through teaming arrangements, internships, and capstone course participation.

AERONAUTICAL MANAGEMENT TECHNOLOGY (AMT)

AMT Note 1. Flight instruction costs are not included in university tuition and fees.

AMT 400 Flight Safety IV. (1)

fall, spring, summer

Multiengine and crew training and safety briefings. Continuous enrollment required until completion of rating and multicrew training. Lecture, lab. Fee. See AMT Note 1. Prerequisite: AMT 300. Pre- or corequisite: AMT 387.

AMT 408 National Aviation Policy. (3)

fall

Examination of aviation and airspace policies and policy process, including agencies involved in formulation, implementation, and evaluation of aviation policy. Prerequisite: AMT 308.

AMT 409 Nondestructive Testing and Quality Assurance. (1)

not regularly offered

Purpose of inspection and quality assurance. Theory and application of nondestructive inspection methods. Application of pertinent standards, specifications, and codes. Lecture, lab. Cross-listed as AET 409. Credit is allowed for only AET 409 or AMT 409. See AMT Note 1. Prerequisite: AMT 280 or MET 230.

AMT 410 Aviation Safety and Human Factors. (3)

fall

Aviation accident prevention, human factors, life support, fire prevention, accident investigation, and crash survivability. Development and analysis of aviation safety programs. Prerequisites: junior standing; completion of 1 semester of General Studies L requirement.

AMT 442 Aviation Law/Regulations. (3)

fall

Aviation within context of U.S. Common Law system. Public law, administrative rule making, sovereignty, enforcement, and case law analysis. Prerequisite: junior standing.

AMT 444 Airport Management and Planning. (3)

spring

Orientation to administration and management of modern public airports, including overview of planning, funding, and development of airport facilities. Prerequisite: AMT 308.

AMT 482 Airline Instrument Procedures. (3)

fall

Advanced instrument flight using airline instrument procedures and airline crew and cockpit resource management. Lecture, lab. Prerequisites: AMT 322, 382.

AMT 484 Aeronautical Internship. (1–12)

fall, spring, summer

Work experience assignment with aerospace industry commensurate with student's program. Special project guidance by industry with university supervision. Prerequisites: advisor approval; junior standing.

AMT 489 Airline Administration. (3)

spring

Administrative organizations, economics of airline administration, operational structure, and relationship with federal government agencies. Prerequisites: AMT 308; instructor approval.

AMT 491 Aviation Management Capstone. (3)

spring

Integration and overview of management tools, current business problems and topics related to aviation industry. Group project with industry and government and business partners. Prerequisite: senior standing.

AMT 496 Airline Aircraft Systems Capstone. (3)

spring

Commercial airline aircraft systems and flight procedures. Includes theoretical education for large, commercial passenger aircraft. Lecture, lab. Prerequisite: senior standing.

AMT 521 Air Transportation Regulation. (3)

not regularly offered

Reviews evolutionary history of government regulations. Explores alternatives for economic, safety, social, and administrative regulatory reform in air transportation. Prerequisite: AMT 444 or 489 (or its equivalent).

AMT 523 Aviation Systems Management. (3)

not regularly offered

Systems theory applied to intermodal transportation networks. Survey of air and ground transportation infrastructure, institutional frameworks, and intermediaries promoting connections between modes. Prerequisite: AMT 444 or 489 (or its equivalent).

AMT 525 Airport Planning and Design. (3)

not regularly offered

Students complete various phases of airport master planning process. Provides guidance for logical and timely development of airports. Project work groups assigned. Prerequisite: AMT 444 or 489 (or its equivalent).

AMT 527 Airline Management Strategies. (3)

not regularly offered

Since deregulation, airlines have undergone profound changes through mergers, consolidation, and acquisition. In-depth look at airline management strategies for the 21st century. Prerequisite: AMT 444 or 489 (or its equivalent).

AMT 528 International Aviation. (3)

not regularly offered

Major issues of international aviation, historical review of institutional framework. Bilateral route agreements, freedom versus sovereignty, current legal and political arrangements. Prerequisite: AMT 444 or 489 (or its equivalent).

AMT 529 Fixed-Base Operations Management. (3)*not regularly offered*

Examination of FBO role in the national aviation system. Organization of flight line operations, aircraft maintenance, and administration for multiple aircraft types. Prerequisite: AMT 444 or 489 (or its equivalent).

AMT 541 Aviation Physiology. (3)*not regularly offered*

Survey of human physiology and human performance principles related to modern aircraft and aircraft systems operating in multiple environments. Prerequisite: AMT 410 (or its equivalent).

AMT 543 Ergonomics in High-Technology Environments. (3)*not regularly offered*

Examination of ergonomic design principles regarding man-machine interface requirements of high-technology workstations. Emphasis on computer workstation design issues. Prerequisite: AMT 410 (or its equivalent).

AMT 545 Human Factors in Aviation. (3)*not regularly offered*

Overview of human role in aviation. Issues, problems of unsafe acts and attitudes in human behavior. Human engineering capabilities and limitations. Prerequisite: AMT 410 (or its equivalent).

AMT 546 Crew Resource Management/Line-Oriented Flight Training. (3)*not regularly offered*

Evaluation of in-depth, multicrew coordination issues for commercial aviation pilots. Stresses importance of critical thinking, decision making, integrated resource utilization. Prerequisite: AMT 410 (or its equivalent).

AMT 547 Modern Human Factors Design Issues. (3)*not regularly offered*

Research and discussion of current human factors issues. State-of-the-art analyses of information regarding rapidly evolving designs and applications. Prerequisite: AMT 410 (or its equivalent).

AMT 549 Human Factors Research. (3)*not regularly offered*

Aviation human factors research principles applied and tested in operational settings. Group projects assigned in conjunction with industry partners. Prerequisite: AMT 410 (or its equivalent).

AMT 580 Practicum. (1–12)*not regularly offered***AMT 584 Internship. (1–12)***not regularly offered***AMT 590 Reading and Conference. (1–12)***not regularly offered***AMT 591 Seminar. (1–12)***not regularly offered***AMT 592 Research. (1–12)***not regularly offered***AMT 593 Applied Project. (1–12)***not regularly offered***AMT 595 Continuing Registration. (1)***not regularly offered***AMT 598 Special Topics. (1–4)***not regularly offered***AMT 599 Thesis. (1–12)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Department of Electronics and Computer Engineering Technology

The faculty in the Department of Electronics and Computer Engineering Technology offer a graduate program leading to the M.S.Tech. Four concentrations are available: computer systems engineering technology, electronics systems engineering technology, instrumentation and measurement technology, and microelectronics engineering technology. The instrumentation and measurement technology concentration is offered in conjunction with the Department

of Manufacturing and Aeronautical Engineering Technology.

Admission and Proficiency Requirements. For general admission requirements, see “Admission to the Graduate College,” page 92, and “Technology,” page 323. Admission and proficiency requirements and course work may be obtained from the department.

Program of Study. The minimum requirements for the M.S.Tech. degree offered by the Department of Electronics and Computer Engineering Technology are as follows:

Thesis Option

Concentration	15–17
Supporting area	7–9

Research Methods Courses

EET 500 Research/Writing	2
EET 591 Graduate Seminar	1
EET 592 Research	3
EET 599 Thesis	3

Total minimum semester hours	33
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A minimum of 20 semester hours must be 500-level courses. At least nine hours of 500-level course work must be included in the concentration. Students may take up to 12 semester hours of 400-level course work to broaden their technical knowledge within the technical concentration or the supporting area. Students are required to complete EET 592 (three semester hours) and EET 599 (three semester hours), write a thesis, and present an oral defense.

Applied Project Option

Concentration	15–18
Supporting area	9–12

Research Methods Courses

EET 500 Research/Writing	2
EET 591 Graduate Seminar	1
EET 593 Applied Project	3

Total minimum semester hours	33
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A minimum of 20 semester hours must be 500-level courses. At least nine hours of 500-level course work must be included in the technical concentration. A maximum of three semester hours of applied project (EET 593) may be applied toward the 20 semester hour 500-level minimum. The applied project requires a supporting report; the project and report are defended in a final oral examination. All course work applied toward the minimum 33 semester hour total must be at the 400 level or higher.

All course work outside the Department of Electronics and Computer Engineering Technology must be preapproved. Completion of deficiencies or prerequisites may be required before admission to the M.S.Tech. degree program.

For more information concerning the M.S.Tech. degree, see “Technology,” page 323.

RESEARCH ACTIVITY

Research activities in the Department of Electronics and Computer Engineering Technology include systems, circuit applications, and hardware design. Teaching and research are conducted in microelectronics fabrication, utilizing the clean-room facilities of the College of Technology and Applied Sciences Teaching Factory. Various aspects of computer systems are under investigation within the department,

such as networking, internet activities, distributed Web-based software applications, and embedded systems. Electronic systems and telecommunications are also topics of research by department faculty and graduate students. M.S.Tech. degree candidates will find a broad range of research that can lead to an applied project or thesis. For more information on research areas and laboratories, access the department's Web site at www.east.asu.edu/ctas/ecet.

Faculty research interests are concentrated in, but not limited to, the following general areas and topics.

Computers and Digital Systems. Digital systems design and applications; digital switching circuits; microcomputer hardware, programming, interfacing, and software systems development and application; computer process control hardware, techniques, and applications; computer networks; digital testing; distributed applications and software frameworks to support them; databases; embedded systems; wireless systems and their software; computer process control hardware, techniques, and applications; client-server models and reconfigurable computers.

Engineering Technology Education. Studies emphasizing curriculum and laboratory design and development in electronics, computers, telecommunications, and microelectronics engineering technology at the bachelor's and master's levels; studies involving faculty, student, administrative, and graduate characteristics; industry unitization and manpower needs; program curriculum and math-science articulation requirements and characteristics; characteristics of excellence in engineering technology education; computerized educational design.

Microelectronics. Solid-state device fabrication, testing, and design; monolithic bipolar and MOS and thin-film/thick-film hybrid circuit fabrication and manufacturing techniques; vacuum vapor deposition and sputtering techniques and applications; new photolithography processes; device and system packaging; new hybrid materials and processing techniques.

Systems Control and Instrumentation. Electrical power equipment and systems, insulator testing, control and distribution; direct solar energy conversion; analog and digital process control components, instrumentation, systems, and process applications; electronic measurements and instrumentation circuits, systems, and applications; automatic test systems, test programming, and failure tolerant design; computer-aided design; analog and digital simulation.

COMPUTER ENGINEERING TECHNOLOGY (CET)

CET 400 Software Engineering Technology. (3)

spring

Software life-cycle models; project management; team development environments; software specification, design, implementation techniques and tools, validation, and maintenance; user documentation. Prerequisite: senior standing in Technology.

CET 401 Digital Signal Processing for Multimedia. (3)

fall

Application of DSP techniques to multimedia. Digital filter analysis and design. Time and frequency techniques. Computer applications. Cross-listed as EET 401. Credit is allowed for only CET 401 or EET 401. Prerequisites: EET 301; MAT 262.

CET 425 Server Software Programming. (3)

once a year

Design and implementation of software servers, threaded socket servers, servers for distributed Web-based applications; security for the Web. Prerequisite: CET 300 or instructor approval.

CET 426 Software Tools for the Semiconductor Industry. (3)

spring

Introduction to software tools commonly used in the semiconductor industry, such as SUPREM IV, PSPICE, VIEWLOGIC, and ICED. Cross-listed as UET 426. Credit is allowed for only CET 426 or UET 426. Prerequisite: UET 331.

CET 427 Distributed Objects with Java and CORBA. (3)

spring

Managing network objects with RMI and CORBA; frameworks for naming, discovering, and invocation, such as JNDI, JINI, and JavaSpaces. Prerequisite: CET 300 or instructor approval.

CET 428 Web-Client User Interface Programming. (3)

fall

Client-server model for window interfaces. Java Swing, Applets, markup and scripting languages; Web tools and related technologies. Prerequisite: CET 300 or instructor approval.

CET 433 Database Technology. (3)

fall

Introduction to database technologies and DBMS, data models, and languages. Prerequisites: CET 230, 300.

CET 436 Applications of Visual BASIC. (3)

fall

Applications of Visual BASIC to graphics, graphical user interfaces, error handling, file processing, OO programming, DBMS, networking, and multimedia. Prerequisite: CET 236.

CET 450 Advanced Internetworking Technologies. (3)

spring

Effects and benefits, design and functions of internetworking protocols. Prepares students for the Cisco certification examination. Prerequisite: CET 250.

CET 452 Digital Logic Applications. (4)

spring

Design of sequential machines using system design techniques and complex MSI/LSI devices with lab. Prerequisite: CET 350.

CET 454 Microcontrollers. (3)

spring

Microcontroller input/output ports and advanced features. Microcontrollers as an embedded system and their interfacing considerations. Prerequisites: CET 350, 354.

CET 456 Assembly Language Applications. (3)

fall

Programming using BIOS and DOS routines. High-level language interfacing. Disk operations, TSR routines, and device drivers. Prerequisite: CET 354.

CET 457 Microcomputer Systems Interfacing. (4)

spring

Applications of microcomputer hardware and software. Special purpose controllers, interface design. Lecture, lab. Prerequisites: CET 354; CSE 183; EET 310.

CET 458 Digital Computer Networks. (3)

once a year

Network technology, topologies, protocols, control techniques, reliability, and security. Prerequisite: CET 354.

CET 473 Digital/Data Communications. (4)

fall

Signals, distortion, noise, and error detection/correction. Transmission and systems design. Interface techniques and standards. Lecture, lab. Prerequisites: CET 354; EET 372.

CET 483 UNIX with C Applications. (3)

fall

Generate user proficiency in the use of the UNIX operating system, its shells, environment, and 4th generation language and tools. Prerequisite: senior standing in the ECET department (or its equivalent).

CET 485 Digital Testing Techniques I. (3)

once a year

Hardware/software aspects of digital testing technology; systems, board, and logic testing and equipment. Lecture, lab. Cross-listed as UET 485. Credit is allowed for only CET 485 or UET 485. Prerequisites: CET 350; EET 310.

CET 486 Hardware Description Languages: VHDL. (3)

spring

Introduction to hardware description languages using VHDL. Techniques for modeling and simulating small digital systems using a VHDL simulator. Prerequisites: CET 350, 483.

CET 487 Hardware Description Languages: VERILOG. (3)*fall*

Introduction to hardware description languages, digital modeling, and simulation techniques using the VERILOG HDL. Prerequisites: CET 350, 354.

CET 488 UNIX Systems Administration. (3)*fall*

Generate user proficiency in administration of UNIX operating system, its processes, system calls, kernel, file structure, and interprocess communication tools. Prerequisites: CET 483 (or its equivalent); C or C++ language.

CET 489 Network Programming Applications. (3)*fall*

Generate user proficiency in writing C programs and scripts to control and administer a UNIX operating system network. Prerequisites: CET 473 and 488 (or their equivalents); C or C++ language.

CET 494 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) Computer Project

CET 501 Digital Signal Processing Applications. (3)*fall*

Application of DSP techniques to the design and analysis of digital filters. Solution of filtering problems using computer techniques. Cross-listed as EET 501. Credit is allowed for only CET 501 or EET 501. Prerequisite: EET 401 or instructor approval.

CET 520 Computer Architecture. (3)*fall*

Basics of computer architecture. RTN, RISC, CISC concepts; computer arithmetic; ALUs; memory systems; I/O. Prerequisite: CET 354.

CET 533 Database Management Systems. (3)*fall*

Systems aspects of relational databases: relational database design, index and access structures, implementation and performance evaluation, query processing and optimization. Prerequisite: CET 433.

CET 546 Computer Vision. (3)*spring*

Image segmentation and enhancement. Object recognition and modeling. Morphological operation for object recognition and measurement. Prerequisite: CET 300.

CET 552 Digital Systems Design. (3)*spring*

Digital system design techniques and applications. Prerequisite: CET 452 or instructor approval.

CET 554 Distributed Computing. (3)*spring*

Topics in distributed systems, including communications, distributed operating systems, fault-tolerance, and performance issues. Prerequisites: CET 354, 386.

CET 556 Windows Programming. (3)*fall*

Programming techniques in the MS Windows and X Window environments. Prerequisite: CET 256 (or its equivalent).

CET 557 Microcomputers and Applications. (3)*fall*

Applications of small computer systems, mini- and microcomputer hardware and software. Prerequisites: CET 354; CSE 100 (or 183); EET 310.

CET 566 Principles and Practices of Operating Systems. (3)*spring*

Principles and practices of operating systems: virtual memory systems, I/O devices and systems, file systems and organization, and other topics. Prerequisite: CET 386.

CET 576 Embedded Real-Time Programming. (3)*fall*

Topics in real-time embedded operating systems such as synchronization, communications, file systems, and memory sharing. Prerequisites: CET 300, 386.

CET 580 Practicum. (1–12)*not regularly offered***CET 583 Network Programming. (3)***fall*

Generate user proficiency in writing C programs and scripts to control and administer a UNIX operating system network. Prerequisites: CET 473 and 488 (or their equivalents); C or C++ language.

CET 584 Internship. (1–12)*not regularly offered***CET 585 Digital Testing Techniques II. (3)***fall*

Testing technology as applied to digital systems, boards, and chips. Lecture, lab. Prerequisite: CET 354.

CET 586 Digital Modeling Techniques. (3)*spring*

Digital system modeling and simulation using hardware description languages. Prerequisites: CET 350, 354.

CET 590 Reading and Conference. (1–12)*not regularly offered***CET 591 Seminar. (1–12)***not regularly offered***CET 592 Research. (1–12)***not regularly offered***CET 593 Applied Project. (1–12)***not regularly offered***CET 594 Conference and Workshop. (1–12)***not regularly offered***CET 595 Continuing Registration. (1)***not regularly offered***CET 598 Special Topics. (1–4)***not regularly offered***CET 599 Thesis. (1–12)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

ELECTRONICS ENGINEERING TECHNOLOGY (EET)**EET 401 Digital Signal Processing for Multimedia. (3)***fall*

Application of DSP techniques to multimedia. Digital filter analysis and design. Time and frequency techniques. Computer applications. Cross-listed as CET 401. Credit is allowed for only CET 401 or EET 401. Prerequisites: EET 301; MAT 262.

EET 406 Control System Technology. (4)*spring*

Control system components, analysis of feedback control systems, stability, performance, and application. Lecture, lab, computer simulations. Prerequisites: EET 301; MAT 262.

EET 407 Energy Conversion and Applications. (4)*fall*

Electricity, magnetism, mechanics, heat and units, and three-phase circuits. Electrical machines, transformers, generation, transmission, and distribution of electrical energy. Lecture, lab. Prerequisite: EET 208.

EET 410 Electronic Circuits II. (3)*fall and spring*

Analysis and design of OP-amps, power amplifiers, and digital logic families. Feedback design using frequency response. Computer analysis and design. Prerequisites: EET 301, 310.

EET 422 Electronic Switching Circuits. (4)*once a year*

Analysis and design of electronic circuits operating in a switching mode. Waveshaping, timing, and logic. Computer simulation. Lecture, lab. Prerequisites: CET 350; EET 301, 310.

EET 430 Instrumentation Systems. (4)*fall*

Measurement principles and instrumentation, techniques. Signal and error analysis. Lecture, lab. Prerequisites: EET 301, 310.

EET 460 Power Electronics. (4)*spring*

Analysis of circuits for control and conversion of electrical power and energy. Lecture, lab. Prerequisites: EET 301, 310, 407.

EET 470 Communication Circuits. (4)*spring*

Analysis and design of passive and active communication circuits. Coupling networks, filters, and impedance matching. Modulation and demodulation techniques. Computer solutions. Lecture, lab. Prerequisites: EET 372; MAT 262.

EET 478 Fiber Optic Communications. (3)*spring*

Fiber optic communication systems analysis and design. Study of fiber optic waveguides, light sources, light detectors, noisy light signal detection. Prerequisites: EET 372; MAT 262.

EET 500 Research/Writing. (2)*fall and spring*

Designed to help master's students develop their projects and write the first three chapters of their projects. Lecture, seminar. Prerequisite: instructor approval.

EET 501 Digital Signal Processing Applications. (3)*fall*

Application of DSP techniques to the design and analysis of digital filters. Solution of filtering problems using computer techniques. Cross-listed as CET 501. Credit is allowed for only CET 501 or EET 501. Prerequisite: EET 401 or instructor approval.

EET 506 System Dynamics and Control. (3)*spring*

Time, frequency, and transform domain analysis of physical systems. Transfer function analysis of feedback control systems performance and stability. Compensation. Prerequisite: EET 301 or MAT 262.

EET 508 Digital Real-Time Control. (3)*once a year*

Sample data control techniques and applications to process control. Prerequisites: CET 354; EET 406.

EET 510 Linear Integrated Circuits and Applications. (3)*fall*

Analysis, design, and application of linear integrated circuits and systems. Prerequisites: CET 350; EET 301, 310.

EET 522 Digital Integrated Circuits and Applications. (3)*spring*

Analysis, design, and application of integrated circuits and systems. Prerequisites: CET 350; EET 301, 310.

EET 530 Electronic Test Systems and Applications. (3)*fall*

Analysis, design, and application of electronic test equipment, test systems, specifications, and documentation. Prerequisites: CET 354; EET 301, 310.

EET 560 Industrial Electronics and Applications. (3)*spring*

Analysis, design, and application of special electronic devices and systems to industrial control, power, communications, and processes. Prerequisites: CET 350; EET 301, 310, 407.

EET 574 Microwave Amplifier-Circuits Design. (3)*fall*

Analysis and design of microwave amplifier-circuits using s-parameter theory and computer-aided design. Prerequisites: EET 304, 470.

EET 578 Digital Filter Hardware Design. (3)*spring*

Hardware design of FIR and IIR filters, including adaptive filters, based on DSP chips. Develop new applications using DSP microprocessor systems. Prerequisites: CET 354; EET 401.

EET 579 Digital Image Communication. (3)*spring*

Image capture, transform, compression, storage, and transmission. Computer environment (software and hardware) is provided to emphasize the practical aspect. Prerequisite: EET 401 or instructor approval.

EET 580 Practicum. (1–12)*not regularly offered***EET 584 Internship. (1–12)***not regularly offered***EET 590 Reading and Conference. (1–12)***not regularly offered***EET 591 Graduate Seminar. (1–12)***not regularly offered***EET 592 Research. (1–12)***not regularly offered***EET 593 Applied Project. (1–12)***not regularly offered***EET 594 Conference and Workshop. (1–12)***not regularly offered***EET 595 Continuing Registration. (1)***not regularly offered***EET 598 Special Topics. (1–4)***not regularly offered***EET 599 Thesis. (1–12)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

MICROELECTRONICS ENGINEERING TECHNOLOGY (UET)

UET 411 Applied Vacuum Technology. (3)*spring*

Fundamentals, applications, and practical aspects of vacuum systems and their uses in semiconductor fabrication. Prerequisite: UET 331.

UET 416 Monolithic Integrated Circuit Devices. (3)*fall*

Physics and electronics of bipolar and MOS devices used in integrated circuits. Prerequisite: UET 331. Corequisite: UET 417.

UET 417 Monolithic Integrated Circuit Laboratory. (2)*fall*

Laboratory practice in the fabrication of integrated circuits. Lab. Prerequisite: UET 331. Corequisite: UET 416.

UET 418 Hybrid Integrated Circuit Technology. (4)*spring*

Layout, fabrication, design, and manufacture of thin and thick film hybrid circuits. Lecture, lab. Prerequisites: EET 310; UET 331.

UET 421 Applied Device Physics. (3)*fall*

Band structures of solids, physics of current carriers in solids, pn junctions, MOS and bipolar transistors. Prerequisite: senior standing in the department.

UET 424 Integrated Circuit Mask-Making Technology. (3)*fall*

Fundamentals, applications, and techniques for the fabrication of integrated circuit masks. Prerequisite: UET 331.

UET 426 Software Tools for the Semiconductor Industry. (3)*spring*

Introduction to software tools commonly used in the semiconductor industry, such as SUPREM IV, PSPICE, VIEWLOGIC, and ICED. Cross-listed as CET 426. Credit is allowed for only CET 426 or UET 426. Prerequisite: UET 331.

UET 432 Semiconductor Packaging and Heat Transfer. (3)*spring*

Packaging theory and techniques; hermetic and plastic assembly; thermal management; electrical characteristics and reliability. Prerequisites: EET 340 and UET 331 (or their equivalents).

UET 437 Integrated Circuit Testing. (3)*spring*

Principles, techniques, and strategies employed at wafer level and final product testing, both destructive and nondestructive. Prerequisite: UET 416.

UET 485 Digital Testing Techniques I. (3)*once a year*

Hardware/software aspects of digital testing technology; systems, board, and logic testing and equipment. Lecture, lab. Cross-listed as CET 485. Credit is allowed for only CET 485 or UET 485. Prerequisites: CET 350; EET 310.

UET 513 VLSI Circuit Design and Layout. (3)*fall*

Techniques and practice for the design and layout of very large-scale integrated (VLSI) circuits. Emphasis on "system on silicon" using tools for computer-aided design layout. Seminar. Prerequisite: UET 416.

UET 516 Semiconductor Process Simulation and Integration. (3)*spring*

Modern IC processes and process integration; design of modern IC processes using SUPREM. Lecture, lab. Prerequisite: UET 416.

UET 518 Hybrid IC Technology and Applications. (3)*spring*

Theory, processing, fabrication, and manufacturing of hybrid microelectronics devices and products. Applications. Prerequisite: UET 331 (or its equivalent) or instructor approval.

UET 521 Device Physics. (3)*fall*

Band structure of solids, electron hole-pairs, mobility, lifetime, fermi-level, pn junctions, diodes, and bipolar and MOS transistors. Prerequisite: graduate standing in the department.

UET 532 IC Packaging. (3)*spring*

IC packaging theory and techniques; assembly techniques, material issues; thermal management; electrical performance and reliability. Lecture, lab. Prerequisites: ETC 340 and UET 331 (or their equivalents).

UET 580 Practicum. (1-12)*not regularly offered***UET 584 Internship. (1-12)***not regularly offered***UET 590 Reading and Conference. (1-4)***not regularly offered***UET 591 Seminar. (1-12)***not regularly offered***UET 592 Research. (1-12)***not regularly offered***UET 593 Applied Project. (1-12)***not regularly offered***UET 594 Conference and Workshop. (1-12)***not regularly offered***UET 595 Continuing Registration. (1)***not regularly offered***UET 598 Special Topics. (1-4)***not regularly offered***UET 599 Thesis. (1-12)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Department of Information and Management Technology

The faculty in the Department of Information and Management Technology through the College of Technology and Applied Sciences at ASU East offer the M.S.Tech. degree. The student may select one of four technical concentrations: environmental technology management, fire service administration, graphic information technology, or management of technology.

Graphic Information Technology. The graphic information technology concentration provides students with a seamless graphic user interface from traditional printing and publishing applications to digital/multimedia, 3-D modeling, animation, database management, and Internet/Intranet Web development. Computer hardware/software configurations, information protocols, and networks provide students with an applications-level working knowledge of the different facets of the graphic information industry.

Environmental Technology Management. The environmental technology management concentration for the M.S.Tech. degree provides three areas of study: environmental management, hazardous materials and waste management, and international environmental management. Classes are scheduled to minimize disruption of work schedules by meeting six times a semester on alternating Fridays and Saturdays.

Fire Service Administration. The fire service administration concentration is the advanced study of fire administration and leadership concepts. Students learn concepts and develop skills needed to be effective fire administrators.

This program is designed to build a bridge between grounded theory and applied practice. Students completing this program are able to perform the functions of a fire chief in any size public sector fire department, administer fire related programs in the private sector, and conduct meaningful research applicable to fire service programs. The technical concentration is 21 semester hours and includes an applied research project. Students select from the list of technical classes or related support electives to complete the balance of the 33 required hours. Course work in the related area of support cannot exceed six semester hours.

Management of Technology. The management of technology concentration provides the necessary content and technical knowledge to improve management functions in industry, manufacturing, and public service organizations. The curriculum addresses topics to include data analysis, ethical issues, project management, organizational effectiveness, personnel development, project management, quality assurance, and technological advancements that impact a global marketplace.

Admission. Applicants are expected to satisfy all requirements for admission to the Graduate College. Industrial experience beyond completion of a baccalaureate degree is strongly recommended. Applicants who have deficiencies or who do not meet the prerequisites may be required to complete them before being admitted to the degree program.

Program of Study. All candidates for the M.S.Tech. degree program are required to complete a minimum of 33 semester hours of graduate credit. Additional courses may be assigned by the faculty supervisory committee depending on the background of the candidate.

Final Examinations. Either an applied project or thesis is required. Upon completion of the approved course of study or during the last semester, an oral defense of the applied project or thesis is required.

Master's degree candidates are required to complete a six semester hour research block that includes either ITM 549 Research Techniques and Applications and IMC 593 Applied Project, or ITM 549 Research Techniques and Applications and IMC 599 Thesis. The program of study is designed for flexibility, permitting the student to select a combination of courses in a technical area and supporting area to meet individual goals.

For more information concerning the M.S.Tech. degree, see "Technology," page 323.

RESEARCH ACTIVITY

Research interests of faculty in the Department of Information and Management Technology include digital imaging, digital publishing, internet development/e-commerce, information databases, multimedia, animation, 3-D modeling, perishability studies of technology, hazardous materials and waste management, environmental regulations, remediation processes, operations management, quality assurance, and industrial training.

ENVIRONMENTAL TECHNOLOGY MANAGEMENT (ETM)**ETM 401 Hazardous Waste Management. (3)***fall and spring*

Definition of hazardous waste, RCRA classification, and OSHA criteria. Overview of requirements and methods of waste management. Prerequisite: ETM 301.

ETM 402 Unit Treatment Technologies. (3)*spring*

Addresses various treatment technologies for contaminated air, water, and soil. Emphasizes design based upon medium, type of contamination, and concentration. Prerequisite: ETM 302.

ETM 406 Environmental Chemistry. (3)*fall and spring*

Examines reactions, transport, and fates of hazardous chemicals in water, soil, air, and living organisms. Prerequisites: both CHM 113 and 115 or only CHM 114; MAT 170.

ETM 407 Occupational Hygiene. (3)*spring*

Overview of occupational health hazards, including recognition, evaluation, and control. Includes regulatory status and health standards. Prerequisites: CHM 101 (or 113 or 114); MAT 170.

ETM 424 Comprehensive Emergency Management. (3)*summer*

Addresses theory and management techniques for emergency preparedness, including mitigation, preparedness, response, and recovery. Pre- or corequisite: ETM 301.

ETM 426 Environmental Issues. (3)*spring*

Explores the science and policy implications of contemporary problems that threaten the environment. Pre- or corequisites: CHM 113; MAT 170.

ETM 428 International Environmental Management. (3)*summer*

Emphasis on technological and economic pressures experienced by developing countries. Prerequisite: ETM 301.

*General Studies: G***ETM 501 Principles of Hazardous Materials and Waste Management. (3)***fall*

Foundation for courses in curriculum. Topics include definitions of toxic and hazardous substances and wastes, RCRA classification, and OSHA criteria. Pre- or corequisites: both CHM 113 and 115 or only CHM 114.

ETM 502 Regulatory Framework for Toxic and Hazardous Substances. (3)*fall*

Examines federal, state, and local regulations for hazardous materials and wastes. Includes history and trends in regulatory development. Prerequisite: ETM 501.

ETM 503 Principles of Toxicology. (3)*spring*

Interaction of chemicals with life and environment. Mechanisms of toxic action, dose-response relationships, toxicity testing models, predictive toxicology, and epidemiology. Prerequisites: both CHM 113 and 115 or only CHM 114.

ETM 504 Technology for Storage, Treatment, and Disposal of Hazardous Materials. (3)*fall*

Current and state-of-the-art technologies and future trends for storage, treatment, and disposal of hazardous materials and waste. Prerequisites: both CHM 113 and 115 or only CHM 114; ETM 501.

ETM 505 Quantitative Analysis and Practical Laboratory Techniques. (3)*fall and spring*

EPA methodologies for sampling and analysis of soils and water. Includes quality assurance and regulatory requirements. Lab is arranged off site. Prerequisites: both CHM 113 and 115 or only CHM 114, 231; MAT 170.

ETM 506 Chemistry of Hazardous Materials. (3)*fall*

Chemistry and toxicology of hazardous chemicals. Topics include proper handling, storage, transportation, and disposal. Prerequisites: both CHM 113 and 115 or only CHM 114; MAT 170. Corequisite: CHM 231.

ETM 507 Industrial Hygiene. (3)*not regularly offered*

Emphasis on chemical hazards in industrial settings. Topics include recognizing and measuring hazards, control techniques, and regulatory standards. Prerequisites: both CHM 113 and 115 or only CHM 114; MAT 170.

ETM 522 Air Pollution and Toxic Chemicals. (3)*fall*

Examines issues in the measurement analysis and control of toxic chemicals in air pollution. Prerequisites: both CHM 113 and 115 or only CHM 114; ETM 501; MAT 170.

ETM 523 Soils and Groundwater Contamination. (3)*fall*

Theoretical and practical hydrogeology as it applies to cleaning up contamination. Investigative techniques, monitoring, risk assumptions, and assessment methodology. Prerequisites: both CHM 113 and 115 or only CHM 114; ETM 501; MAT 170. Corequisite: CHM 231.

ETM 524 Emergency Preparedness, Response, and Planning for Hazardous Materials. (3)*summer*

In-house or on-site emergency response contingency planning. Preemergency assessment, resources for cooperation, equipment requirements, and coordination with other agencies. Prerequisites: both CHM 113 and 115 or only CHM 114; ETM 501; MAT 170.

ETM 525 Risk Assessment for Hazardous Materials. (3)*spring*

Applies the risk assessment process in situations ranging from hazardous facilities regulation to toxic substances in the environment. Prerequisites: both CHM 113 and 115 or only CHM 114; ETM 501; MAT 170.

ETM 526 Current Environmental Technology Issues. (3)*fall*

In-depth study of current issues in environmental technology facing both the private and public sectors.

ETM 527 Environmental/Resources Regulations Concepts. (3)*spring*

Develops environmental regulations from common law to statutory requirements. Emphasis on Superfund, hazardous materials, toxics, and liability contracts. Pre- or corequisite: ETM 501.

ETM 591 Graduate Seminar. (1)*not regularly offered***ETM 592 Research. (1–12)***not regularly offered***ETM 598 Special Topics. (1–4)***spring*

Possible topics:

- (a) Advanced Bioremediation. (3)
Management and policy issues related to bioremediation of mine-tailing and animal waste and replacement of chemical control with biological methods. Lecture, case studies.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

FIRE SERVICE ADMINISTRATION (FSA)**FSA 500 Research Methods. (1–12)***not regularly offered*

Possible topics:

- (a) Fire Administration. (3)
Relationship of fire administration and the role of executive fire administrator in administration of complex issues in a dynamic environment.

FSA 502 Managing Change in the Fire Service. (3)*not regularly offered*

Dynamics of organizational change and the effect change has on the delivery of fire services to the community.

FSA 503 Fire Service and the Community. (3)*not regularly offered*

Theoretical concepts of public service to build an understanding of how the fire service fits within the community.

FSA 510 Fire Department Budgeting and Finance. (3)*not regularly offered*

Functions of budgeting and finance in fire departments within the context of the public sector.

FSA 522 Leadership in the Fire Service. (3)*not regularly offered*

Leadership theories analyzed in a variety of contexts within public and private organizations, then applied to the leadership challenges in the fire service.

FSA 530 Public Policy in the Fire Service. (3)*not regularly offered*

Public policy and the fire services' role in the making of public policy in the community.

FSA 540 Applied Research Methods in the Fire Service. (3)*not regularly offered*

Research methods applicable to problems that arise in the fire service, including assessments of programs and customer service research.

FSA 550 Fire Service Program Management. (3)*not regularly offered*

Functions of developing and managing fire service programs. Designed for advanced students of fire service administration.

FSA 551 Fire Prevention and Public Fire Education. (3)*not regularly offered*

Managing fire prevention organizations and administering fire prevention programs in a contemporary society.

FSA 552 Emergency Medical Services Administration. (3)*not regularly offered*

Complex issues of administering an Emergency Medical Services (EMS) division in a fire department.

FSA 553 Special Operations in the Fire Service. (3)*not regularly offered*

Focuses on the variety of special emergency services operations provided by contemporary fire departments.

FSA 554 Emergency Fire Operations Administration. (3)*not regularly offered*

Delivery of emergency services to a community by a contemporary fire department.

FSA 580 Practicum. (1–12)*not regularly offered*

Possible topics:

- (a) Fire Service Practicum. (3)
Structured practical fire service research experience that is supervised by an approved fire service professional or faculty member.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

FIRE SERVICE MANAGEMENT (FSM)**FSM 598 Special Topics. (1–4)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

GRAPHIC INFORMATION TECHNOLOGY (GIT)**GIT 411 Computer Animation. (3)***fall and spring*

2D and 3D computer animation methods: project planning, scripting, storyboards, advanced modeling, lighting, materials mapping, and motion. Lecture, lab. Prerequisites: GIT 312, 334.

GIT 412 Multimedia Authoring, Scripting, and Production. (3)*fall and spring*

Production of multimedia projects using industry-standard authoring applications: project management, client considerations, and project documentation; user interface design, interactivity, media, and databases. Lecture, lab. Prerequisites: GIT 314.

GIT 413 Professional Portfolio Design and Presentation. (3)*spring*

Digital media portfolio design and production: planning, audience analysis, media selection, authoring, media formats, production, copyright considerations, marketing, and delivery. Lecture, lab. Prerequisites: GIT 314, 334.

GIT 414 Web Site Design and Internet/Web Technologies. (3)*spring*

Web site design, authoring, standards, protocols, tools, and development techniques for commercial client-sided Web-based graphic information systems. Lecture, lab. Prerequisites: GIT 334, 337.

GIT 415 Computer Graphics: Business Planning and Management. (3)*spring*

Implementation planning: feasibility and application studies; needs assessment and operational analysis techniques; organization, managerial, and technology considerations; business plan development. Lecture, lab, field trips. Prerequisite: senior standing in Information Technology (graphic information technology concentration).

GIT 417 Advanced Internet Programming. (3)*fall*

Uses industry-standard programming languages and techniques to create interactive graphic information Web sites and applications. Lecture, lab. Prerequisite: GIT 414.

GIT 432 Graphic Industry Business Practices. (3)*not regularly offered*

Business practices related to press/prepress/Web industries; trade customs, cost analysis, marketing and management approaches. Lecture, lab, field trips. Prerequisite: GIT 414.

GIT 435 Web Management and E-Commerce. (3)*not regularly offered*

Internet Web site management, security, online databases, and new E-commerce business models. Lecture, lab. Prerequisite: GIT 237. Corequisite: GIT 414.

GIT 436 Gravure Technology. (3)*spring*

In-depth study of the market profile and production sequences related to the gravure method of printing. Prerequisite: GIT 135.

GIT 437 Color Reproduction Systems. (3)*fall*

Scientific analysis for the engineering of color reproduction systems and color models used in the graphics industry. Prerequisite: GIT 334.

GIT 441 Graphic Information Systems. (3)*not regularly offered*

Graphic information systems common to the workplace: graphic user interfaces for online databases, geographic, industrial, architectural, and management applications. Lecture, lab. Prerequisite: senior standing in Information Technology (graphic information technology concentration).

GIT 450 Digital Workflow in Graphic Industries. (3)*fall*

Analysis of digital production systems for input, assembly, and output of graphic information to print and Web, including networking and job tracking. Lecture, lab. Prerequisite: GIT 334.

GIT 510 Computer Graphics Programming: Design, Customization, and Development. (3)*not regularly offered*

Advanced design, development, and documentation of graphic application programs. Lecture, lab.

GIT 512 Multimedia-Based Education and Training. (3)*fall*

Creative design, planning, development, documentation, and production of technology-based learning and multimedia-based education and training materials and programs. Lecture, lab. Prerequisite: GIT 412.

GIT 537 Current Issues in Quality Assurance. (3)*not regularly offered*

Directed group study of selected issues relating to quality assurance in the printing, publishing, and information industry.

GIT 538 Personnel Development for the Graphics Industry. (3)*not regularly offered*

Employee training and development specific to production and management in the graphics industry.

GIT 590 Reading and Conference. (1–12)*not regularly offered***GIT 598 Special Topics. (1–4)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

INDUSTRIAL TECHNOLOGY MANAGEMENT (ITM)**ITM 402 Legal Issue for Technologists. (3)***fall*

American legal system and impact on technology management issues: contracts, torts, intellectual property, white collar crime, anti-trust, environmental, and employment.

ITM 405 Forecasting and Evolution of Technology. (3)*not regularly offered*

History and evolutionary nature of selected technologies, issues in the management of emerging technologies, and methods of technological forecasting. Prerequisite: IMC 346 (or its equivalent).

ITM 430 Ethical Issues in Technology. (3)*spring*

Topics in social responsibility for industrial technology and engineering. Prerequisite: IMC 346.

ITM 440 Introduction to International Business. (3)*spring*

International business principles and operations, including partnerships, trade agreements, currency issues, international sales, and cultural differences between countries. Prerequisite: IMC 346.

*General Studies: G***ITM 445 Industrial Internship. (1–10)***fall, spring, summer*

Work experience assignment in industry commensurate with student's program. Specialized instruction by industry with university supervision. Pass/fail. Prerequisites: advisor approval; junior standing; 2.50 GPA.

ITM 451 Industrial Distribution and Materials Management. (3)*not regularly offered*

Surveys topics in industrial distribution including, but not limited to, materials handling, purchasing, receiving, warehousing, traffic, inventory control, and shipping. Prerequisite: IMC 346 or ITM 343.

ITM 452 Industrial Human Resource Management. (3)*fall*

Concepts and practices of human resource management in a global industrial environment. Prerequisite: IMC 346.

ITM 453 Safety Management. (3)*not regularly offered*

Development and management of safety programs, education and training, and relationships within an organization. Prerequisite: ITM 343 or instructor approval.

ITM 455 Industrial Marketing Concepts. (3)*not regularly offered*

Customer and sales strategies for industrial organizations, including current practice and future planning. Prerequisites: ECN 111; IMC 346; junior standing.

ITM 456 Introduction to Organized Labor. (3)*spring*

Introduction to labor relations, unions, federations, collective bargaining, grievances, and labor legislation. Prerequisites: IMC 346; ITM 344.

ITM 461 Operations Management. (3)*fall*

Introduction to supervisory principles as applied to production of goods and services. Prerequisites: IMC 346; ITM 344.

ITM 480 Organizational Effectiveness. (3)*spring*

Human aspects of supervisory behavior in the industrial setting and how they influence efficiency, morale, and organizational practices. Prerequisite: IMC 346.

ITM 501 Managerial Economics. (3)*not regularly offered*

Basic managerial economic tools and techniques applied to unique concerns of scientifically intensive firms operating in rapidly evolving industrial sectors.

ITM 502 Financial Management. (3)*not regularly offered*

Examines corporate financial and managerial accounting systems, budgeting, and financial policy, using microcomputers to analyze, forecast, and report information.

ITM 503 Marketing Management. (3)*not regularly offered*

Modern methods and industrial case studies of planning, pricing, promoting, and distributing goods and services in the global marketplace. Prerequisites: ITM 480 (or its equivalent); instructor approval.

ITM 504 Law and Ethics for Technical Professionals. (3)*not regularly offered*

Analyzes legal and ethical framework for making managerial decisions in the corporate environment of engineering- and technology-related industries.

ITM 520 Strategic Management of Technology. (3)*not regularly offered*

Analyzes entrepreneurial dynamics and technology development, methods of research and development management, new technology implementation, and start-up organization. Prerequisites: ITM 480 (or its equivalent); instructor approval.

ITM 540 International Management. (3)*not regularly offered*

Practices and procedures for effective management of multinational business organizations, including partnerships, joint ownerships, and global subsidiaries.

ITM 548 Statistical Methods for Research. (3)*not regularly offered*

Multivariate statistical techniques to analyze research data. Uses statistical software and applications. Prerequisite: STP 420 (or its equivalent).

ITM 549 Research Techniques and Applications. (3)*fall and spring*

Selection of research problems, analysis of literature, individual investigations, preparing reports, and proposal writing. Prerequisite: STP 420 (or its equivalent).

ITM 550 Industrial Training and Development. (3)*not regularly offered*

Training techniques and learning processes. Planning, developing, evaluating, and managing industrial and governmental programs. Prerequisite: ITM 480.

ITM 552 Global Management Philosophies. (3)*not regularly offered*

Analyzes and compares significant supervision philosophies developed in various industrial nations and their potential application in the United States.

ITM 560 Managerial Decision Making. (3)*fall*

Analyzes common decision-making bias and techniques to overcome them. Uses both subjective quantitative decision tools and computerized decision aids.

ITM 570 Advanced Project Management. (3)*spring*

Planning, organizing, coordinating, and controlling staff and project groups to accomplish the project objective.

ITM 593 Applied Project. (1–12)*not regularly offered***ITM 598 Special Topics. (1–4)***not regularly offered*

Possible topics:

- (a) Quantitative Research Analysis

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Department of Manufacturing and Aeronautical Engineering Technology

The faculty in the Department of Manufacturing and Aeronautical Engineering Technology (MAET) in the College of Technology and Applied Sciences, ASU East, offer the M.S.Tech. degree. A minimum of 33 semester hours of approved courses is required. Both a thesis and applied project option are available. The flexible program permits the student to select a combination of courses in the relevant concentration and supporting areas to meet individual career goals in technology or to provide the foundation for further advanced study.

The department provides the student with a number of programs of study that presuppose a sound technical undergraduate degree. The programs are designed to provide the graduates with technical and professional skills that will facilitate preparation for and advancement in leadership positions in industry, education, government, and military. Laboratories and classrooms are well equipped, and the

faculty members administering the classes have relevant teaching, research, industry and training experience and background. Areas of concentrations include aeronautical engineering technology, instrumentation and measurement technology, manufacturing engineering technology, mechanical engineering technology, and security engineering technology. The instrumentation and measurement technology concentration is offered jointly with the Department of Electronics and Computer Engineering Technology.

The student may select one of the areas to meet the requirement of 16–18 semester hours. Careful program selection in coordination with a faculty advisor and/or advisory committee is an essential aspect of building a focused program for the student. The selection process also facilitates the potential for expanding the depth and breadth of the training the student may receive in related areas. The supporting area (six to nine semester hours) may be selected from outside the department upon approval from the supervisory committee. The thesis option includes six hours of research credits spread over at least two semesters.

Admission. Applicants are expected to satisfy all requirements for admission to the Graduate College. Industrial experience beyond completion of a baccalaureate degree is strongly recommended. Applicants with deficiencies or those not meeting the prerequisites may be required to complete them before being admitted to the degree program.

Program of Study. All candidates for the M.S.Tech. degree program are required to complete a minimum of 33 semester hours of graduate credit as follows:

Thesis Option

Technical area of emphasis	18
Supporting area	6
Research course	3
Research	6
Total	33

Applied Project Option

Technical area of emphasis	18
Supporting area	9
Research course	3
Applied project.....	3
Total	33

Additional courses may be assigned by the supervisory committee depending on the background of the candidate. The program is designed for flexibility, permitting the student to select a combination of courses in a technical area and supporting area to meet individual goals.

Final Examinations. An applied project or thesis is required, upon completion of the approved course of study or during the last semester. An oral defense of the applied project or thesis is required.

RESEARCH ACTIVITY

Department faculty are engaged in both theoretical and applied research projects, involving undergraduate and graduate students in both manufacturing and aeronautical-related topic areas. Graduate students employed in local industry are encouraged to develop research topics that address problems of interest to their employers.

Current research interests of the faculty include manufacturing modeling and simulation—with a particular focus on

the semiconductor fabrication process, “smart” materials—especially composite materials, hydrogen generation and use as a fuel, optimization of turbine engines, machinability and manufacturing processes, and design.

Applied research projects are carried out in a number of well-equipped laboratories and facilities: computer-aided design and computer-aided manufacturing laboratory, machining center laboratory, composite materials laboratory, energy conversion and combustion laboratory, automation laboratory, welding and casting laboratory, materials inspection and metrology laboratory, and metallurgy/materials testing laboratory.

AERONAUTICAL ENGINEERING TECHNOLOGY (AET)

AET Note 1. Flight instruction costs are not included in university tuition and fees.

AET 409 Nondestructive Testing and Quality Assurance. (1)
not regularly offered

Purpose of inspection and quality assurance. Theory and application of nondestructive inspection methods. Application of pertinent standards, specifications, and codes. Lecture, lab. Cross-listed as AMT 409. Credit is allowed for only AET 409 or AMT 409. See AET Note 1. Prerequisite: AMT 280 or MET 230.

AET 415 Gas Dynamics and Propulsion. (3)

spring

Introduction to compressible flow, internal and external flow, and aerothermodynamic analysis of propulsion systems. Prerequisite: MET 434.

AET 417 Aerospace Structures. (3)

fall

Analysis and design of aircraft and aerospace structures. Shear flow. Semimonocoque structures. Effects of dynamic loading. Prerequisites: AET 300, 312; MET 313.

AET 420 Applied Aerodynamics and Wind Tunnel Testing. (3)

fall

Introduction to viscous and inviscid flow and their relationship to aircraft lift and drag. Wind tunnel design and testing. Lecture, lab. Prerequisites: AET 300; MET 434.

AET 432 Applied Heat Transfer. (3)

fall

Steady-state and transient conduction, heat transfer by convection and radiation. Applications of heat transfer. Prerequisite: MET 434 or instructor approval.

AET 487 Aircraft Design II. (3)

spring

Basic aerodynamics and airplane performance analysis methods applied to practical design project. Prerequisite: AET 300.

AET 490 Advanced Applied Aerodynamics. (3)

not regularly offered

Study of fluid motion and aerodynamics. Essentials of incompressible aerodynamics and computational fluid dynamics. Elements of laminar and turbulent flows. Prerequisites: AET 312; ETC 100; MAT 262.

AET 500 Research Methods. (1–12)

not regularly offered

AET 524 Application of Heat Transfer. (3)

fall

Energy conservation, steady-state and transient conduction, convection transfer, free and forced convection Reynolds analogy, blackbody and environmental radiation. Prerequisite: MET 434 or instructor approval.

AET 525 Advanced Propulsion. (3)

spring

Mechanics and thermodynamics of propulsion systems. Solid, liquid propellant rocket design performance. Electrical nuclear propulsion systems. Space missions. Prerequisites: both AET 415 and 420 (or MET 434) or only instructor approval.

AET 560 Numerical Methods in Engineering Technology. (3)

not regularly offered

Analyzing problems in physical sciences, modeling of physical problems, perturbation techniques, curvefitting, data analysis, numerical solutions, ordinary and partial differential equations.

AET 580 Practicum. (1–12)

not regularly offered

AET 583 Field Work. (1–12)*not regularly offered***AET 584 Internship. (1–12)***not regularly offered***AET 590 Reading and Conference. (1–12)***not regularly offered***AET 591 Seminar. (1–12)***not regularly offered***AET 592 Research. (1–12)***not regularly offered***AET 593 Applied Project. (1–12)***not regularly offered***AET 594 Conference and Workshop. (1–12)***not regularly offered***AET 595 Continuing Registration. (1)***not regularly offered***AET 598 Special Topics. (1–4)***not regularly offered***AET 599 Thesis. (1–12)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

MANUFACTURING ENGINEERING TECHNOLOGY (MET)**MET 401 Quality Assurance. (3)***spring*

Introduction to statistical quality control methods design of experiments, sampling, gage requirements, specifications, quality assurance tools emphasizing CNC-CMM programming. Lecture, lab. Prerequisite: junior standing.

MET 416 Applied Computer-Integrated Manufacturing. (3)*fall*

Techniques and practices of computer-integrated manufacturing, with emphasis on computer-aided design and computer-aided manufacturing. Prerequisite: MET 345.

*General Studies: CS***MET 432 Thermodynamics. (3)***spring*

Thermodynamics of mixtures. Combustion process. Applies thermodynamics to power and refrigeration cycles. Prerequisite: ETC 340.

MET 433 Thermal Power Systems. (4)*not regularly offered*

Analyzes gas power, vapor power, and refrigeration cycles. Components of air conditioning systems. Direct energy conversion. Psychrometry. Analyzes internal combustion engines and fluid machines. Lecture, lab. Prerequisite: MET 432 or instructor approval.

MET 434 Applied Fluid Mechanics. (3)*spring*

Fluid statics. Basic fluid flow equations. Viscous flow in pipes and channels. Compressible flow. Applies fluid measurement and flow in conduits. Prerequisite: ETC 340.

MET 435 Alternate Energy Sources. (3)*not regularly offered*

Alternate energy systems, energy use and its impact on the environment, and demonstrating practical alternative energy sources to fossil fuels. Prerequisite: instructor approval.

MET 436 Turbomachinery Design. (3)*not regularly offered*

Applies thermodynamics and fluid mechanics to the analysis of machinery design and power cycle performance predictions. Prerequisites: ETC 340; MET 434.

MET 438 Design for Manufacturing II. (4)*fall*

Applies mechanics in design of machine elements and structures. Uses experimental stress analysis in design evaluation. Lecture, lab. Prerequisite: AET 312 or MET 331 or instructor approval.

MET 442 Specialized Production Processes. (3)*fall*

Nontraditional manufacturing processes, emphasizing EDM, ECM, ECG, CM, PM, HERF, EBW, and LBW. Prerequisite: MET 231.

MET 443 CNC Computer Programming. (3)*fall*

Theory and application of N/C languages using CAM software and CNC machine tools. Lecture, lab. Prerequisite: MET 345 or instructor approval.

MET 444 Production Tooling. (3)*fall*

Design and fabrication of jigs, fixtures, and special industrial tooling related to manufacturing methods. Lecture, lab. Prerequisite: MET 345.

MET 448 Expert Systems in Manufacturing. (3)*not regularly offered*

Introduction to expert systems through conceptual analysis, with emphasis on manufacturing applications. Prerequisite: MET 231.

MET 451 Introduction to Automation. (3)*spring*

Introduction to automation. Topics include assembly techniques, fixed and flexible automation systems, robots, material-handling systems, sensors, and controls. Lecture, lab. Prerequisite: MET 346.

MET 452 Implementation of Robots in Manufacturing. (3)*not regularly offered*

Robotic workcell design, including end effectors, parts presenters, and optimum material flow. Prerequisite: MET 451 or instructor approval.

MET 453 Robotic Applications. (3)*spring*

Lab course utilizing robots and other automated manufacturing equipment to produce a part. Students are required to program robots, as well as interface the robots with other equipment. Prerequisite: instructor approval.

MET 460 Manufacturing Capstone Project I. (3)*fall*

Small-group projects designing, evaluating, and analyzing components, assemblies, and systems. Develop products/manufacturing techniques demonstrating state-of-the-art technology. Lecture, lab. Prerequisites: MET 331, 341, 346; senior standing.

MET 461 Manufacturing Capstone Project II. (3)*spring*

Small-group projects applying manufacturing techniques, with emphasis on demonstrating state-of-the-art technology. Lecture, lab. Prerequisite: MET 460 or instructor approval.

MET 500 Research Methods. (1–12)*not regularly offered***MET 501 Statistical Quality Control Applications. (3)***spring*

SPC problem-solving techniques for implementation in industrial setting; design and analysis of experiments. Prerequisite: instructor approval.

MET 502 Specialized Production Processes. (3)*fall*

Specialized production processes including lasers, electronic beam, abrasive and water jet, and chemical and thermal processes. Prerequisite: instructor approval.

MET 504 Applications of Production Tooling. (3)*fall*

Design and fabrication of fixtures, jigs, templates, and specialized industrial tooling for manufacturing. Lecture, lab. Prerequisite: instructor approval.

MET 507 Manufacturing Enterprise. (3)*fall and spring*

Organization and project management of cellular manufacturing methods, including IIT and lean manufacturing. Prerequisite: instructor approval.

MET 509 Applied Engineering Economics. (3)*spring*

Fundamentals of engineering economics in a practical, industry-based approach. Includes effects of depreciation, taxes, inflation, and replacement analysis. Lecture, computer lab experiences.

MET 512 Introduction to Robotics. (3)*not regularly offered*

Introduction to industrial robots. Topics include: robot workspace, trajectory generation, robot actuators and sensors, design of end effectors, and economic justification. Application case studies. Prerequisite: instructor approval.

MET 513 Advanced Automation. (3)*fall*

Analysis and design of hard and flexible automation systems. Particular attention to material-handling technology. Prerequisite: instructor approval.

MET 514 CNC Computer Programming. (3)*spring*

Theory and application of N/C languages using CAM software and CNC machine tools. Lecture, lab. Prerequisite: instructor approval.

MET 515 Manufacturing Simulation. (3)*spring*

Computer simulation of manufacturing operations. Discrete event simulation models range from individual processes to whole factories. Lecture, computer lab experiences.

MET 517 Applied Computer-Integrated Manufacturing. (3)*fall*

Techniques and practices of computer-integrated manufacturing, with emphasis on computer-aided design and computer-aided manufacturing. Prerequisite: MET 345 or instructor approval.

MET 560 Fundamentals of Security Engineering. (3)*fall*

Definitions of threats, fundamentals of design of physical protection systems, computer modeling and analysis of security systems.

MET 571 Waste Minimization and Waste Prevention. (3)*spring*

Life cycle analysis, selection of environmentally compatible materials, design of waste minimization equipment and operation, economics of waste minimization and prevention. Prerequisite: ETC 340 or instructor approval.

MET 580 Practicum. (1–12)*not regularly offered***MET 584 Internship. (1–12)***not regularly offered***MET 590 Reading and Conference. (1–12)***not regularly offered***MET 591 Seminar. (1–12)***not regularly offered***MET 592 Research. (1–12)***not regularly offered***MET 593 Applied Project. (1–12)***not regularly offered***MET 594 Conference and Workshop. (1–12)***not regularly offered***MET 595 Continuing Registration. (1)***not regularly offered***MET 598 Special Topics. (1–4)***not regularly offered***MET 599 Thesis. (1–12)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

SECURITY ENGINEERING TECHNOLOGY (SET)**SET 540 Explosives Surety. (3)***fall*

Physical and chemical nature of explosives; detonation models; initiating systems; commercial, military, and improvised explosives; investigations; and counter measures. Lecture, lab. Prerequisite: graduate standing.

SET 560 Physical Security I. (3)*spring*

Systems engineering principles and concepts to guide the design, analysis, and implementation of protection systems. Lecture, lab. Prerequisite: graduate standing.

SET 561 Physical Security II. (3)*fall*

Scientific theory behind analysis of physical protection systems. Includes probability and statistics, data collection techniques, algorithm processing. Lecture, lab. Prerequisite: SET 560.

SET 570 Security System Instrumentation. (3)*fall*

Operating principles, limitations, and test procedures of security instrumentation and sensors. Lecture, lab. Prerequisite: SET 560.

SET 592 Research. (1–12)*not regularly offered***SET 598 Special Topics. (1–4)***not regularly offered***SET 599 Thesis. (1–12)***not regularly offered*

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Theatre**Master's and Doctoral Programs****(GHALL 232) 480/965-5359****herbergercollege.asu.edu/theatre**

PROFESSORS

BARKER, BEDARD, ECKARD, GINER, KNAPP, MASON, SALDAÑA, THOMSON, WILLS

ASSOCIATE PROFESSORS

ACKER, EDWARDS, HOLLOWAY, RISKE, VINING

ASSISTANT PROFESSORS

REYES, STERLING, WOODSON

LECTURERS

IRVINE, SMITH-DAWSON, TONGRET

The faculty in the Department of Theatre offer graduate programs leading to the M.A., the Master of Fine Arts, and the Ph.D. degrees in Theatre. Areas of concentration are performance, scenography and theatre for youth at the M.F.A. level and theatre for youth at the Ph.D. level. Students may also pursue an interdisciplinary program leading to the M.F.A. degree in Creative Writing. This program is offered by the faculties in the Departments of English and Theatre (see "English," page 202).

MASTER OF ARTS

The M.A. degree in Theatre is a flexible program of advanced theatre studies that prepares students for graduate study beyond the master's level. The program primarily emphasizes theoretical studies.

See "Master's Degrees," page 100, for general requirements.

Admission. Applicants must meet all admission requirements of the Graduate College. In addition, the Department of Theatre requires comprehensive undergraduate preparation in theatre (at least a Theatre minor or its equivalent), acceptable scores on either the Graduate Record Examination (GRE) or Miller Analogies Test, three letters of recommendation, and an undergraduate GPA of 3.00.

Application Deadline. The first deadline for receipt of applications and test scores is March 1 (February 1 for Creative Writing). After that date, admission is subject to space availability.

Deficiencies. Deficiencies in undergraduate preparation (not to exceed 12 hours) may be removed while pursuing the

M.A. degree; courses taken to remove deficiencies may not be counted toward the degree.

Program of Study. The required courses are THE 500, 504, 505, 520, and 521. Additional course work to complete the degree is selected by the student with the approval of the supervisory committee. Theatre courses must be completed with a grade of “B” or higher. A thesis or equivalent is required.

Foreign Language Requirements. Optional, depending upon research area, and with the approval of the supervisory committee.

Thesis or Equivalent Requirements. For students electing to prepare a thesis, the program consists of a minimum of 24 semester hours of graduate work and three hours each of thesis (599) and research (592) credit. A research thesis is especially recommended for students planning to continue graduate study beyond the master’s degree and may be elected with the approval of the supervisory committee.

In consultation with their supervisory committee, students may elect to prepare a thesis equivalent. This option consists of 36 semester hours of graduate work, of which six hours are research (592) credit, and three hours of THP 593 Applied Project. Each student develops an approved project and supports this project with a written document. In addition, at least 18 semester hours of course work on the program of study must be 500-level courses and 20 semester hours must be in the major field.

Final Examinations. Both final written and oral examinations are required of all candidates. The written examination is based on the required courses; the oral examination is a defense of the thesis or equivalent.

MASTER OF FINE ARTS

The M.F.A. degree in Theatre is a 60-semester-hour professional program with concentrations in performance, scenography, and theatre for youth. It is a terminal degree for students interested in pursuing professional and educational careers. The concentration in performance is focused on developing performers as creative artists. It emphasizes skills for approaching and creating new work and developing entrepreneurship, performance applications in multimedia, interdisciplinary collaboration, artistic integrity, and social responsibility.

In the scenography concentration, students learn skills and methodologies to create and execute designs in costumes, lighting, and scenery.

The concentration in theatre for youth is designed to prepare candidates for work as drama specialists; for college and university teaching in the field of theatre for youth; for professional careers in children’s theatre; and for work in community theatres, recreational programs, and various social agencies.

Admission. Applicants must meet all admission requirements of the Graduate College. In addition, the Department of Theatre requires a minimum of 30 semester hours of course work in theatre, a minimum GPA of 3.20 for all course work in theatre, and acceptable scores on either the GRE or MAT.

For the concentration in performance, requirements include:

1. an interview and audition consisting of two performed selections, not to exceed four minutes total;
2. three letters of recommendation; and
3. a detailed statement of purpose.

Dates and sites for interviews may be obtained from the Department of Theatre.

For the concentration in scenography, three letters of recommendation are required from leaders in the field of theatre, education, or art. In addition, applicants must provide a portfolio of 12 slides or photographs of their work with a return envelope and postage, as well as a statement of educational and artistic objectives. An interview is recommended; dates and sites may be obtained from the Department of Theatre.

For the concentration in theatre for youth, three letters of recommendation are required from leaders in the field of theatre for youth, theatre education, or recreation, as well as a statement of educational and career goals. Submission of a current résumé is also necessary. An interview is suggested but not required.

More detailed information regarding admission requirements for the concentration may be obtained from the Department of Theatre.

Application Deadline. The first deadline for receipt of applications and test scores is March 1. After that date, admission is subject to space availability.

Program of Study. Each student works closely with a supervisory committee to develop a program of study in required and elective course work. All M.F.A. candidates majoring in Theatre are evaluated at the end of each semester by their supervisory committee, with the responsibility resting on each student for documenting professional development. The advancement of each student through each of the three years in the M.F.A. program is dependent upon a positive recommendation of the supervisory committee.

The program for the performance concentration consists of a minimum of 60 semester hours, distributed as follows: 48 hours of course work in the major (THE 500, 504, 505, 520, 521; THP 501, 502, 503, 504, 598); six hours of THE 692 Research; and six hours of THP 693 Applied Project.

The program for the scenography concentration consists of 60 semester hours distributed as follows: 43 hours of required course work in the major (THE 500 [one hour], 504, 505, 520, 521; THP 506, 530, 540, 545, 649 [three hours], 691, six hours each of THP 684 Internship and THP 693 Applied Project); 12 hours of additional design and/or technical theatre classes which may be selected from THE 430, 431; THP 431, 435, 441, 442, 444, 445, 494; and five additional hours of electives subject to the approval of the supervisory committee.

The program for theatre for youth consists of 60 semester hours, distributed as follows: 39 hours of required course work in the major (THE 500, 504, 505, 520, 521, 524; THP 411, 511, and 611 or 618, six hours each of THP 684 Internship and THP 693 Applied Project); and 21 hours of approved electives in the major and related areas.

Credit Before Admission. Subject to approval by the supervisory committee, a maximum of 24 semester hours of graduate work from a completed master’s degree program earned at ASU or another accredited institution may be applied to the program of study. In other cases, a maximum

of nine semester hours of nondegree graduate work from ASU or another institution may be applied (see “Credit Completed Before Admission,” page 101). All course work for the degree must be completed within the six-year time limit.

Foreign Language Requirements. Optional.

Final Examinations. A comprehensive examination or comprehensive review in the area of concentration is required. In addition, students failing to receive a grade of “B” or higher in THE 504, 505, 520, and 521 must pass a written comprehensive examination on the subject matter of those courses. A final project THP 693 Applied Project (six hours), supported by written documentation and defended in an oral defense, is required.

Deficiencies. Deficiencies in undergraduate preparation of no more than 12 hours may be removed while pursuing the M.F.A. degree; courses taken to remove deficiencies may not be counted toward the degree.

DOCTOR OF PHILOSOPHY

The Ph.D. degree is designed to give students a broad knowledge of theatre as well as special research, production, and teaching skills in theatre for youth. A detailed description of the program may be obtained from the Department of Theatre.

See “Doctor of Philosophy,” page 103, for general requirements.

Admission. Applicants must meet all admission requirements of the Graduate College. In addition, the Department of Theatre requires a master’s degree in theatre or education; a minimum of 36 hours of undergraduate and graduate course work in theatre (to include courses in dramatic literature, acting, directing, stagecraft, improvisation with youth, theatre for children, children’s literature, research methods, theatre history, and theatre theory/criticism); acceptable scores on the GRE and on the Test of English as a Foreign Language (where applicable); and three letters of recommendation.

Application Deadline. The first deadline for receipt of applications and test scores is March 1. After that date admission is subject to space availability.

Program of Study. A total of 90 semester hours is required for this degree, consisting of (1) a minimum of 66 semester hours of graduate course work (including a maximum of 30 semesters hours accepted from the first year of graduate study, a core of 15 semester hours of required courses, and 21 semester hours of elective and research credits); and (2) 24 semester hours of research and dissertation preparation.

A minimum of 30 semester hours of the approved Ph.D. program, exclusive of dissertation and research hours, must be completed after admission to the Ph.D. at ASU.

In meeting these requirements, students, with the advice of the supervisory committee, may select theatre courses in areas such as theatre education, directing, acting, design, playwriting, theatre history, and theatre theory/criticism, in addition to tutorial courses, as well as courses offered by other departments in areas such as pertinent research methodologies, educational theory and methodology, aesthetic theory, the arts and arts education, and children’s literature.

Students are encouraged to be involved in on- and off-campus production and teaching. All activities are selected to help students meet the goals of the program and develop the capability of becoming leaders in the field.

Research Technique Requirement. Students must successfully complete two graduate level courses in qualitative or quantitative research approved by their committee, or they must successfully pass an examination in a foreign language approved by their committee.

Preliminary Reviews. Reviews of a student’s performance in courses and development of research skills, artistic skills, and teaching competencies are conducted by the supervisory committee at the end of each semester.

Comprehensive Examinations. These examinations are composed of written and oral components centering upon: theatre history, literature, and criticism; theatre for youth and theatre in education; and the research area.

Dissertation Requirements. A dissertation based on original research work of high quality, demonstrating proficiency in the student’s special field, is required. (See “Doctoral Dissertations,” page 102.)

Financial Assistance. University scholarships, fellowships, grants, and other forms of financial assistance are available. See “Financing Graduate Studies,” page 46, and “Assistantships and Associateships,” page 98. Graduate assistantships are granted by the Department of Theatre; application forms and information concerning graduate assistantships are available through the graduate secretary, Department of Theatre. A current résumé and a minimum of three letters of recommendation must accompany applications for graduate assistantships.

RESEARCH ACTIVITY

Recent Ph.D. dissertations completed in Theatre for Youth:

An Interrogation of Drama in Colonial Educational Contexts: Three Boys Schools in Queensland, Australia, by Janet McDonald.

Mapping the Cultural Geography of Childhood or Constructing the Child in Child Drama: 1950–Present, by Stephani Woodson.

Drama Activities at the Ethical Culture School, 1878–1930, by Virginia Page Tennyson.

Longevity and the Secondary Theatre Arts Teacher: A Case Study, by Cynthia Brown.

Russian Theatre for Young Audiences and the Changes in Ideological Function with Glasnost and Perestroika, by Manon C. van de Water.

Understanding Two Teachers’ Practices and Their Use of Theatre in the Elementary School Classroom, by Lorenzo Garcia.

THEATRE (THE)

THE 400 Focus on Film. (3)

fall, spring, summer

Specialized study of prominent film artists, techniques, and genres. Emphasis on the creative process. May be repeated for credit. Prerequisite: ENG 101 or 105.

THE 402 Gender Identity in Film. (3)*fall, spring, summer*

Examines the representation of gender in Hollywood cinema with particular focus on films from 1970 to the present. Prerequisite: THE 300.

THE 403 Independent Film. (3)*fall and spring*

Examines independent films and filmmakers in the United States, 1968 to the present

THE 404 Foreign Films and Filmmakers. (3)*once a year*

Films and filmmakers from Europe, Asia, Australia, South America, and Caribbean. Emphasis on cultural content and filmmaking philosophies.

THE 405 Film: Great Performers and Directors. (3)*fall and spring*

Examines processes and influences of one or more great film performers and/or directors. May be repeated for credit. Prerequisite: THE 300.

*General Studies: HU***THE 420 History of the American Theatre. (3)***fall*

History of the plays, artists, and events in the development of American theatre from colonial to modern times.

*General Studies: HU, H***THE 421 History of the English Theatre. (3)***spring*

History of the artists, events, and plays in the development of English theatre from medieval times to the present. Lecture, group and independent work. Prerequisite: THE 100 or 220.

*General Studies: L/HU***THE 422 Latino and Latina Theatre. (3)***spring*

Readings, discussion, video of dramatic literature and production styles of Latino/Latina playwrights and theatre companies in the United States. Prerequisites: both ENG 101 and 102 or only ENG 105.

THE 424 Trends in Theatre for Youth. (3)*not regularly offered*

Surveys the history, literature, and contemporary practices in theatre for youth.

THE 425 History of Asian Theatre. (3)*not regularly offered*

History and production techniques of theatre forms in India, China, and Japan. Prerequisite: 6 hours in theatre history or written instructor approval.

*General Studies: L/HU***THE 430 History of Costume: Western Tradition. (3)***not regularly offered*

Studies major costume styles throughout history of Western civilization and how these fashions reflected society. Explores how styles can be used by theatrical costumers.

THE 431 History of Costume: Non-Western Tradition. (3)*not regularly offered*

Studies major costume styles of India, Asia, Eastern Europe, and the Middle East and how these fashions reflected society. Explores how styles can be used by theatrical costumers.

THE 440 Theatre Forms and Contexts. (3)*fall*

Explores 20th-century modernist theatrical forms and movements and development of alternative strategies for analyzing contemporary theatre and performance. Prerequisites: THE 220, 320, 321; Theatre major.

THE 480 Methods of Teaching Theatre. (4)*spring*

Applies materials, techniques, and theories for theatre with 9th-through 12th-grade students. Emphasis on curriculum development and praxis. Prerequisite: theatre education concentration or written instructor approval.

THE 500 Research Methods. (1–3)*fall*

Introduction to graduate study in theatre.

THE 504 Studies in Dramatic Theory and Criticism. (3)*fall*

Dramatic theory, criticism, and aesthetics from the classical period to the 19th century. Related readings in dramatic literature. Prerequisite: Theatre major.

THE 505 Studies in Dramatic Theory and Criticism. (3)*spring*

Dramatic theory, criticism, and aesthetics from the 19th century to the present. Related readings in dramatic literature. Prerequisite: Theatre major.

THE 510 Studies in Literature. (1)*fall and spring*

Assigned individual reading programs in standard sources and masterpieces in theatre literature. May be repeated for credit in different sections. Possible topics:

- (a) Acting–Directing
- (b) Criticism
- (c) Design–Technical
- (d) History

THE 520 Theatre History and Literature I. (3)*fall*

Surveys historiographical issues, historical periods, and theatre literature, through the 17th century.

THE 521 Theatre History and Literature II. (3)*spring*

Surveys historiographical issues, historical periods, and theatre literature, from the 17th century to present.

THE 524 Advanced Studies in Theatre for Youth. (3)*fall*

In-depth study of the history, literature, and contemporary practice of theatre for youth. Prerequisite: written instructor approval.

THE 591 Seminar. (3)*once a year*

Selected topics in child drama, community theatre, and theatre history. Prerequisite: written instructor approval.

THE 598 Special Topics. (1–4)*not regularly offered*

Possible topics:

- (a) College Teaching

THE 692 Research. (1–12)*not regularly offered***THE 700 Advanced Research Methods. (3)***fall*

Critical review of research, development, and design of research in theatre and theatre for youth.

THE 791 Seminar. (3)*not regularly offered*

Selected topics offered on a revolving basis. May be repeated for credit when topics vary.

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.**THEATRE PERFORMANCE AND PRODUCTION (THP)****THP 401 Theatre Practicum. (1–3)***fall, spring, summer*

Production assignments for advanced students of technical production, stage and business management, and design. May be repeated for credit. Prerequisite: written instructor approval.

THP 406 Scenography. (3)*not regularly offered*

Process of production collaboration. Taught in conjunction with THP 519. Prerequisites: a combination of THP 214 and 340 and 345 or only instructor approval.

THP 411 Methods of Teaching Drama. (3)*fall*

Applies materials, techniques, and theories with grades K–8 youth. Regular participation with children. Prerequisite: THP 311 or written instructor approval.

THP 418 Directing the Actor. (3)*fall*

Practical applications of directing for the stage. Rehearsal and presentation of scenes and short plays. Prerequisites: THP 318; instructor approval.

THP 430 Costume Design. (3)*not regularly offered*

Principles of costume design with projects in both modern and period styles. Includes budgets and fabric/pattern estimates. Lecture, studio. Prerequisite: THP 214.

THP 431 Advanced Costume Construction. (3)*once a year*

Specialized training in costume construction problems and crafts with projects in tailoring, millinery, and period accessories. Prerequisites: both THP 214 and 331 or only instructor approval.

THP 435 Advanced Technical Theatre. (3)*once a year*

Selection of materials, drafting of working drawings, tool operation, and construction techniques. 2 hours lecture, 2 hours lab. Prerequisites: both THP 340 and 345 or only written instructor approval.

THP 440 Advanced Scene Design. (3)*once a year*

Advanced studio projects in designing scenery for a variety of stage forms. Fee. Prerequisite: THP 340 or written instructor approval.

THP 441 Scene Painting. (3)*not regularly offered*

Studio projects in painting stage scenery. Fee. Prerequisite: THP 340 or written instructor approval.

THP 442 Drawing. (3)*not regularly offered*

Techniques in drawing and rendering for scenic, costume, and lighting design. Prerequisite: written instructor approval.

THP 444 Drafting for the Stage. (3)*not regularly offered*

Fundamentals of and practice in graphic techniques for the stage. Introduction to computer-aided design for the stage. 2 hours lecture, 3 hours studio. Fee. Prerequisites: THP 213; written instructor approval.

THP 445 Advanced Lighting Design. (3)*not regularly offered*

Specialized techniques in stage lighting. Advanced application of design process, graphic techniques of design presentation, and use of qualities of light. Lecture, class workshops. Fee. Prerequisite: THP 345 or written instructor approval.

THP 450 Theatre Organization and Management. (3)*not regularly offered*

Overview of nonprofit arts: organizational design, strategic planning, financial management, and leadership. Prerequisite: THE 220.

THP 460 Playwright's Workshop. (3)*fall and spring*

Practice and study of creating characters, dialogue, scenes, plays, and monologues for the stage. May be repeated for credit. Studio, lecture. Prerequisite: written instructor approval.

THP 461 Scripts in Progress. (3)*fall and spring*

Studio work with the instructor, centered on revisions of original plays. May be repeated for credit. Studio. Prerequisite: THP 460 or written instructor approval.

THP 472 Advanced Movement for the Stage. (3)*once a year*

Movement techniques for the classical and nonrealistic theatre; stage combat and special skills. Prerequisite: THP 272 or instructor approval.

THP 477 Advanced Speech for the Stage. (3)*once a year*

Exercises to develop vocal flexibility and power; mastery of elevated American diction and language skills applied to classical and nonrealistic drama; stage dialects. Prerequisite: THP 377.

THP 481 Secondary School Play Production. (3)*fall*

Methods of directing, designing, and coordinating play production experiences at the secondary school level. Off-campus practicum. Prerequisites: both THP 318 and theatre education concentration or only instructor approval.

THP 484 Internship. (1-4)*once a year***THP 485 Acting: Advanced Classical Scene Study. (3)***once a year*

Rehearsal and performance of period, classical, and nonrealistic plays. Emphasis on understanding poetic language and strong vocal and physical skills. Prerequisite: THP 385 or instructor approval.

THP 486 The Meisner Approach to Acting. (3)*once a year*

Improvisations and exercises developed by Sanford Meisner applied to scene work from selected texts. Studio. Prerequisite: introductory acting classes.

THP 487 Acting for TV and Film. (3)*once a year*

Professional television and film acting techniques, terminology, and on-camera experience. Studio. Prerequisite: THP 207 or 285.

THP 488 Audition Techniques. (3)*once a year*

Techniques and preparation for stage, commercial, and TV/film auditions utilizing monologues, cold readings, and personal style. Studio. Prerequisite: introductory acting classes.

THP 489 Actor Career Development. (3)*once a year*

Familiarization with the business of acting: self-promotional tools and techniques, marketing strategies, finances, interview skills, and actor unions. Studio. Prerequisite: introductory acting classes.

THP 494 Special Topics. (1-4)*once a year*

Possible topics:

- (a) Advanced Acting Techniques
- (b) Advanced Scene Painting
- (c) Advanced Screenwriting
- (d) Advanced Stage Management
- (e) Performance and Technology
- (f) Problems in Directing
- (g) Properties and Dressings Design and Construction
- (h) Solo and Collaborative Performance
- (i) Solo Performance
- (j) Stage Dialects
- (k) Standards in the School K-12
- (l) Storytelling
- (m) Technical Theatre
- (n) Theatre of the Oppressed
- (o) Theory and Practice of Performance
- (p) Video and Industrial Scene Design

THP 498 Pro-Seminar. (1-7)*once a year*

Possible topics:

- (a) Directing. (1-6)
- (b) Projects. (1-6)
 - Costume Design
 - Lighting Design
 - Properties Design
 - Scenery Design
 - Technical Direction
- (c) Stage Management. (1-6)
- (d) Theatre for Youth Tour. (1-6)
- (e) Theatre in Education. (1-6)

Prerequisite: written instructor approval.

THP 501 Performance: Solo Performance. (8)*once a year*

Students begin to define their mission in art. Emphasis on the actor as a solo storyteller, speaking as herself or himself. Studio. Prerequisite: instructor approval.

THP 502 Performance: Aesthetics of Theatre Art. (8)*once a year*

Understanding and analyzing scripts and performance in order to be an effective actor/storyteller who speaks as a character. Projects focus on solo, duet performances. Studio. Prerequisite: instructor approval.

THP 503 Performance: The Ensemble. (8)*once a year*

Ensemble, working with a playwright, creates a play that addresses social issues through improvisation and community input. Studio. Prerequisite: instructor approval.

THP 504 Acting: Transformation II. (8)*once a year*

Fundamentals including combat, scansion, poetic language, acting style. Scene study, ensemble performance projects focused on Shakespeare, new scripts. Studio. Prerequisite: THP 503 or written instructor approval.

THP 506 Scenography. (3)*not regularly offered*

Process of production collaboration. Taught in conjunction with THP 519. Fee. Prerequisite: theatre graduate standing or written instructor approval.

THP 507 Acting: Advanced Research and Performance. (1-3)*once a year*

Acting in advanced theatre projects, productions, or collaborative

performance in directing classes. May be repeated for credit. Studio. Prerequisite: instructor approval.

THP 508 Multiethnic Workshop. (3)

fall and spring

Advanced workshop for development and presentation of works originating out of American ethnic cultures. Lecture, lab.

THP 509 Singing for Actors. (1)

fall and spring

Introduces the basics of singing technique. Breath control, resonance, articulation, exploration, and expansion of singing range. May be repeated for credit. Studio. Prerequisite: admission to M.F.A. performance concentration or written instructor approval.

THP 511 Improvisation with Youth Workshop. (3)

spring

Theories and techniques of drama with various populations of youth. Emphasis on how research informs practice. Includes practicum. Prerequisites: only THP 411 or both graduate standing and written instructor approval.

THP 512 Puppetry Workshop. (3)

fall and spring

Survey of puppetry in education, puppetry as an art form in design and performance. Fee. Prerequisite: graduate standing or written instructor approval.

THP 517 Stage Management Practicum. (3)

fall

Readings and research in stage management and participation as a stage manager in a university theatre production. Prerequisite: written instructor approval.

THP 518 Advanced Directing Lab. (3)

fall and spring

Active discovery of directing concepts through practical exercises and collaboration; deconstruction of contemporary/classic literature. Explores director as primary artist. Lab. Prerequisite: written instructor approval.

THP 519 Directing: Works in Progress. (3)

spring

Advanced projects in directing concentrating on a collaborative process between director, playwright, actors, and designers. Focuses primarily on new scripts or adaptations of literature. May be repeated for credit. Studio, on-site practicum. Prerequisites: THP 418; instructor approval.

THP 530 Advanced Costume Design. (3)

not regularly offered

Advanced studio projects in costume design for a variety of production forms. Prerequisite: written instructor approval.

THP 540 Scene Design Applications. (3)

once a year

Conceptual and practical application of the design process including graphic and sculptural projects. Practical design problems investigated in laboratory. Lab fee. Prerequisite: written instructor approval.

THP 545 Lighting Design Applications. (3)

not regularly offered

Advanced studio projects in stage lighting design. Prerequisite: written instructor approval.

THP 560 Playwright's Workshop. (3)

fall and spring

Practice and study of creating characters, dialogue, scenes, plays, and monologues for the stage. May be repeated for credit. Studio. Prerequisite: written instructor approval.

THP 561 Scripts in Progress. (3)

fall and spring

Studio work with the instructor centered on revisions of original plays. May be repeated for credit. Studio. Prerequisite: THP 560 or written instructor approval.

THP 562 Literary Management Workshop. (3)

fall

Advanced literary management for the contemporary theatre, including trends in new play development, festivals and productions throughout the United States. Participation in Arizona Playwriting Competition. Prerequisite: THP 560 or written instructor approval.

THP 584 Internship. (1–3)

once a year

Field research and on-site training in theatre for youth, community theatre, and production techniques. Prerequisite: written instructor approval.

THP 592 Research. (1–12)

not regularly offered

THP 593 Applied Project. (1–12)

once a year

Prerequisite: written instructor approval.

THP 594 Conference and Workshop in Child Drama. (3)

once a year

Prerequisite: written instructor approval.

THP 598 Special Topics. (1–4)

once a year

Lecture, studio. Possible topics:

- (a) Acting
- (b) Advanced Screenwriting
- (c) College Teaching:
 - Acting
 - Improvisation with Youth
 - Movement
 - Puppetry
 - Theatre for Social Change
 - Voice
- (d) Directing
- (e) Performance and Technology
- (f) Solo and Collaborative Performance
- (g) Solo Performance
- (h) Stage Dialects
- (i) Stage Management
- (j) Works in Progress:
 - Actor
 - Playwright

THP 599 Thesis. (1–12)

not regularly offered

THP 611 Improvisation with Youth Seminar. (3)

once a year

Examines current research, theory, and practices in drama with youth. Development and execution of research projects. Prerequisite: written instructor approval.

THP 618 Directing Practicum. (3)

once a year

Practical experience in directing and producing an entire play or musical for young audiences. Prerequisite: written instructor approval.

THP 649 Design Studio. (3)

fall and spring

Projects include design of scenery, costume, lighting, or sound for laboratory or mainstage productions. May be repeated for credit. Prerequisite: written instructor approval.

THP 684 Internship. (3–6)

fall, spring, summer

Field research in performance, improvisation with youth, theatre for youth, puppetry, and scenography. Prerequisite: written instructor approval.

THP 691 Seminar: Scenography. (3)

not regularly offered

Examines and researches modern concepts and practices of scenography. Prerequisite: written instructor approval.

THP 693 Applied Project. (1–12)

fall, spring, summer

Final projects for M.F.A. Theatre candidates in performance, scenography, and theatre for youth. Prerequisite: written instructor approval.

THP 783 Field Work. (1–12)

once a year

Possible topics:

- (a) Theatre Education

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.

Translation

See "Certificate in Translation," page 248.

Transportation Systems

Interdisciplinary Certificate Program

Mary Kihl

Director

(ARCH 119) 480/965-6395

Fax 480/965-3635

eastair.east.asu.edu/transportation

Aeronautical Management Technology (ASU East)

Professor: Gesell;

Associate Professor: Jackson;

Assistant Professor: Karp

Civil and Environmental Engineering

Professor: Mamlouk;

Assistant Professors: Owusu-Antwi, Zhu

Geography

Professor: Burns;

Associate Professor: Kuby

Planning and Landscape Architecture

Professors: Kihl, Mushkatel, Pijawka;

Associate Professor: Guhathakurta

Under the auspices of the Graduate College, the interdisciplinary certificate in Transportation Systems program is administered by the Committee on Transportation Systems. The objective of this program is to enable existing ASU gradu-

ate students and transportation professionals with advanced degrees to examine transportation-related issues from a variety of perspectives and in the context of different travel modes.

The certificate program requires a minimum of 15 semester hours of course work. To qualify for the certificate, the student must complete an interdisciplinary issues proseminar class (three semester hours), complete three elective courses (nine semester hours) from an approved list of transportation-related courses in at least two disciplines that are outside the student's degree program, and complete a capstone research paper that explores a transportation problem from a multidisciplinary perspective (three semester hours). A thesis in the area of transportation may substitute for the capstone paper.

Master's degree candidates in good standing in participating departments may apply. Current practicing professionals who already hold a graduate degree or who have at least three years of postbaccalaureate professional transportation experience may also apply for admission to the certificate program. Applications are reviewed by the Transportation Systems Certificate Admissions and Advisory Committee, made up of representatives of participating departments. Enrollment in all classes outside the major requires permission of the instructor. For more information, contact the program director, 480/965-6395.

TRANSPORTATION SYSTEMS CERTIFICATE (TRC)

TRC 591 Seminar. (1-12)

fall and spring

TRC 593 Applied Project. (1-12)

fall and spring

Omnibus Graduate Courses. See page 50 for omnibus graduate courses that may be offered.



The Student Recreation Complex, featuring a 70-meter outdoor pool, is one of the finest collegiate workout facilities in the U.S.

ASU Main Directory

For the “ASU East Directory,” see page 427. For the “ASU West Directory,” see page 437. For the “ASU Extended Campus Directory,” see page 452.

Organization	Location	Telephone	Web Address
Accounts Receivable	ADM A109	480/965-6341	—
Admissions	—	—	—
Adult Reentry	MU 14	480/965-2252	www.asu.edu/studentlife/reentry
Graduate	WILSN 101	480/965-6113	www.asu.edu/graduate/admission
Law	LAW 101	480/965-1474	www.law.asu.edu
Readmissions (Undergraduate)	SSV 142	480/965-7440	www.asu.edu/registrar/readmissions
Undergraduate	SSV 112	480/965-7788	www.asu.edu/admissions
Architecture and Environmental Design, College of	ARCH 134	480/965-8169	www.asu.edu/caed
Architecture, School of	AED 162	480/965-3536	www.asu.edu/caed/architecture
Design, School of	AED 154	480/965-4135	www.asu.edu/caed/design
Herberger Center for Design Excellence	ARCH 119	480/965-6693	www.asu.edu/caed/herberger
Planning and Landscape Architecture, School of	AED 158	480/965-7167	www.asu.edu/caed/planning
Arizona Drug and Gang Prevention Resource Center	ASUDC B2	480/727-5015 1-888-432-2347	www.asu.edu/adgprc
Arizona Prevention Resource Center	ASUDC B2	480/727-2772 1-888-432-2772	www.asu.edu/aprc
Associated Students of ASU (ASASU)	MU 310	480/965-3161	www.asu.edu/asasu
ASU Alumni Association	MAIN 200	480/965-2586	www.asu.edu/alumni
Administration	MAIN 200	480/965-2086	
Alumni Publications/ASU Vision Magazine	MAIN 200	480/727-6280	
Alumni Relations	MAIN 200	480/965-5276	
Alumni Travel	MAIN 200	480/965-0099	
Business Office	MAIN 200	480/965-9357	
Campuses, Chapters, and College Associations	MAIN 200	480/965-5276	
Career Programs	MAIN 200	480/965-5074	
Membership/Marketing	MAIN 200	480/965-8346	
Records Department	MAIN 200	480/965-2127	
Reunions and Traditions	MAIN 200	480/965-4282	
Scholarships/Alumni Development	MAIN 200	480/965-4034	
Student Relations	MAIN 200	480/965-7754	
Sun Devil Advocates (Grass Roots Network)	MAIN 200	480/965-4078	
ASU West Alumni Programs	FAB S363	602/543-5315	
ASU East ¹	—	480/727-3278	www.east.asu.edu
ASU Extended Campus ²	—	480/965-9696	www.asu.edu/xed
ASU Main	—	480/965-9011	www.asu.edu
ASU West ³	—	623/543-5500	www.west.asu.edu
Bookstore, ASU	BKSTR	480/965-7928	bookstore.asu.edu/index2.html
Business, College of	BA 123	480/965-4227	www.cob.asu.edu
Accountancy and Information Management, School of	BA 223	480/965-3631	www.cob.asu.edu/acct
Business Administration (M.B.A.)	—	480/965-3332	www.cob.asu.edu/mba
Business Administration (Ph.D.)	—	480/965-3368	www.cob.asu.edu/grad/phd

¹ See “ASU East Directory,” page 427.

² See “ASU Downtown Center,” page 450.

³ See “ASU West Directory,” page 437.

Organization	Location	Telephone	Web Address
Business, College of (continued)			
Economics, Department of	BAC 659	480/965-3531	www.cob.asu.edu/ecn
Finance, Department of	BAC 519	480/965-3131	www.cob.asu.edu/fin
Health Administration and Policy, School of	BA 318	480/965-7778	www.cob.asu.edu/hap
International Business Studies	BA 122	480/965-4066	www.cob.asu.edu/up/ipo.cfm
Management, Department of	BA 323	480/965-3431	www.cob.asu.edu/mgt
Marketing, Department of	BAC 460	480/965-3621	www.cob.asu.edu/mkt
Small Business, Center for the Advancement of	BA 111	480/965-3962	www.cob.asu.edu/up/smallbusiness.cfm
Supply Chain Management, Department of	BAC 446	480/965-6044	www.cob.asu.edu/scm
Campus Dining Services	MU 138	480/965-3464	www.asu.edu/mu/campusdining
Career Services	SSV 329	480/965-2350	career.asu.edu
Cashiering Services	SSV 244	480/965-7468	—
Child and Family Services	MU 14C	480/965-9515	www.asu.edu/vpsa/family
Cocurricular Programs	MCL 109B	480/965-9600	www.asu.edu/vpsa/partnerships
Community Service Program	MU 303	480/965-2255	www.asu.edu/vpsa/community
Counseling and Consultation	SSV 334 SHS A168	480/965-6146 480/965-4726	www.asu.edu/counseling_center/index1.html —
Creative Writing (M.F.A.)	LL 307C	480/965-3528	www.asu.edu/clas/english/creativewriting
Disability Resources for Students	MCENT	—	www.asu.edu/drs
TTY	—	480/965-9000	—
Voice	—	480/965-1234	—
Drop/Add and Withdrawal Information	SSV 140	480/965-3124	—
Education, College of			
Bilingual Education, Center for	EDB 108 ED 440	480/965-3306 480/965-7134	www.ed.asu.edu/coe www.asu.edu/educ/cber
Computer Support/Student Computer Lab	EDB 122	480/965-2126	—
Curriculum and Instruction, Division of	ED 426	480/965-1644	www.ed.asu.edu/coe/candi
Curriculum and Instruction, Graduate Program Office	ED 434	480/965-4602	coephd.asu.edu
Dean's Office	EDB 104	—	courses.ed.asu.edu/deanos
Educational Leadership and Policy Studies, Division of	ED 120	480/965-3538	asu.edu/elps
Educational Research and Services, Bureau of	EDB 140	480/965-6357	bers.asu.edu
Indian Education, Center for	ED 402	480/965-6292	www.asu.edu/educ/cie
Professional Field Experiences, Office of (Student Teaching)	EDB L1-14	480/965-6255	www.ed.asu.edu/coe/pfe
Psychology in Education Admissions Information (Recording, Voice Mail)	—	480/965-6420	—
Psychology in Education, Division of	EDB 302	480/965-3384	seamoney.ed.asu.edu/~gail/division/divintro.htm
Student Affairs, Office of (Academic Advising and Certification)	EDB L1-13	480/965-5555	coe.asu.edu/osa/advising/advising.html
Student Affairs, Office of (Recruitment and Support Programs) (Tutoring Scholarships)	EDB L1-19	480/965-5555	coe.asu.edu/osa/tutorial/tutorial.html
Educational Opportunity Center	1000 E Apache No. 118	480/894-8451	www.asu.edu/studentlife/eoc
Engineering and Applied Sciences, College of			
Bioengineering, Department of	ECG 100 ECG 202	480/965-3421 480/965-3028	www.eas.asu.edu www.eas.asu.edu/~bme

¹ See "ASU East Directory," page 427.

² See "ASU Downtown Center," page 450.

³ See "ASU West Directory," page 437.

Organization	Location	Telephone	Web Address
Engineering and Applied Sciences, College of (continued)	ECG 100	480/965-3421	www.eas.asu.edu
Chemical and Materials Engineering, Department of	ECG 202	480/965-3313	www.eas.asu.edu/~cbme
Civil and Environmental Engineering, Department of	ECG 252	480/965-3589	www.eas.asu.edu/~civil
Computer Science and Engineering, Department of	GWC 206	480/965-3190	www.eas.asu.edu/~csdept
Construction, Del E. Webb School of	SCOB 241	480/965-3615	construction.asu.edu
Electrical Engineering, Department of	ENGRC 552	480/965-3424	www.eas.asu.edu/ee
Engineering, School of	ECG 104	480/965-1726	—
Industrial Engineering, Department of	GWC 502	480/965-3185	www.eas.asu.edu/~imse
Mechanical and Aerospace Engineering, Department of	ECG 346	480/965-3291	www.eas.asu.edu/~mae
Equal Opportunity/ Affirmative Action TTY	ADM B171 —	480/965-5057 480/965-0471	www.eoaa.asu.edu —
Exercise Science (Ph.D.)	PEBW M201	480/965-7906	www.asu.edu/clas/espe
Extended Education, College of ²	DTC C319	480/965-9696	www.asu.edu/xed
FASTT (Financial Aid Services Through Technology)	—	480/968-4400	www.asu.edu/fastt
Fine Arts, Herberger College of	GHALL 132	480/965-6536	herbergercollege.asu.edu
Art, School of	ART 102	480/965-3468	herbergercollege.asu.edu/art
Dance, Department of	PEBE 107B	480/965-5029	herbergercollege.asu.edu/dance
Music, School of	MUSIC E183	480/965-3371	herbergercollege.asu.edu/music
Theatre, Department of	GHALL 232	480/965-5359	herbergercollege.asu.edu/theatre
Gerontology (Certificate)	WHALL 116	480/965-3225	www.asu.edu/graduate/gerontology
Graduate College	WILSN lobby	480/965-3521	www.asu.edu/graduate
Admissions	WILSN 101	480/965-6113	www.asu.edu/graduate/fr_appy.html
Advising Office	WILSN lobby	480/965-3521	www.asu.edu/graduate/checklist.html#ADVISING
Financial Assistance	WILSN 120	480/965-3521	www.asu.edu/graduate/financial.html
Format Office	—	480/965-3521	—
General Office	—	480/965-3521	—
Scholarships	—	480/965-3521	—
Graduation Section	—	—	www.asu.edu/registrar/graduation
Commencement Office	ADM B167	480/965-6611	www.asu.edu/ssc/commence
Graduate Division	SSV 140	480/965-6980	—
Greek Life	MU 305	480/965-2255	www.asu.edu/vpsa/greeklife
HOME (Housing Options Made Easy)	—	480/303-3434	www.asu.edu/reslife
Information Technology	—	—	www.asu.edu/it
Computer Accounts Office	CPCOM 105	480/965-1211	www.asu.edu/computeraccounts
Computing Site Hours	—	480/965-6500	www.asu.edu/it/fyi/sites/siteschedule.html
Computing Sites	CPCOM atrium	480/965-4459	www.asu.edu/computingsites
	BAC 16	480/965-3074	—
	ECG 150	480/965-6280	—
	GWC 185	480/965-4307	—
Customer Assistance Center	CPCOM 202	480/965-5939	www.asu.edu/cacenter
Geographic Information Systems Lab	CPCOM 235	480/965-4007	www.asu.edu/gislab
Help Desk	CPCOM 202	480/965-6500	www.asu.edu/helpdesk
Instruction Support Lab	CPCOM 213	480/965-6739	is.asu.edu
Visualization Services	CPCOM 235	480/965-9699	www.asu.edu/visualization
International Programs Office	MOEUR 124	480/965-5965	ipo.asu.edu
International Student Office	SSV 265	480/965-7451	www.asu.edu/studentlife/iso
InTouch	—	480/350-1500	www.asu.edu/registrar/registration/intouch.html

¹ See "ASU East Directory," page 427.

² See "ASU Downtown Center," page 450.

³ See "ASU West Directory," page 437.

Organization	Location	Telephone	Web Address
Justice Studies (Ph.D.)	WILSN 316	480/965-7682	www.asu.edu/copp/justice/home.htm
Law, College of	LAW 101	480/965-6181	www.law.asu.edu
Admissions Office	—	480/965-1474	—
TTY	—	480/965-2048	—
Learning Resource Center	SSV 394	480/965-6254	www.asu.edu/vpsa/lrc
Liberal Arts and Sciences, College of	SS 111	480/965-6506	www.asu.edu/clas
Aerospace Studies, Department of	TC 324	480/965-3181	www.asu.edu/clas/afrotc
African American Studies	HEC 227	480/965-4399	www.asu.edu/clas/aftramstu
Anthropology, Department of	ANTH 233	480/965-6213	www.asu.edu/clas/anthropology
Biology, Department of	LSC 226	480/965-3571	lifesciences.asu.edu/biology
Chemistry and Biochemistry, Department of	PS D102	480/965-3461	www.asu.edu/clas/chemistry
Chicana and Chicano Studies, Department of	COWDN 224	480/965-5091	www.asu.edu/clas/chicana
English, Department of	LL 542	480/965-3168	www.asu.edu/clas/english
Exercise Science and Physical Education, Department of	PEBW M212	480/965-3875	www.asu.edu/clas/espe
Family and Human Development, Department of	COWDN 106	480/965-6978	www.asu.edu/clas/frhd
Geography, Department of	SCOB 340H1	480/965-7533	geography.asu.edu
Geological Sciences, Department of	PS F686	480/965-5081	geology.asu.edu
History, Department of	SS 204	480/965-5778	www.asu.edu/clas/history
Interdisciplinary Humanities Program	LL 641	480/965-6747	www.asu.edu/clas/humanities
Languages and Literatures, Department of	LL 440	480/965-6281	www.asu.edu/clas/dll
Mathematics, Department of	PS A216	480/965-3951	math.la.asu.edu
Microbiology, Department of	LSE 210	480/965-1457	lifesciences.asu.edu/microbiology/
Molecular and Cellular Biology	LSE 441	480/965-0743	ls.la.asu.edu/mcb/
Molecular Bioscience and Biotechnology	LSE 218	480/965-3414	lifesciences.asu.edu/mbb
Military Science, Department of	TC B100	480/965-3318	www.asu.edu/clas/military
Philosophy, Department of	PS A524	480/965-3394	www.asu.edu/clas/philosophy
Physics and Astronomy, Department of	PS F470	480/965-3561	phy.asu.edu
Plant Biology, Department of	LSE 218	480/965-3414	lifesciences.asu.edu/plantbiology
Political Science, Department of	SS 410	480/965-6551	www.asu.edu/clas/polisci
Psychology, Department of	PSY 237	480/965-3326	www.asu.edu/clas/psych
Religious Studies, Department of	ECA 377	480/965-7145	www.asu.edu/clas/religious_studies
Sociology, Department of	SS 321	480/965-3546	www.asu.edu/clas/sociology
Speech and Hearing Science, Department of	LL 173A	480/965-2374	www.asu.edu/clas/shs
Women's Studies Program	ECA 209	480/965-2358	www.asu.edu/clas/womens_studies
Libraries (See "University Libraries," page 348.)			
Memorial Union	MU	—	www.asu.edu/mu
Administrative Offices	MU mezzanine	480/965-5310	www.asu.edu/mu/staff.html
Event Meeting Services	MU 1st level	480/965-3406	www.asu.edu/mu/ems.html
Information Desk	MU 1st level	480/965-5728	—
Lost and Found	MU 1st level	480/965-5728	—
Sun Devil Involvement Center	MU 3rd level	480/965-2255	www.asu.edu/mu/sdic.html
Multicultural Student Center	SSV 394	480/965-6060	www.asu.edu/studentlife/msc
Nursing, College of	NUR 344	480/965-3244	www.asu.edu/nursing
Community Health Services Clinic	—	480/941-9283	www.asu.edu/nursing/chs
Continuing and Extended Education	CSB 334	480/965-7431	www.asu.edu/nursing/ce
Graduate Program	NUR 444	480/965-3948	www.asu.edu/nursing
Student Service Office	NUR 108	480/965-2987	www.asu.edu/nursing/studentsservices
Operator, University	—	480/965-9011	—

¹ See "ASU East Directory," page 427.

² See "ASU Downtown Center," page 450.

³ See "ASU West Directory," page 437.

Organization	Location	Telephone	Web Address
Parents Association (Programs)	SSV 110	480/965-2602	www.asu.edu/admissions/parentprograms
Parking and Transit Services	TOWER 107	480/965-6406	www.asu.edu/dps/pts
Public Programs, College of	WILSN 234	480/965-1034	www.asu.edu/copp
Advanced Public Executive Program	ASUDC C110	480/965-4006	www.asu.edu/copp/apep
American Indian Studies Program	AG 372	480/965-3634	www.asu.edu/copp/americanindian
Asian Pacific American Studies Program	AG 352	480/965-9711	www.asu.edu/copp/asianamerican
Human Communication, Hugh Downs School of	STAUF A412	480/965-5095	com.pp.asu.edu
Journalism and Telecommunication, Walter Cronkite School of	STAUF A231	480/965-5011	www.asu.edu/cronkite
Justice Studies, School of	WILSN 331	480/965-7682	www.asu.edu/copp/justice
Morrison Institute for Public Policy	UVCMN 203	480/965-4525	www.asu.edu/copp/morrison
Nonprofit Leadership and Management, Center for	AG 346	480/965-0607	www.asu.edu/copp/nonprofit
Public Affairs, School of	WILSN 208	480/965-3926	spa.asu.edu
Recreation Management and Tourism, Department of	MOEUR 131	480/965-7291	www.asu.edu/copp/recreation
Social Work, School of	WHALL 135	480/965-3304	ssw.asu.edu
Urban Inquiry, Center for	AG 320B	480/965-9216	www.asu.edu/copp/urban
Registrar	SSV 140	—	www.asu.edu/registrar
Expedite	—	480/968-5988	www.asu.edu/registrar/general/expedite.html
InTouch	—	480/350-1500	www.asu.edu/registrar/registration/intouch.html
TTY	—	480/965-3236	—
Voice	—	480/965-3124	—
Residency Classification	SSV 170	480/965-7712	www.asu.edu/registrar/residency
Residential Life	SSV 170	480/965-3515	www.asu.edu/reslife
Science and Engineering of Materials (Ph.D.)	PS B135	480/965-2460	www.asu.edu/graduate/SEM
Speech and Hearing Science (Ph.D.)	CSB 146	480/965-2373	www.asu.edu/clas/shs
Statistics (M.S.)	BAC 570	480/965-2671	www.asu.edu/graduate/statistics
Student Affairs Research and Evaluation Office	MU 14D	480/965-4070	www.asu.edu/vpsa/research
Student Aid Disbursement	SSV 235	480/965-2956	www.asu.edu/fastt/apply/disbursement.html
Student Business Services	ADM A105	480/965-6301	—
Student Development	MU 182	480/965-7313	www.asu.edu/vpsa/sd
Student Employment	SSV 202	—	www.asu.edu/fa/studemp
Off-Campus	—	480/965-6318	—
On-Campus	—	480/965-5186	—
Student Financial Assistance	SSV 216A	480/965-3355	www.asu.edu/fastt
Student Foundation	MU 340	480/965-5731	—
Student Health and Wellness Center	SHS	480/965-3346	www.asu.edu/health
Appointments	—	480/965-3349	—
Fax	—	480/965-8914	—
Measles Information	—	480/965-1358	—
Student ID (Sun Card)	MU 190	480/965-2273	www.suncard1.com
Student Leadership Programs	MU 340	480/965-2255	www.asu.edu/vpsa/slp
Student Life	SSV 263	480/965-6547	www.asu.edu/studentlife
Student Media	MCENT 2	480/965-7572	www.statepress.com/aboutus
State Press Advertising	—	480/965-6555	www.statepress.com/spress
State Press Information	—	480/965-7572	—
State Press Newsroom	—	480/965-2292	—
Web Devil	—	480/727-6941	www.statepress.com

¹ See "ASU East Directory," page 427.

² See "ASU Downtown Center," page 450.

³ See "ASU West Directory," page 437.

Organization	Location	Telephone	Web Address
Student Organization Resource Center	MU 340	480/965-2255	www.asu.edu/clubs
Student Recreation Complex and Recreational Sports	SRC 220	480/965-8900	www.asu.edu/src
Summer Sessions, Office of	ADM B167	480/965-6611	www.asu.edu/ssc
Summer International Programs	AG 313	480/965-6611	www.asu.edu/ssc/StudyAbroad
Testing Support Services	SSV 322	480/965-6777	www.asu.edu/uts
Tickets	—	—	—
Athletic Events, Intercollegiate (Sun Devil Ticket Office)	—	480/965-2381	—
Gammage Box Office	GGMA	480/965-3434	—
Public Event information	—	480/965-5062	—
Transcripts (Outgoing)	SSV 140B	480/965-7276	www.asu.edu/registrar/transcripts
Transportation Systems (Certificate)	ARCH 119	480/965-6395	eastair.east.asu.edu/transportation
Tuition Payment Office	SSV 235	480/965-4347	—
University Evaluation, Office of	AG 281	480/965-9291	www.asu.edu/oue
University Libraries	LIB	480/965-6164	www.asu.edu/libraries
Architecture and Environmental Design Library	AED 153	480/965-6400	www.asu.edu/caed/AEDlibrary/
Archives and Manuscripts, Department of	LIB 413	480/965-3145	www.asu.edu/lib/archives
East Campus Library	CNTR	480/727-1037	eastlib.east.asu.edu
Hayden Library (Circulation Desk)	LIB	480/965-3605	www.asu.edu/lib/hayden
Library Administration	LIB	480/965-3417	—
Music Library	MUSIC W302	480/965-3513	www.asu.edu/lib/music
Noble Science and Engineering Library	NOBLE	480/965-2600	—
Reference Questions	—	480/965-4932	—
Ross-Blakley Law Library	LAWLB	480/965-6141	www.lawlib.asu.edu
Video Resources	ECA 100	480/965-5046	www.asu.edu/lib/video
West Campus Library	FLHLB	602/543-8501	www.west.asu.edu/library
University Testing Services	EDB 301	480/965-7146	www.asu.edu/uts
Upward Bound	SSV 276	480/965-6483	www.asu.edu/studentlife/ub/main.html
Veterans Services Section	SSV 148	480/965-7723	www.asu.edu/registrar/veterans
Veterans Upward Bound	1000 E Apache No. 106	480/965-3944	www.asu.edu/studentlife/vub
Winter Session	—	480/965-9797	www.asu.edu/xed/wntsrssn.html

¹ See "ASU East Directory," page 427.

² See "ASU Downtown Center," page 450.

³ See "ASU West Directory," page 437.

ASU Main Faculty and Academic Professionals

The faculty and academic professionals listed are involved in undergraduate and graduate instruction and research.
The year of first appointment follows the name. Emeriti are included.

A

- Aanenson, Todd** (2000), Faculty Associate of Construction; B.S., Arizona State University
- Aannestad, Per** (1975), Associate Professor of Physics and Astronomy; B.S., University of Oslo (Norway); Ph.D., University of California, Berkeley
- Abbaszadegan, Morteza** (1999), Associate Professor of Civil and Environmental Engineering and Adjunct Faculty of Microbiology; B.S., University of Montana; M.S., Northern Arizona University; Ph.D., University of Arizona
- Abele, Deborah** (1990), Faculty Associate of Planning and Landscape Architecture; B.A., Vassar College
- Aberle, James T.** (1989), Associate Professor of Electrical Engineering; B.S., M.S., Polytechnic Institute of New York; Ph.D., University of Massachusetts, Boston
- Abramson, Jay** (1999), Lecturer of Mathematics; B.S., University of New Mexico; M.S., University of New Hampshire
- Abston, Deborah** (1990), Associate Librarian, Hayden Reference Services; B.S., M.S.L.S., Wayne State University
- Acereda, Alberto** (1998), Assistant Professor of Latin American Literature; Licenciado, University of Barcelona (Spain); M.A., Ph.D., University of Georgia
- Acevedo, Roberto M.** (1964), Professor Emeritus of Spanish; B.A., University of California, Berkeley; M.A., Ph.D., University of Arizona
- Acharya, Raghunath** (1976), Associate Professor of Physics and Astronomy; B.Sc., M.Sc., University of Delhi (India); Ph.D., University of Rochester
- Acker, Barbara** (1991), Associate Professor of Theatre; B.F.A., University of Texas, Austin; M.A., Case Western Reserve University; Ph.D., Wayne State University
- Acker, William J.** (1970), Professor Emeritus of Geography; B.S., Purdue University; M.S., University of Kansas; M.A., Ph.D., Syracuse University
- Adams, Donna** (1983), Associate Professor of Nursing; B.S.N., University of Missouri, Columbia; M.S., Arizona State University; D.N.Sc., University of San Diego
- Adams, James B.** (1996), Professor of Materials Engineering; Interim Codirector, Science and Engineering of Materials; B.S., Duke University; M.S., Ph.D., University of Wisconsin, Madison
- Adams, Karen L.** (1984), Professor of English; Director, Program for Southeast Asian Studies; B.A., M.A., Ph.D., University of Michigan
- Adelman, Madelaine** (1998), Assistant Professor of Justice Studies; A.B., Ph.D., Duke University
- Adelson, Roger D.** (1974), Professor of History; B.A., George Washington University; B.Litt., University of Oxford (United Kingdom); M.A., Ph.D., Washington University
- Aerni, Wayne** (1991), Faculty Associate of Public Affairs; B.A., University of Oregon; M.P.A., D.P.A., Arizona State University
- Agadjanian, Victor** (1995), Assistant Professor of Sociology; B.A., Moscow State University (Russia); M.S., Ph.D., University of Southern California
- Aguilar, John L.** (1976), Professor Emeritus of Anthropology; B.A., University of California, Los Angeles; M.A., California State University, Los Angeles; Ph.D., University of California, San Diego
- Ahn, Seung C.** (1990), Associate Professor of Economics; B.A., Sogang University (Korea); M.A., Ph.D., Michigan State University
- Ahrendt, Laurie** (2000), Faculty Associate of Nursing; B.S.N., M.S., Arizona State University
- Aiken, Leona S.** (1985), Professor of Psychology; B.S., Virginia Commonwealth University; M.S., Ph.D., Purdue University
- Akins, William H.** (1975), Professor Emeritus of Theatre; B.A., Duke University; M.A., Ph.D., University of Denver
- Alarcon, Ricardo O.** (1989), Professor of Physics and Astronomy; B.S., M.S., University of Chile (Chile); Ph.D., Ohio University
- Alberts, Jess K.** (1989), Professor of Communication; Director, Hugh Downs School of Human Communication; B.S.Ed., M.A., Abilene Christian University; Ph.D., University of Texas, Austin
- Alcock, John** (1972), Regents' Professor of Biology; B.A., Amherst College; Ph.D., Harvard University
- Alcorn, Marianne** (1981), Law Librarian, Reference; B.A., University of Washington; M.L.S., University of Southern California
- Aldama, Arturo** (1996), Assistant Professor of Chicana and Chicano Studies; B.A., Evergreen State University; M.A., Ph.D., University of California, Berkeley
- Aldrich, Frank T.** (1969), Professor Emeritus of Geography; B.A., University of Texas, Austin; M.S., Ph.D., Oregon State University
- Alexander, Robert J.** (1975), Professor of German; B.A., Macalester College; M.A., Ph.D., University of Wisconsin, Madison
- Alford, Terry L.** (1993), Associate Professor of Materials Engineering; B.S., M.S., North Carolina State University, Raleigh; Ph.D., Cornell University
- Alisky, Marvin** (1957), Professor Emeritus of Political Science; B.A., M.A., Ph.D., University of Texas, Austin
- Allee, David R.** (1991), Associate Professor of Electrical Engineering; B.S., University of Cincinnati; M.S., Ph.D., Stanford University

- Allen, Craig M.** (1991), Associate Professor of Journalism and Telecommunication; B.A., Linfield College; M.S., University of Oregon; Ph.D., Ohio University
- Allen, James P.** (1989), Professor of Chemistry and Biochemistry; B.S., Saint Joseph's University; M.S., Ph.D., University of Illinois
- Allen, Jonathan** (2001), Assistant Professor of Chemical Engineering and Civil and Environmental Engineering; B.S., University of Pennsylvania; M.S., Sc.D., Massachusetts Institute of Technology
- Allison, Maria T.** (1984), Professor of Recreation Management and Tourism; B.S., M.S., University of New Mexico; Ph.D., University of Illinois
- Alozie, Nicholas O.** (1991), Associate Professor of Public Affairs; B.A., M.P.A., Texas Southern University; M.A., Ph.D., University of Texas, Dallas
- Alpers, Rojann** (1995), Associate Professor of Nursing; B.S.N., M.S., Arizona State University; Ph.D., University of Iowa
- Alquist, Lewis R.** (1984), Professor of Art; B.F.A., Florida Atlantic University; M.F.A., Cranbrook Academy of Art
- Altheide, David L.** (1973), Regents' Professor of Justice Studies; Interim Director, Justice Studies Master's Program; B.A., Central Washington State College; M.A., University of Washington; Ph.D., University of California, San Diego
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ROBERT B. CIALDINI
Psychology



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Electrical Engineering



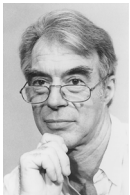
DAVID L. ALTHEIDE
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*Center for Solid-State
Science and
Chemistry and Biochemistry
Emeritus*



CARLETON B. MOORE
*Chemistry and Biochemistry
and Geology*



NANCY FELIPE RUSSO
Psychology



KURT WEISER
Art

Administrative Personnel

Arizona Board of Regents

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Governor of Arizona	Jane Dee Hull
Superintendent of Public Instruction	Lisa Graham Keegan
Student Regent, appointed to July 2001	Mary Echeverria
Regent, appointed to January 2002	George H. Amos III
Regent, appointed to January 2002	Judith Gignac
Regent, appointed to January 2004	Kay McKay
Regent, appointed to January 2004	Donald J. Ulrich
Regent, appointed to January 2006	Chris Herstam
Regent, appointed to January 2006	Jack Jewett
Regent, appointed to January 2008	Christina Palacios
Regent, appointed to January 2008	Gary Stuart
Counsel to the Board	Joel Sideman

President's Office

President	Lattie F. Coor
Senior Vice President	Gary S. Krahenbuhl
Senior Executive Assistant to the President	Ben R. Forsyth
Assistant to the President	Joyce Smitheran
Executive Assistant for University Programs	Ruth S. Jones
Advisor to the President on American Indian Affairs	Peterson Zah
Director, Athletics	Gene Smith
Director, Equal Opportunity/Affirmative Action	Barbara A. Mawhiney
Vice President and General Counsel	Paul J. Ward
Dean, College of Extended Education	Bette F. DeGraw
ICA Faculty Representative	Jerry L. Kingston

ASU Main

Academic Affairs

Senior Vice President and Provost	Milton D. Glick
Vice Provost	Kathleen K. Church
Vice Provost for Research	Jonathan Fink
Vice Provost for Academic Personnel	Gail Hackett
Vice Provost for Information Technology	William E. Lewis
Vice Provost for Academic Programs	William T. Trotter
Assistant Vice President for Academic Affairs	Louis Olivas
Assistant to the Senior Vice President and Provost	Linda Van Scoy
Fiscal Operations Administrator	Lynn Carpenter
Director, Academic and Administrative Documents	Tabb Forster
Director, Academic Articulation	Zoila Gamero de Tovar
Director, Academic Facilities	David Techau
Director, Center for Learning and Teaching Excellence	Duane Roen
Director, Fiscal Planning and Analysis	Alan Carroll
Director, Institutional Analysis	John Porter
Director, International Programs	William G. Davey
Director, Strategic Planning and Policy Analysis	Douglas Vinzant
Director, Summer Sessions	Carol Switzer
Executive Director, Division of Undergraduate Academic Services	William S. Johnson
Director, University Evaluation	Patricia Green

Barrett Honors College

Dean, Barrett Honors College	Ted Humphrey
Associate Dean	Janet M. Burke
Director, Office of National Scholarship Advisement	Michael Cochise Young

College of Architecture and Environmental Design

Dean, College of Architecture and Environmental Design	John Meunier
--	--------------

Associate Dean, College of Architecture and Environmental Design Lorraine M. Cutler
 Associate Dean, College of Architecture and Environmental Design Mary Kihl
 Director, Ph.D. Program in Environmental Planning in Design David Pijawka
 Director, School of Architecture Ron McCoy
 Director, School of Design Jacques Giard
 Director, School of Planning and Landscape Architecture Frederick Steiner
 Director, Herberger Center for Design Excellence Mary Kihl
 Coordinator, Joint Urban Design Program John McIntosh
 Coordinator, Joint Urban Design Studio Michael Dollin

College of Business

Dean, College of Business Larry E. Penley
 Associate Dean, Executive and Professional Programs Lee R. McPheters
 Associate Dean, Graduate Programs Dennis L. Hoffman
 Associate Dean, Undergraduate Programs Philip R. Regier
 Director, School of Accountancy and Information Management Philip M.J. Reckers
 Chair, Department of Economics Arthur E. Blakemore
 Chair, Department of Finance Herbert M. Kaufman
 Director, School of Health Administration and Policy Eugene S. Schneller
 Chair, Department of Management William H. Glick
 Chair, Department of Marketing Michael P. Mokwa
 Chair, Department of Supply Chain Management Joseph R. Carter
 Director, Center for Advanced Purchasing Studies Phillip L. Carter
 Director, Center for the Advancement of Small Business Mary Lou Bessette
 Director, Arizona Real Estate Center Jay Q. Butler
 Director, Center for Business Research Timothy D. Hogan
 Director, Center for Services Marketing and Management Stephen W. Brown
 Director, Bank One Economic Outlook Center Lee R. McPheters
 Director, L. William Seidman Research Institute Timothy D. Hogan

College of Education

Dean, College of Education David C. Berliner
 Associate Dean, Teacher Education Nicholas R. Appleton
 Interim Associate Dean, Academic Programs and Personnel Sarah J. Hudelson
 Associate Dean, Research Gene V Glass
 Assistant Dean, Office of Student Affairs Inta "Maggie" Tolan
 Director, Division of Curriculum and Instruction Nicholas R. Appleton
 Associate Director of Research and Graduate Education,
 Division of Curriculum and Instruction Robert B. Rutherford Jr.
 Associate Director for Professional Development and Induction,
 Division of Curriculum and Instruction Billie Enz
 Associate Director of Initial Teacher Certification, Division of Curriculum
 and Instruction Frederick Staley
 Director, Division of Educational Leadership and Policy Studies Terrence G. Wiley
 Academic Program Coordinator, Educational Administration and Supervision Donna J. Macey
 Academic Program Coordinator, Education Policy Studies Mary Lee Smith
 Academic Program Coordinator, Social and Philosophical Foundations Eric Margolis
 Academic Program Coordinator, Higher and Post-Secondary Education Robert H. Fenske
 Director, Division of Psychology in Education Elsie G.J. Moore
 Training Director and Academic Program Leader, Counseling Psychology Terence Tracey
 Academic Program Leader, Counselor Education Terence Tracey
 Interim Training Director, Educational Technology James D. Klein
 Academic Program Leader, Educational Psychology Edward A. Nelsen
 Interim Training Director, School Psychology Raymond W. Kulhavy
 Director, Center for Bilingual Education and Research Josué M. González
 Director, Bureau of Educational Research and Services Margaret A. Mangini
 Director, Center for Indian Education Octaviana Trujillo
 Director, Counselor Training Center Judith Homer
 Director, Office of Professional Field Experiences *To Be Appointed*

College of Engineering and Applied Sciences

Dean, College of Engineering and Applied Sciences Peter E. Crouch
 Associate Dean, Academic Affairs Daniel F. Jankowski
 Associate Dean, Planning and Administration Ben M. Huey
 Associate Dean, Research Gregory B. Raupp
 Associate Dean, Student Affairs and Special Programs Mary R. Anderson-Rowland

Director, Del E. Webb School of Construction	William W. Badger
Director, School of Engineering	Daniel F. Jankowski
Chair, Department of Bioengineering	Eric J. Guilbeau
Chair, Department of Chemical and Materials Engineering	Subhash Mahajan
Chair, Department of Civil and Environmental Engineering	Sandra L. Houston
Chair, Department of Computer Science and Engineering	<i>To Be Appointed</i>
Chair, Department of Electrical Engineering	Stephen M. Goodnick
Chair, Department of Industrial Engineering	Gary L. Hogg
Chair, Department of Mechanical and Aerospace Engineering	<i>To Be Appointed</i>
Director, Engineering Core and Special Studies	Daniel F. Jankowski
Director, Center for Research on Education in Science, Mathematics, Engineering, and Technology	Donovan L. Evans
Codirector, Center for Low Power Electronics	Dieter K. Schroder
Director, Center for Professional Development	Charles S. Elliott
Director, Center for Solid-State Electronics Research	Michael Kozicki
Director, Center for System Science and Engineering Research	Frank C. Hoppensteadt
Director, Manufacturing Institute	Thomas E. Callarman
Interim Director, Telecommunications Research Center	Joseph Y. Hui

College of Law

Dean, College of Law	Patricia D. White
Associate Dean	Hannah R. Arterian
Associate Dean and Director, Ross–Blakley Law Library	Victoria K. Trotta
Assistant Dean, Administrative and Business Services	Rhonda Sandler
Assistant Dean and Director of Admissions	Brenda Brock
Assistant Dean, Student Services	Leslie Mamaghani
Development Officer	Susan Mathew
Director, Alumni Relations	Cari Gerchick
Director, Communications	Jodi Weisberg
Director, Center for the Study of Law, Science, and Technology	Daniel S. Strouse
Associate Director, Center for the Study of Law, Science, and Technology	Andrew Askland
Director, Clinical Programs	Catherine O'Grady
Director, Development	Tom Stevick
Director, Legal Research and Writing and Academic Success Program	Judith M. Stinson
Executive Director, Indian Legal Program	Rebecca A. Tsosie
Associate Director, Indian Legal Program	Kate Rosier

College of Liberal Arts and Sciences

Interim Dean, College of Liberal Arts and Sciences	Linell E. Cady
Associate Dean	Milton R. Sommerfeld
Associate Dean, Academic Programs	Leonard Gordon
Associate Dean, Administration and Personnel	Nancy A. Gutierrez
Chair, Department of Aerospace Studies	Col. Ronald Scott, Jr.
Chair, Department of Anthropology	John K. Chance
Chair, Department of Biology	James P. Collins
Chair, Department of Chemistry and Biochemistry	J. Devens Gust
Chair, Department of Chicana and Chicano Studies	Vicki L. Ruiz
Chair, Department of English	Daniel Bivona
Chair, Department of Exercise Science and Physical Education	Philip E. Martin
Chair, Department of Family and Human Development	Richard A. Fabes
Chair, Department of Geography	Breandán Ó hUallacháin
Chair, Department of Geological Sciences	Simon M. Peacock
Chair, Department of History	Noel J. Stowe
Chair, Department of Languages and Literatures	David William Foster
Chair, Department of Mathematics	Rosemary A. Renaut
Chair, Department of Microbiology	Edward A. Birge
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Chair, Department of Sociology	Verna M. Keith
Chair, Department of Speech and Hearing Science	David Ingram

Director, African American Studies	Leonor Boulain Johnson
Director, Center for Asian Studies	Timothy Wong
Director, Cancer Research Institute	G. Robert Pettit
Director, Center for the Study of Early Events in Photosynthesis	Andrew N. Webber
Director, Climatology Laboratory	Robert C. Balling
Interim Director, Hispanic Research Center	Gary D. Keller
Director, Interdisciplinary Humanities Program	Charles J. Dellheim
Director, Interdisciplinary Committee for Molecular and Cellular Biology	Robert W. McGaughey
Director, Institute of Human Origins	Donald C. Johanson
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Director, Center for Meteorite Studies	Carleton B. Moore
Director, Center for Solid-State Science	David J. Smith
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Director, Women's Studies Program	Kathleen J. Ferraro

College of Nursing

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Associate Dean for Graduate Programs and Research	Pamela Kidd
Associate Dean for Undergraduate Programs and Extended Education	Mary Killeen
Director, Continuing and Extended Education	David Hrabe
Director, Student Services	Jean Craig Stengel
Chair, Division of Adult Health/Parent-Child Nursing	Frances Thurber
Chair, Division of Community Health/Psychosocial Nursing Systems	Betty J. Gale
Manager, Community Health Services Clinic	Elizabeth Holman

College of Public Programs

Dean, College of Public Programs	Anne L. Schneider
Associate Dean, College of Public Programs	Frederick C. Corey
Assistant Dean, College of Public Programs	Kathryn Gundersen
Director, Student Services	Cheryl Herrera
Director, Hugh Downs School of Human Communication	Jess K. Alberts
Director, Walter Cronkite School of Journalism and Telecommunication	Joe S. Foote
Director, School of Justice Studies	<i>To Be Appointed</i>
Director, School of Public Affairs	Jeffrey Chapman
Director, School of Social Work	Leslie Leighninger
Chair, Department of Recreation Management and Tourism	Randy J. Virden
Director, Advanced Public Executive Program	Peggy O'Sullivan-Kachel
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Director, Asian Pacific American Studies Program	Thomas K. Nakayama
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Director, Center for Nonprofit Leadership and Management	Robert F. Ashcraft
Director, Center for Urban Inquiry	Peg Bortner

Division of Undergraduate Academic Services

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Associate Director, Advising Services	Stephanie Jacobson
Director, Student Success Programs	Stephen Rippon
Director, University Academic Advising Center	Casey Self
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Senior Program Coordinator, General Studies	Phyllis Lucie
Senior Business Manager	Kathleen Renshaw

Graduate College

Dean, Graduate College	Bianca L. Bernstein
Associate Dean, Student Support Services	Marjorie S. Zatz
Associate Dean, Academic Programs	Maria T. Allison
Assistant Dean, Academic Programs	Sarah B. Lindquist
Assistant Dean, Administrative Services and Information Systems	Kent D. Blaylock

Herberger College of Fine Arts

Dean, Herberger College of Fine Arts	J. Robert Wills
Director, School of Art	Julie F. Codell
Chair, Department of Dance	Claudia Murphey
Director, School of Music	Wayne A. Bailey
Chair, Department of Theatre	<i>To Be Appointed</i>

Interim Director, Institute for Studies in the Arts	Daniel L. Collins
Director, Undergraduate Student Academic Services	Gina Stephens
Director, ASU Art Museum	Marilyn A. Zeitlin

University Libraries

Dean, University Libraries	Sherrie Schmidt
Associate Dean, Continuous Improvement/Total Quality Service	<i>To Be Appointed</i>
Associate Dean, Library Services	Jane A. Conrow
Associate Dean, Video Resources	<i>To Be Appointed</i>
Assistant Dean, Personnel	Kurt R. Murphy
Head, Access Services	Virginia Sylvester
Head, Architecture and Environmental Design Library	Deborah H. Koshinsky
Head, Department of Archives and Manuscripts	Robert P. Spindler
Head, Government Documents/Map Collection	Rebecca Burke
Interim Head, Interlibrary Loan and Document Delivery	Virginia Sylvester
Head, Library Instruction, Systems, and Technology (LIST)	Scott S. Herrington
Head, Music Library	Robert E. Follet
Head, Preservation	Lois I. Schneberger
Head, Special Collections	Marilyn J. Wurzburger
Interim Head, Noble Science and Engineering Library Reference Services	Linda A. Shackle
Team Leader, Collection Development	Jeanne Richardson
Team Leader, Reference Services	Lydia E. LaFaro
Team Management, Technical Services Department	Betsy J. Redman, Ronda L. Ridenour, and Rebecca S. Uhl

Administrative Services, ASU Main

Vice Provost, Administrative Services	Mernoy Harrison
Assistant Vice Provost, Administrative Services	LeEtta Overmyer
Senior Executive Assistant, Administrative Services	Sheila Stokes
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Assistant Comptroller, Accounting Services	Marilyn Mulhollan
Assistant Comptroller, Student Business Services and Treasury Management	Joanne Wamsley
Assistant Vice Provost, Facilities Management	Scott Cole
Director, Operations and Management	Dave Brixen
Director, Engineering Maintenance and Remodeling Services	Ted Cary
Director, Facilities Planning and Construction	<i>To Be Appointed</i>
Assistant Director, Administrative Services	Polly Pinney
Assistant Director, Business Operations	Dennis Ederer
Assistant Director, Construction and Design Management	Vance Linden
Assistant Director, Crafts	Fred Giles
Assistant Director, Custodial Services	Charles Simonette
Interim Assistant Director, Grounds Services	Scott Cisson
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Campus Planner	Rick Collins
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Manager, Computing Services	Joe Metzger
Manager, Engineering	Ray Tena
Manager, Human Resources	Carrie McNamara-Segal
Assistant Vice Provost, Human Resources	Susan M. Malaga
Associate Director, Human Resources	Connie Wood
Assistant Director, Human Resources	Christine Cervantes
Assistant Director, Human Resources	Sue Madden
Director/Chief of Police, Public Safety	John Pickens
Assistant Chief of Police	Kay Gojkovich
Director, Parking and Transit	Linda Riegel
Director, Purchasing and Business Services	Ray Jensen
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Assistant Director	Greg Rush
Assistant Director, Real Estate, Staff Development	Karen Honeycutt
Assistant Director, Document Production Services	Robert Lane
Director, ASU Bookstore	Val Ross
Director, Internal Audit and Management Services	Walter B. Silva
Director, Risk Management	Robert Gomez

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Vice President for Institutional AdvancementAllan Price
 Associate Vice President for Institutional Advancement. *To Be Appointed*
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 Assistant Vice President for Institutional AdvancementSteve Miller
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 Executive Director, Federal RelationsStuart Hadley
 Executive Director, Public EventsColleen Jennings-Roggensack
 Director, Development. Lonnie L. Ostrom
 Director, Economic Development and Community Outreach. Gail Howard
 Director, Federal and Community RelationsNeil Giuliano
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 General Manager, Television Station KAET Charles R. Allen

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* Emeritus

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Doug Johnson	Allan Price	Alice Snell	Vincent Waldron

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Chair for the Nominating Committee	Lois Savage
Chair, Volunteer Friends of Channel 8	Dr. Maggie Sherwood
Ex Officio, General Manager for KAET	Charles R. Allen
Ex Officio, Associate Vice President for Institutional Advancement	Judy Knudson
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Emeritus	Kathy Zatz

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Steve Loy	Mike Maloney	Nate Norris	William Pope
Bill Post	Ed Robson	Max Schrimsher	Don Tapia
Gregg Tryhus			

Intercollegiate Athletics

Director, Athletics	Gene Smith
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ASU Head Coaches

Baseball–Men	Pat Murphy
Basketball–Men	Rob Evans
Basketball–Women	Charli Turner Thorne
Cross Country–Men	Walt Drenth
Cross Country–Women	Walt Drenth
Diving–Men and Women	Mark Bradshaw
Football–Men	Dirk Koetter
Golf–Men	Randy Lein
Golf–Women	Linda Vollstedt
Gymnastics–Women	John Spini
Soccer–Women	Terri Patraw
Softball–Women	Linda Wells
Swimming–Men	Michael Chasson
Swimming–Women	Michael Chasson
Tennis–Men	Lou Belken
Tennis–Women	Sheila McNerney
Track and Field–Men	Greg Kraft
Track and Field–Women	Greg Kraft
Volleyball–Women	Patti Snyder-Park
Wrestling–Men	Lee Roy Smith

Research

Vice Provost for Research	Jonathan Fink
Associate Vice Provost for Research	Ronald Barr
Assistant to the Vice Provost	Cynthia Ryan
Senior Business Operations Manager	Rich Fill
Executive Director/Strategic Initiatives	Patrick Burkhart
Director, Office of Research and Creative Activities (Interim)	Gary Delago
Director, Office of Research Publications	Conrad Storad
Director, Center for Environmental Studies	Charles L. Redman

Director, Partnership for Research in Stereo Modeling Program (PRISM) Anshuman Razdan
 Director, Animal Care Facility. Tedd A. Brandon
 Assistant Director Gloria Aerni
 Director, Radiation Safety Office Kenneth L. Mossman
 Director, Technology Collaborations and Licensing Office Alan Poskanzer

Student Affairs

Vice President Christine K. Wilkinson
 Associate Vice President for Student Affairs and Dean, Student Development Jim Rund
 Assistant Vice President for Student Affairs and Dean, Student Life Bob Soza
 Assistant Vice President and Director, Counseling and Consultation Martha D. Christensen
 Manager of Student Affairs Computing Services Michael Schaefer
 Associate Dean, Student Development and Memorial Union Sally Ramage
 Director, Arizona Prevention Resource Center Gail Chadwick
 Director, Career Services. Raymond I. Castillo
 Director, Recreational Sports. Howard Taylor
 Director, Residential Life and Assistant Dean, Student Development Kevin Cook
 Director, Student Financial Assistance Diane Stemper
 Director, Student Health and Wellness Center Mary Rimza
 Director, Student Media. Bruce D. Itule
 Director, Undergraduate Admissions. Tim Desch
 Registrar. Lou Ann Denny

University Continuous Improvement

Project Administrator. Jacquie Gentry
 Program Coordinator. Vicki Harmon
 Human Resources Specialist Senior Patrick Patterson

ASU East

See “ASU East Administrative Personnel,” page 432.

ASU Extended Campus

See “ASU Extended Campus Administrative Personnel,” page 452.

ASU West

See “ASU West Administrative Personnel,” page 445.

ASU East

**Charles E. Backus, Ph.D., Campus Chief Executive Officer
and Provost, ASU East; Vice President, ASU**

www.east.asu.edu



Mary Ann Turney, associate professor in the Department of Aeronautical Management Technology at ASU East

Tim Trumble photo

ASU East was established in 1996 at the former Williams Air Force Base, 23 miles southeast of ASU Main. There, ASU East and its educational partners have created the Williams Campus—a residential, academic community focused on meeting the needs of students and of business, industry, and the larger community. The 600-acre Williams Campus offers a small college environment, yet students have ready access to the amenities of a major metropolitan area and the resources of a major research university.

ASU East offers degree programs to give students the knowledge and skills needed for success in professional, civic, and personal lives in the 21st century. Thirteen baccalaureate degree programs, four master's degree programs, and one certificate program can now be completed at ASU East. New facilities, new programs, and new opportunities are constantly emerging at ASU East.

The College of Technology and Applied Sciences offers a master's degree and a range of bachelor's programs in high demand areas of technology, the only programs of their kind in Arizona. The unique bachelor's and master's degrees in agribusiness in the Morrison School of Agribusiness and Resource Management prepare students for careers in one of the fastest growing sectors of global business. The Environmental Resources degrees offered through the Morrison School provide opportunities to study wilderness areas and urban habitats and how people's activities affect the regenerative ability of natural resources.

East College offers a range of supporting courses for all ASU East programs and bachelor's degrees in Applied Psychology, Business Administration, Elementary Education, and Family and Human Development. A Master of Science degree in Family and Human Development is also offered through the Department of Nutrition in East College.

The campus is easily accessible via major interstate routes. See the "ASU East Map," page 426.

For more information, see "College of Technology and Applied Sciences," page 89; "East College," page 65; and "Morrison School of Agribusiness and Resource Management," page 56, or call 480/727-EAST (3278), or access the Web site at www.east.asu.edu.

CAMPUS AND STUDENT SERVICES

ASU East is a student-centered campus that offers many of the features of a small college in a rural area while providing access to the resources of a major research university and the amenities of a large metropolitan area. The campus includes excellent educational facilities: a 21st-century electronic library, modern classrooms and laboratories, and state-of-the-art computer equipment. Other amenities include the bookstore, campus union, child care services, copy center, free parking, and a learning center. A shuttle service provides transportation between ASU East and ASU

Main. An additional shuttle is available for transportation from ASU Main to ASU West.

Enrollment Services—OASIS

The OASIS provides one-stop services for admission, financial aid, business services, and registration. Conveniently located in the Academic Center Building, students find personnel ready to assist them with registration processes, tuition payment, financial assistance information, student employment, photo IDs, and parking information.

Student Support Services

Staff provide academic advising for undeclared majors, new student advisement orientation programs, and workshops. Additional staff members strive to support clubs and organizations, international and multicultural students, students with disabilities and tutoring services and referrals. Staff also provide career advising and assessment, career exploration software programs, career planning workshops, and internship information.

Williams Campus Housing and Residential Life

Campus housing is located in several academic villages designed to support and promote student academic success. Family resident assistants live and work in the homes and resident assistants live and work in the residence halls. There are many opportunities for students to be involved in leadership positions and residential life programs.

Residence Halls. Residence halls offer 160 large private rooms with amenities. Students may elect to share a room with another student if they prefer this option.

Homes. More than 600 homes with two to five bedrooms are located on campus. Single and married students, as well as faculty and staff living with their families, make their home at the Williams Campus. For further information, call 480/727-1700.

Library Services

Strong resources and personal service define the ASU East Library. As a primarily electronic research library, it is designed to take maximum advantage of new technology. Electronic indexes, catalogs, and journals support study and research in many fields, with an emphasis on the majors offered at ASU East. While the library acquires materials in all formats, by intention it prefers electronic text. Thousands of periodicals are available digitally in a variety of subjects, while those that remain in print form can quickly be obtained by the library. Documents in electronic form can be delivered directly to students' desks by e-mail or fax. Most publications not available on campus may be obtained overnight. While most come from the other campuses of ASU, the library can obtain publications from anywhere in the world. Visit the library's Web site at www.eastlib.east.asu.edu.

Computing Services

With more than 75 workstations, the Computing Commons at ASU East provides general computing access through the campus network to the Internet and ASU Main computer services, including e-mail and general purpose computing. The IT East department provides specialized software and systems to meet the particular needs of the ASU East programs. In addition, IT East provides computer classrooms and audiovisual material to support the campus

academic programs. IT East has a staff of support personnel to aid the campus community's computing needs, including Web development.

Williams Campus Union

The Campus Union (CU) is the center of the campus community serving students, faculty, staff, and guests. CU facilities include meeting and study rooms, a ballroom, TV lounge, coffee bar, and a game room. Programs and services such as movie nights, ice cream socials, dances, and holiday parties complement the educational mission of the Williams Campus and enhance the quality of campus life. The CU is staffed primarily by students, providing them the opportunity to develop leadership skills and a customer service orientation. For more information, call 480/727-1098 or 480/727-1203.

Recreational Facilities and Services

The Williams Campus Fitness Center is equipped with state-of-the-art weight training and cardiovascular machines, racquetball courts, and a gymnasium. Trained exercise professionals are on hand daily to provide personal training assistance. A variety of health, fitness, and sports classes are also offered at the Fitness Center. For students who prefer outdoor sports activities, the campus has basketball and tennis courts, soccer/football fields, baseball fields, a running track, and swimming pool. For more information, call 480/988-8400.

Student Health Services

Health services for ASU East students are provided by the Veteran's Administration Medical Center located at the Williams Campus. Services include a full range of assessment and treatment, physical examinations and immunizations, women's health care, diagnostic tests, laboratory tests/x-rays, and pharmacy. Health education and counseling, and wellness and health assessments are also available. Student registration fees cover the cost of office visits for full-time ASU East students. Part-time students pay a nominal fee. Some office procedures and laboratory tests require additional charges. Health insurance is not required to use Health Services, however, it is strongly advised for all students and is required for international students. For more information, call 602/222-6568.

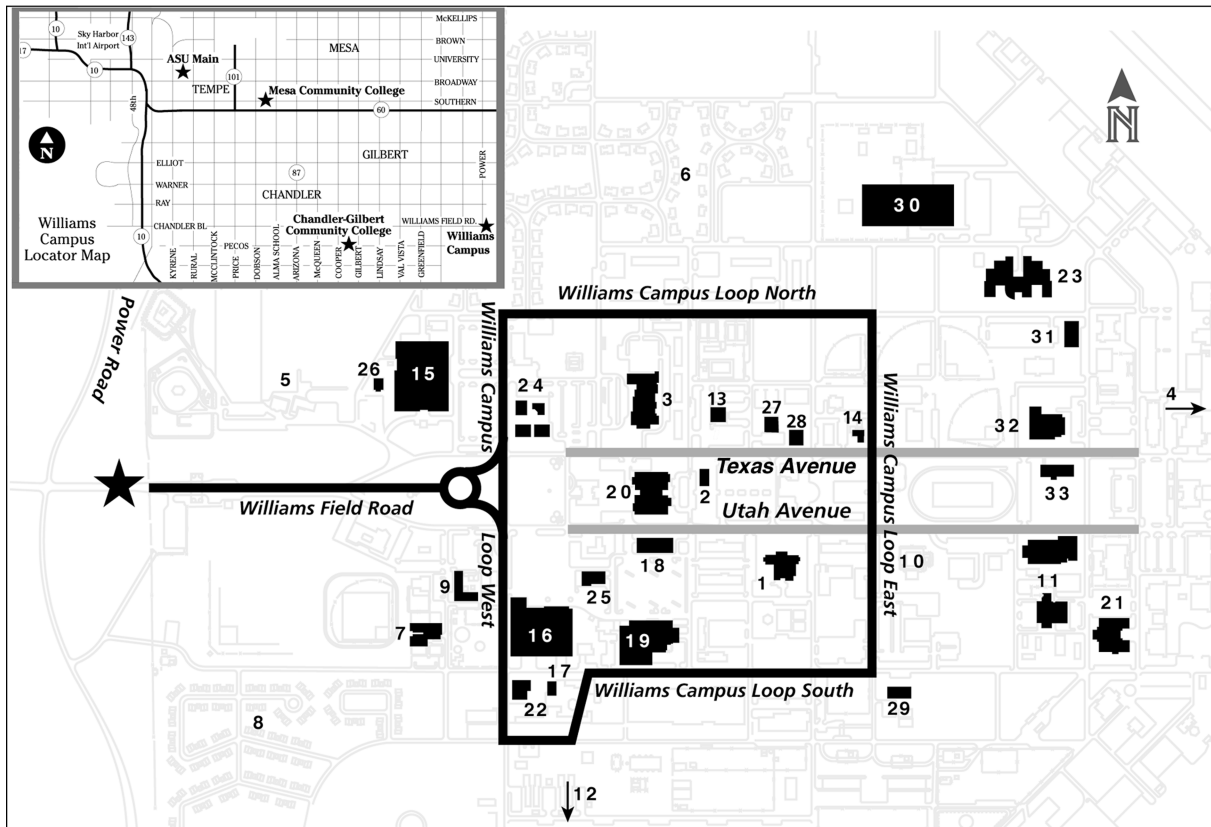
Accreditation

The North Central Association of Colleges and Schools accreditation of ASU Main includes ASU East. In addition, ASU East programs in Aeronautical Engineering Technology, Electronics Engineering Technology, and Manufacturing Engineering Technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (TAC of ABET).

Academic Organization and Administration

The chief operating and academic officer of ASU East is the campus chief executive officer and provost. There are two colleges and one school at ASU East administered by deans. These academic units develop and implement the teaching, research, and service programs of the institution. Additional support for the academic mission of the campus is provided by Library Services and Information Technology, each administered by a director. See "ASU East Administrative Personnel," page 432.

ASU East Map



WILLIAMS CAMPUS

- 1 Williams Campus Dining Hall (El Mirage)
- 2 Williams Campus Housing Office
- 3 Williams Campus Union (**CU**)
- 4 Williams Gateway Airport and Flight Line
- 5 Toka Sticks Clubhouse and Golf Course
- 6 North Desert Village
- 7 Child Development Center (**CDCTR**)
- 8 West Desert Village
- 9 Administrative Services Building—Security (**ADMIN**)
- 10 Swimming Pool (**POOL**)
- 11 Research Training Laboratory
- 12 South Desert Village
- 13 Williams Express Copy Services (**COPY**)
- 14 Williams Campus Post Office (**WCPO**)

CHANDLER-GILBERT COMMUNITY COLLEGE AT WILLIAMS CAMPUS

- 30 Aviation Technology Center, Embry-Riddle, and University of North Dakota (**ATC**)
- 31 General Studies Building (**GSB**)
- 32 Physical Education Center (**PEC**)
- 33 Science Lab Building (**SLB**)

ASU EAST

- 15 Health Sciences Center
(ASU East Student Health, VA Clinic)
- 16 Technology Center (**TECH**)
- 17 Agribusiness Food Science Lab (**AGBFS**)
- 18 Auditorium (**AUD**)
- 19 Future Classroom and Lab Building
- 20 Academic Center Building (**CNTR**)
- 21 Classroom Building (**CLRB**)
- 22 TECH II
- 23 Flight Simulator Building (**SIM**)
- 24 Morrison School of Agribusiness and Resource Management Complex (**AGB 1–4**)
- 25 Communication (**COMM2**)
- 26 Professional Golf Management (**PGM**)
- 27 American Indian Programs (**AIP**)
- 28 International Projects Unit (**INTRP**)
- 29 Photovoltaic Testing Lab (**SOLAR**)

ASU East Directory

For the “ASU Main Directory,” see page 343. For the “ASU West Directory,” see page 437. For the “ASU Extended Campus Directory,” see page 452.

Organization	Location	Telephone	Web Address
Agribusiness and Resource Management, Morrison School of	CNTR 20	480/727-1585	www.east.asu.edu/msabr
American Indian Programs	AIP	480/727-1161 480/727-1075	www.east.asu.edu/aip
Bookstore	CNTR 102	480/727-1146	www.asu.edu/east/admin/ Admin%20Business.htm#Bookstore
Campus Union	CUB	480/727-1098	www.asu.edu/east/cls/union.htm
Cashiering Services	CNTR 81	480/727-1081	www.east.asu.edu/admin/ Admin%20Business.htm#Cashiering Services
Computer Commons, ASU East	CNTR 150	480/727-1118	www.east.asu.edu/infotech/labs
East College	CNTR 92	480/727-1515	www.east.asu.edu/ecollege
Applied Psychology, Faculty of	—	—	www.east.asu.edu/ecollege/appliedpsych
Business Administration, Faculty of	—	—	www.east.asu.edu/ecollege/businessadmin
Elementary Education, Faculty of	—	—	www.east.asu.edu/ecollege/elementaryed
Exercise and Wellness, Faculty of	—	—	www.east.asu.edu/ecollege/wellness
Multimedia Writing and Technical Communication, Faculty of	—	—	www.east.asu.edu/ecollege/multimedia
Nutrition, Department of	HSC 1386	480/727-1728	www.east.asu.edu/ecollege/nutrition
Fitness Center, Williams Campus	WCFC Bldg	480/988-8400	www.asu.edu/east/cls/recreation.htm
General Information	CNTR Garden Level	480/727-3278	www.east.asu.edu
Housing, Williams Campus	WCHO Bldg	480/727-1700	www.asu.edu/east/cls/housing
Learning Center	CNTR 160	480/727-1452	www.east.asu.edu/learningcenter
Library Services	CNTR 110	480/727-1037	eastlib.east.asu.edu
OASIS	CNTR Garden Level	480/727-3278	www.east.asu.edu/sta/oasis.html
ASU Sun Cards	—	—	—
Office of the Registrar	—	—	—
Student Business Services	—	—	—
Student Financial Assistance	—	—	—
Undergraduate Admissions	—	—	—
Williams Campus Parking Decals	—	—	—
Printing and Copy Center, Williams Express	BLDG 210	480/727-1600 480/727-1616	www.valleyofthesun.org/printshop.htm
Provost, Office of the	CNTR 30	480/727-1028	—
Student Health Services	Veterans	602/222-6568	www.asu.edu/east/student/stuheal.html
Technology and Applied Sciences, College of	CNTR 10	480/727-1874	www.east.asu.edu/ctas
Aeronautical Management Technology, Department of	SIM 201	480/727-1381	eastair.east.asu.edu
Electronics and Computer Engineering Technology, Department of	TECH 101	480/727-1137	www.east.asu.edu/ctas/ecet
Information and Management Technology, Department of	TECH 102	480/727-1781	www.east.asu.edu/ctas/imt
Manufacturing and Aeronautical Engineering Technology, Department of	SIM 295	480/727-1584	www.east.asu.edu/ctas/maet

ASU East Faculty and Academic Professionals

A

Abuleyaman, Eltayeb S. (1998), Associate Professor of Electronics and Computer Engineering Technology; B.S., University of Khartoum (Sudan); M.S., Oregon State University; Ph.D., University of Arizona

Autore, Donald D. (1959), Professor Emeritus of Technology; B.S.E., University of Michigan; M.S.E., Arizona State University

B

Backus, Charles E. (1968), Professor of Electrical Engineering; Campus Chief Executive Officer and Provost, ASU East; Vice President, ASU; B.S.M.E., Ohio University; M.S., Ph.D., University of Arizona

Barchilon, Marian G. (1989), Professor of Technical Communication; B.A., State University of New York, Binghamton; M.S., Northeastern University

Barrett, Thomas W. (1950), Professor Emeritus of Agribusiness and Resource Management; B.S., Brigham Young University; M.S., Ph.D., Cornell University

Bergeron, Bette S. (2000), Professor of Education; B.S.Ed., University of Maine, Orono; M.S.Ed., Ph.D., Purdue University

Brady, Ward W. (1973), Professor of Environmental Resources; B.S., M.S., Ph.D., Colorado State University

Brock, John H. (1977), Professor of Environmental Resources; B.S., M.S., Fort Hayes State University; Ph.D., Texas A&M University

Brown, Walter C. (1966), Professor Emeritus of Technology; B.S., Northwest Missouri State University; M.Ed., Ed.D., University of Missouri, Columbia

Brownson, Charles W. (1980), Librarian, ASU East Library Services; Director, ASU East Library Services; B.A., South Dakota State University; M.F.A., University of Oregon; M.L.S., University of California, Berkeley

Burdette, Walter E. (1956), Professor Emeritus of Technology; B.S., M.S., Kansas State College of Pittsburg; Ed.D., University of Missouri, Columbia

Burk, Karl W. (1949), Professor Emeritus of Technology; B.A., M.A., Arizona State University; Ed.D., Bradley University

Burkink, Tim (1998), Assistant Professor of Agribusiness and Resource Management; B.S., M.B.A., Ph.D., University of Nebraska, Lincoln

C

Carlsen, Paul A. (1978), Professor Emeritus of Technology; B.A.E., M.N.S., Ed.D., Arizona State University

Cavalliere, William A. (1946), Professor Emeritus of Technology; B.A., M.A., Arizona State University

Chalquest, Richard R. (1971), Professor Emeritus of Agribusiness and Resource Management; B.S., D.V.M., Washington State University; M.S., Ph.D., Cornell University

Collins, Donald W. (1989), Professor of Manufacturing and Aeronautical Engineering Technology; B.Arch., Virginia Polytechnic Institute and State University; M.S., Ph.D., University of Illinois, Chicago

Corbin, Charles B. (1982), Professor of Exercise and Wellness; B.S., University of New Mexico; M.S., University of Illinois; Ph.D., University of New Mexico

Cox, Frank E. (1972), Professor Emeritus of Technology; B.S.M.E., Purdue University; M.S.E., Arizona State University

Cox, Jerry R. (1984), Adjunct Associate Professor of Environmental Resources; B.S., M.S., New Mexico State University; Ph.D., University of Wyoming

D

Daneke, Gregory A. (1982), Professor of Agribusiness and Resource Management; B.A., M.A., Brigham Young University; Ph.D., University of California, Santa Barbara

Danielson, Scott G. (1999), Associate Professor of Manufacturing and Aeronautical Engineering Technology; Chair, Department of Manufacturing and Aeronautical Engineering Technology; B.S., M.S., University of Wyoming; Ph.D., North Dakota State University

DeBano, Leonard F. (1983), Adjunct Associate Professor of Environmental Resources; B.S., Colorado State University; M.S., Utah State University; Ph.D., University of California, Berkeley

Dixon, Kathleen S. (2000), Lecturer of Nutrition; B.S., University of Arizona; M.Ed., Northern Arizona University

Dolin, Penny Ann (1998), Lecturer of Information and Management Technology; B.A., Bard College; M.S., Arizona State University

Duff, Jon M. (1997), Professor of Information and Management Technology; B.S., M.S., Purdue University; Ph.D., Ohio State University

E

Edwards, Mark R. (1978), Professor of Agribusiness and Resource Management; B.S.M.E., United States Naval Academy; M.B.A., D.B.A., Arizona State University

Edwards, Marvin J. (1959), Professor Emeritus of Technology; B.S., M.A., Arizona State University

F

Formedwalt, James N. (1987), Professor Emeritus of Electronics and Computer Engineering Technology; B.S., M.S., University of Arizona; Ph.D., Iowa State University of Science and Technology

G

- Gesell, Laurence E.** (1984), Professor of Aeronautical Management Technology; B.A., Upper Iowa University; M.P.A., University of San Francisco; Ph.D., Arizona State University
- Gordon, Richard S.** (1980), Professor Emeritus of Agribusiness and Resource Management; A.B., University of Rochester; M.A., Harvard University; Ph.D., Massachusetts Institute of Technology
- Green, Douglas M.** (1990), Associate Professor of Environmental Resources; B.S., Oregon State University; M.S., North Dakota State University; Ph.D., Oregon State University
- Grossman, Gary M.** (1994), Associate Professor of Information and Management Technology; B.A., University of the Pacific; M.S., Ph.D., Purdue University

H

- Hampl, Jeffrey** (1998), Assistant Professor of Nutrition; B.S., Liberty University; M.S., University of Massachusetts, Lowell; Ph.D., University of Nebraska
- Harris, Laverne Abe** (1999), Lecturer of Information and Management Technology; B.A., M.Tech., Arizona State University
- Hefner, Stephen P.** (1973), Instructional Professional of Agribusiness and Resource Management, Morrison School of Agribusiness and Resource Management; B.S., Illinois State University; M.S., Arizona State University
- Hild, Nicholas R.** (1983), Professor of Information and Management Technology; B.S.M.E., M.S.Enve., University of Iowa; Ph.D., Union Graduate School
- Hirata, Ernest T.** (1974), Associate Professor of Information and Management Technology; B.A., San Diego State College; Ed.D., Arizona State University
- Horowitz, Renee B.** (1986), Professor Emeritus of Information and Management Technology; B.A., Brooklyn College; M.A., Ph.D., University of Colorado
- Humble, Jane E.** (1989), Associate Professor of Information and Management Technology; B.S.E., M.S.E., Ph.D., Arizona State University
- Hutt, Roger W.** (1975), Associate Professor of Business Administration; B.S., M.B.A., Ohio State University; Ph.D., Michigan State University

J

- Jackson, Andrew E.** (1995), Associate Professor of Aeronautical Management Technology; B.A., University of Louisville; M.B.A., Embry-Riddle Aeronautical University; Ph.D., University of Central Florida
- Johnson, Randall A.** (1984), Adjunct Associate Professor of Environmental Resources; B.S., California State Polytechnic University, Pomona; M.A., M.S., Ph.D., University of Missouri, Columbia
- Johnston, Carol S.** (1986), Professor of Nutrition; B.S., University of Michigan; M.S., Ph.D., University of Texas, Austin
- Jones, Kathy** (1996), Lecturer of Exercise and Wellness; B.A., University of California, Berkeley; M.S., Ph.D., Arizona State University

K

- Kagan, Albert** (1992), Professor of Agribusiness and Resource Management; B.S., M.S., Ph.D., Iowa State University of Science and Technology
- Karp, Merrill R.** (1994), Assistant Professor of Aeronautical Management Technology; B.S., Arizona State University; M.A., Central Michigan University; Ph.D., Walden University
- Keith, Marlow F.** (1946), Professor Emeritus of Technology; B.A., M.A., Arizona State University
- Kelley, Donald G.** (1980), Professor Emeritus of Manufacturing and Aeronautical Engineering Technology; B.S., M.S., Arizona State University
- Kigin, Denis J.** (1958–65; 1967), Professor Emeritus of Technology; Dean Emeritus, Continuing Education and Summer Sessions; B.S., Mankato State University; M.S., University of Wisconsin, Stout; Ed.D., University of Missouri
- Kime, Charles H.** (1999), Assistant Professor of Information and Management Technology; B.S., Arizona State University; M.B.A., University of Phoenix; D.P.A., Arizona State University
- Kisielewski, Robert V.** (1978), Professor Emeritus of Technology; B.S.M.E., M.S.M.E., University of Wisconsin, Madison
- Kleemann, Gary L.** (1979), Administrative Professional, Academic Programs; Director, E-Learning; B.A., M.S., San Jose State University; Ph.D., Arizona State University

L

- Lawler, Eugene D.** (1967), Professor Emeritus of Technology; B.S., Northern State College; M.A., Arizona State University
- Lestar, Dot J.** (1995), Lecturer of Information and Management Technology; B.S., M.Tech., Arizona State University
- Lindquist, Timothy** (1985), Professor of Electronics and Computer Engineering Technology; Chair, Department of Electronics and Computer Engineering Technology; B.S., Purdue University; M.S., Ph.D., Iowa State University
- Lipari, Charles A.** (1995), Assistant Professor of Electronics and Computer Engineering Technology; B.S.E.E., M.S.E.E., University of Southwestern Louisiana; Ph.D., Louisiana State University
- Lytle, Robert G.** (1972), Professor Emeritus of Agribusiness and Resource Management; B.S., Western Kentucky University; M.S., Arizona State University

M

- Macia, Narciso F.** (1990), Associate Professor of Electronics and Computer Engineering Technology; B.S., M.S., University of Texas, Arlington; Ph.D., Arizona State University
- Maddy, Kenneth H.** (1980), Professor Emeritus of Agribusiness and Resource Management; B.S., Pennsylvania State University; M.S., University of Wisconsin, Madison; Ph.D., Pennsylvania State University
- Maid, Barry M.** (2000), Professor of Multimedia Writing and Technical Communication; B.A., University of Wisconsin, Madison; M.A., University of Texas, Austin; Ph.D., University of Massachusetts, Amherst
- Maisel, James E.** (1985), Professor Emeritus of Electronics and Computer Engineering Technology; B.Eng.Sci., B.E.E., Fenn College; M.S.E.E., Ohio State University

Manfredo, Mark R. (1999), Assistant Professor of Agribusiness and Resource Management; B.S., California State University, Fresno; M.S., New Mexico State University; Ph.D., University of Illinois, Urbana

Manore, Melinda M. (1984), Professor of Nutrition; B.S., Seattle Pacific University; M.S., University of Oregon; Ph.D., Oregon State University

Marquardt, Raymond A. (1997), Professor of Agribusiness and Resource Management; Dean, Morrison School of Agribusiness and Resource Management; B.S., M.S., Colorado State University; Ph.D., Michigan State University

Martin, Rose L. (1990), Senior Lecturer of Nutrition; B.S., University of Illinois; M.S., Pennsylvania State University

Matson, John H. (1978), Associate Professor of Information and Management Technology; B.S., M.S., Illinois State University

Matthews, James B. (1989), Professor Emeritus of Aeronautical Technology; B.S., Rose-Hulman Institute of Technology; M.S., Massachusetts Institute of Technology; Ph.D., University of Arizona

McBrien, Edward F. (1986), Professor Emeritus of Electronic/Computer Technology; B.S.E., Fenn College; M.S.E.E., Cleveland State University

McCurry, William K. (1995), Associate Professor of Aeronautical Management Technology; Chair, Department of Aeronautical Management Technology; B.S., Purdue University; M.S., Troy State University; Ph.D., University of Kansas

McHenry, Albert L. (1978), Professor of Electronics and Computer Engineering Technology; Dean, College of Technology and Applied Sciences; B.S., Southern University and A&M College; M.S., Ph.D., Arizona State University

Mermis, William L. (1995), Professor of Human Health; B.S., M.S., Saint Louis University; Ph.D., Arizona State University

Millard, Bruce R. (1988), Associate Professor of Electronics and Computer Engineering Technology; B.A., M.S., Washington State University; Ph.D., Arizona State University

Miller, Victor J. (1958), Professor Emeritus of Agribusiness and Resource Management; B.S., M.S., Ph.D., University of Illinois

Miller, William H. (1984), Associate Professor of Environmental Resources; B.S., M.S., Ph.D., Washington State University

Minter, Marshall R. Jr. (1965), Professor Emeritus of Technology; B.S.M.E., Purdue University; M.S.M.E., University of Arizona

Monte, Woodrow (1979), Associate Professor of Nutrition; B.S., New Mexico Institute of Mining and Technology; M.S., Ph.D., Colorado State University

Moody, E. Grant (1951), Professor Emeritus of Agribusiness and Resource Management; B.S., University of Arizona; M.S., Kansas State University; Ph.D., Purdue University

Munukutla, Lakshmi V. (1987), Professor of Electronics and Computer Engineering Technology; Associate Dean, College of Technology and Applied Sciences; B.S., M.S., Andhra University (India); Ph.D., Ohio University

N

Nam, Changho (1998), Associate Professor of Manufacturing and Aeronautical Engineering Technology; B.S., M.S., Seoul National University (South Korea); Ph.D., Purdue University

O

O'Brien, Marc H. (1997), Lecturer of Aeronautical Management Technology; B.A., Boston University; M.S., Indiana State University

Olson, Larry W. (1995), Associate Professor of Information and Management Technology; B.S., Baylor University; Ph.D., University of Pennsylvania

P

Palmgren, Dale E. (1984), Associate Professor of Manufacturing and Aeronautical Engineering Technology; Assistant Dean, College of Technology and Applied Sciences; B.S., M.S., Ph.D., University of Wisconsin, Madison

Pardini, Louis J. (1967), Professor Emeritus of Technology; B.A., A.M., Idaho State University; Ed.D., University of Northern Colorado

Patterson, Paul M. (1995), Assistant Professor of Agribusiness and Resource Management; B.S., Auburn University; M.S., Ph.D., Purdue University

Pearce, Martha V. (1977), Professor Emeritus of Technology; B.S., Columbia University; M.S., Boston University; Ed.D., Arizona State University

Pearson, Michael W. (1998), Assistant Professor of Aeronautical Management Technology; B.A., University of Houston; M.B.A., J.D., Arizona State University

Peterson, Danny M. (1999), Associate Professor of Information and Management Technology; B.S., University of Idaho; M.B.A., California State University, Sacramento; M.S., Ph.D., Arizona State University

Peterson, Edward R. (1977), Assistant Professor of Electronics and Computer Engineering Technology; B.S.E.E., Fairleigh Dickinson University; M.S.E.E., Arizona State University

Phillips, Wayne T. (1997), Assistant Professor of Exercise and Wellness; Cert. Ed., Cardiff College of Education, Cardiff (United Kingdom); M.S., Loughborough University of Technology (United Kingdom); Ph.D., Arizona State University

Post, Alvin (2000), Assistant Professor of Manufacturing and Aeronautical Engineering Technology; B.S., University of Arizona; M.S., Stanford University; Ph.D., University of Hawaii

Prust, Zenas A. (1959), Professor Emeritus of Technology; B.S., University of Wisconsin, Stout; M.A., University of Minnesota, Twin Cities; Ed.D., University of Northern Colorado

R

Raccach, Moshe (1980), Associate Professor of Agribusiness and Resource Management; B.Sc., M.Sc., The Hebrew University (Israel); Ph.D., Cornell University

Rajadas, John N. (1996), Associate Professor of Manufacturing and Aeronautical Engineering Technology; B.Tech., Indian Institute of Technology (India); M.S., Ph.D., Georgia Institute of Technology

Rasmussen, Robert D. (1949), Professor Emeritus of Agribusiness and Resource Management; B.S., Iowa State University; M.S., Washington State University

Reed, William H. (1968), Professor Emeritus of Manufacturing and Aeronautical Engineering Technology; B.S., University of Oklahoma; M.S., Arizona State University

Richards, Timothy J. (1994), Associate Professor of Agribusiness and Resource Management; B.Comm., University of British Columbia; M.A., Ph.D., Stanford University

Richardson, Grant L. (1953), Professor Emeritus of Agribusiness and Resource Management; B.S., M.S., University of Arizona; Ph.D., Oregon State University

Robinson, Daniel O. (1950), Professor Emeritus of Agribusiness and Resource Management; A.B., Brigham Young University; M.S., University of Arizona; Ph.D., Ohio State University

Roe, Keith B. (1979), Professor Emeritus of Technology; B.S., Wisconsin State College; M.A., University of Michigan

Rogers, Bradley B. (1984), Associate Professor of Manufacturing and Aeronautical Engineering Technology; B.S., M.S., Montana State University; Ph.D., Arizona State University

Rook, Fern H. (1969), Professor Emeritus of Technology; B.A., University of Colorado; M.A., Arizona State University

Roper, Devon J. (1966), Professor Emeritus of Aeronautical Technology; B.S., Utah State University; M.S., Arizona State University

S

Sadowski, Mary A. (1999), Professor of Information and Management Technology; B.S.E., Bowling Green University; M.A., Ohio State University; Ph.D., Purdue University

Salmirs, Seymour (1981), Professor Emeritus of Technology; B.A.E., M.S.A.E., Georgia Institute of Technology

Schildgen, Thomas E. (1981), Professor of Information and Management Technology; Chair, Department of Information and Management Technology; B.S., M.S., Illinois State University; Ed.D., Northern Arizona University

Schmidt, Peter A. (1978), Associate Professor of Manufacturing and Aeronautical Engineering Technology; B.S., Northern Illinois University; M.A., Ed.D., Arizona State University

Schmitz, Troy G. (1998), Assistant Professor of Agribusiness and Resource Management; B.S., University of Saskatchewan (Canada); M.S., Ph.D., University of California, Berkeley

Schoen, Robert A. (1966), Professor Emeritus of Technology; B.S., M.S., Arizona State University

Schvaneveldt, Roger (2000), Professor of Applied Psychology; B.A., University of Utah; M.S., Ph.D., University of Wisconsin, Madison

Schwalm, David E. (1986), Associate Professor of English; Dean of East College, Vice Provost ASUE; B.A., Carlton College; M.S., Ph.D., University of Chicago

Seperich, George J. (1976), Professor of Agribusiness and Resource Management; Associate Dean, Morrison School of Agribusiness and Resource Management; B.S., Loyola University, Chicago; M.S., Ph.D., Michigan State University

Shultz, Clifford J. (1992), Professor of Agribusiness and Resource Management; Marley Foundation Chair in Consumer Food Marketing; B.A., DePauw University; M.S., Ph.D., Columbia University

Stanton, Julie V. (1996), Assistant Professor of Agribusiness and Resource Management; B.A., Georgetown University; Ph.D., University of Maryland, College Park

Stiles, Philip G. (1969), Professor Emeritus of Agribusiness and Resource Management; B.S., University of Arkansas; M.S., University of Kentucky; Ph.D., Michigan State University

Stone, William J. (1967), Professor of Exercise and Wellness; B.S., Boston University; M.S., Florida State University; Ed.D., University of California, Berkeley

Strawn, Roland S. (1967), Professor Emeritus of Technology; B.S.E.E., M.S.E.E., University of Illinois; Ph.D., Arizona State University

Sundararajan, Rajeswari (1996), Associate Professor of Electronics and Computer Engineering Technology; B.S., University of Madras (India); M.S., Indian Institute of Science (India); Ph.D., Arizona State University

Swan, Pamela (1994), Associate Professor of Exercise and Wellness; B.A., University of California, Santa Barbara; M.S., University of North Carolina, Greensboro; Ph.D., University of Tennessee

T

Taysom, Elvin D. (1953), Professor Emeritus of Agribusiness and Resource Management; B.S., University of Idaho; M.S., Utah State University; Ph.D., Washington State University

Thomason, Leslie L. (1969), Professor Emeritus of Technology; A.B., M.A., Ed.D., University of Oklahoma

Thor, Eric P. (1990), Professor of Agribusiness and Resource Management; B.S., M.S., Ph.D., University of California, Berkeley

Turney, Mary Ann (1999), Associate Professor of Aeronautical Management Technology; B.A., LeMoyné College; M.A., Hofstra University; Ed.D., Nova Southeastern University

V

Vaughan, Linda A. (1982), Professor of Nutrition; Chair, Department of Nutrition; B.S., University of California, Davis; M.N.S., Cornell University; Ph.D., University of Arizona

W

Watkins, Thomas B. (1972), Professor Emeritus of Technology; B.S., University of Wyoming; M.S., Arizona State University

Welty, Ellen L. (1996), Reference/Instruction Librarian, ASU East Library Services; B.A., University of Wyoming; M.L.S., University of Arizona

Wenhardt, James C. (1996), Lecturer of Elementary Education; B.S., M.Ed., Arizona State University

Whysong, Gary L. (1974), Associate Professor of Environmental Resources; B.S., M.S., Montana State University; Ph.D., University of Wyoming

Wilson, Daniel (1978), Senior Lecturer of Information and Management Technology; B.S., Drexel University; M.S.E., Ph.D., Arizona State University

Wood, Billy G. (1977), Professor Emeritus of Electronics and Computer Engineering Technology; A.B., University of California; B.S., Eastern Illinois University; M.S., University of Arizona

Woodruff, Larry (1998), Lecturer of Exercise and Wellness; B.S., University of Oregon; M.S., Western Oregon University

Z

Zeng, Guoliang (1991), Associate Professor of Electronics and Computer Engineering Technology; B.S., Chengdu Telecommunication Institute (China); M.S., University of California, San Diego; M.N.S., Ph.D., Arizona State University

ASU East Administrative Personnel

Academic Administration

Campus Chief Executive Officer and Provost, ASU East; Vice President, ASU.....	Charles E. Backus
Vice Provost, Academic Programs	David E. Schwalm
Dean, Student Affairs	Gary L. McGrath
Director, Academic Services	C. Vinette Williams
Director, Administrative Services.....	Terry C. Isaacson
Director, American Indian Programs.....	Phillip J. Huebner
Director, Development	Judith L. Heasley
Director, Information Technology	Kati L. Weingartner
Interim Director, Institutional Advancement.....	C. Vinette Williams
Director, Library Services	Charles W. Brownson
Director, Planning and Budget.....	Sheila L. Ainlay
Director, Research and Sponsored Projects	Jean N. Humphries
Marley Foundation Chair in Consumer Food Marketing	Clifford J. Shultz
Coordinator, Sustainable Technologies, Agribusiness, and Resources Center	John H. Brock

College of Technology and Applied Sciences

Dean, College of Technology and Applied Sciences	Albert L. McHenry
Associate Dean, College of Technology and Applied Sciences.....	Lakshmi V. Munukutla
Assistant Dean, College of Technology and Applied Sciences.....	Dale E. Palmgren
Chair, Department of Aeronautical Management Technology	William K. McCurry
Chair, Department of Electronics and Computer Engineering Technology	Timothy E. Lindquist
Chair, Department of Information and Management Technology	Thomas E. Schildgen
Chair, Department of Manufacturing and Aeronautical Engineering Technology.....	Scott G. Danielson
Project Director, International Projects Institute	Gary M. Grossman

East College

Dean, East College.....	David E. Schwalm
Chair, Department of Nutrition.....	Linda A. Vaughan
Head, Faculty of Applied Psychology	Roger W. Schvaneveldt
Head, Faculty of Business Administration	Roger W. Hutt
Head, Faculty of Elementary Education	Bette S. Bergeron
Head, Faculty of Exercise and Wellness	William J. Stone
Head, Faculty of Multimedia Writing and Technical Communication	Barry M. Maid

Morrison School of Agribusiness and Resource Management

Dean, Morrison School of Agribusiness and Resource Management.....	Raymond A. Marquardt
Associate Dean, Morrison School of Agribusiness and Resource Management.....	George J. Seperich

ASU West

**Elaine P. Maimon, Ph.D., Campus Chief Executive Officer
and Provost, ASU West; Vice President, ASU**

www.west.asu.edu



View of ASU West campus from Fletcher Library

Arthur Holeman photo

Arizona State University West, a growing anchor campus of Arizona State University, serves diverse students who balance academics with the multiple demands of careers, family, and community service. More than 5,300 commuting students are enrolled in junior, senior, and graduate-level courses leading to 29 bachelor's degrees, nine master's degrees, and eight professional certificates. Starting fall 2001, ASU West admits freshmen for the first time, beginning the transition to a full, four-year learning environment.

Through the award-winning University-College Center, some students take community college courses necessary for university transfer on the ASU West campus. Academic advising, child care, and evening tutoring for children of students are just a few examples of innovative services that help families achieve their educational goals. ASU West students enjoy a friendly, small-campus atmosphere while benefiting from the resources and expertise of a research-based, nationally acclaimed, PAC-10 university.

Academic programs are linked directly to community needs, providing relevant, applied learning opportunities, such as internships. Courses are offered through the Colleges of Arts and Sciences, Education, and Human Services and through the Division of Collaborative Programs and the School of Management.

ASU West offers many on-campus services and facilities, including a multimedia resource library, state-of-the-art computer classrooms and labs, tutoring services, bookstore, cafeteria, credit union, fitness center, recreational facilities, and post office, plus many student activities, clubs and organizations. ASU West facilities are completely accessible for those with disabilities, with academic services provided by a disability resource center. Classes are offered in the day and evening, as well as on weekends, and via television and the Internet.

The architecture and courtyards at ASU West are modeled after those of the University of Oxford in Great Britain, enhanced by a beautifully landscaped natural environment featuring widely acclaimed public art. The campus occupies approximately 300 square acres between 43rd and 51st Avenues on West Thunderbird Road, easily accessed from Interstate 17 and Loop 101.

Accreditation

ASU West is accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools. Professional programs in various academic areas are also accredited by the following agencies.

All Business and Accountancy degree programs in the School of Management are accredited by AACSB—the International Association for Management Education, the official accrediting agency in the field of business administration. The Master in Social Work program is currently in

candidacy for accreditation by the Council on Social Work Education. Full accreditation is anticipated in 2002.

Academic Organization and Administration

As chief operating and academic officer of ASU West, the campus chief executive officer and provost provides executive leadership for the continuing development and management of the campus and reports directly to the president of ASU. The campus chief executive officer and provost is aided in the administration of the campus by vice provosts, deans, directors, department chairs, faculty, and other officers. There are four schools and colleges at ASU West administered by deans. These academic units develop and implement the teaching, research, and service programs of the institution, aided by the ASU West Library, Division of Collaborative Programs, and other services.

Degree and Certificate Programs

ASU West offers degree and certificate programs as shown in the "ASU West Graduate Degrees and Majors" table, page 435.

ASU West also offers postbaccalaureate programs for teacher certification in Elementary Education and Secondary Education.

At the graduate or postbaccalaureate level, four certificates are available: the Postbaccalaureate Certificate in Communication and Human Relations and the Certificate in Gerontology, administered by the College of Human Services; and Postbaccalaureate Certificates in Accountancy and Professional Accountancy, administered by the School of Management.

Admission

Students applying for admission to an ASU West degree or certificate program must complete an application and have transcripts sent directly to the following addresses.

Degree program and readmission applicants: call 602/543-4567 or write

GRADUATE STUDIES
ARIZONA STATE UNIVERSITY WEST
PO BOX 37100
PHOENIX AZ 85069-7100

Nondegree and certificate program applicants: call 602/543-8203 or write

ADMISSION SERVICES
ARIZONA STATE UNIVERSITY WEST
PO BOX 37100
PHOENIX AZ 85069-7100

Campus Facilities and Services

The campus of ASU West is located between 43rd and 51st Avenues on West Thunderbird Road in Phoenix. Immediately west of the campus is the city of Glendale. The core campus was completed in March 1991 and includes the following facilities: the Fletcher Library, Sands Classroom Building, Classroom Laboratory/Computer Building, Faculty and Administration Building, Kiva Lecture Hall, and University Center Building.

Library Services. ASU West Library provides resources that support the curriculum of ASU West with a collection of 315,000 volumes, 1.4 million microforms, 7,500 videos,

15,000 slides, 170 electronic databases, and more than 5,000 serial titles, including 2,800 electronic full-text journals. Approximately 53 percent of electronic databases are available to ASU registered users from home computers.

The library is open seven days a week to meet the informational needs of the campus community. Knowledgeable staff members are available to provide reference service and instruction in the use of the library's considerable resources. Individual consultations with subject specialist librarians are available by appointment. The Library Instruction Program provides introduction to the tools and resources available for research in an academic discipline, including Internet resources.

A wide range of information and research tools—most accessible from off-campus—are available through the ASU West Library Web site at www.west.asu.edu/library. For library hours and information, call 602/543-5717.

Sands Classroom Building. Containing 38 rooms for classes and seminars, the building provides an intimate atmosphere in which to exchange ideas.

Kiva Lecture Hall. The Kiva seats 200 and serves as an auditorium for a variety of programs, faculty lectures, and public forums.

Classroom Laboratory/Computer Building. This building contains science laboratories; studios for art, dance, and music; computer classrooms; and an astronomy platform located on the roof.

Faculty and Administration Building. Most faculty and administrative offices are located in this building. Classrooms are located in the basement of the east wing.

University Center. This facility houses admissions and records, an array of student assistance programs, health services, a preschool, and student activities. Other building facilities include food service, a bookstore, cashier and fee payment services, student lounges, an art gallery, a wellness/fitness facility, a black box theater, meeting rooms, a branch office of the Arizona State Savings and Credit Union, and a divisible, multipurpose auditorium.

Computing Facilities and Services. Information Technology at ASU West offers a full range of computing facilities for use by students, faculty, and staff through a combination of local microcomputer facilities and a pervasive high-speed communications network that provides access to server computer facilities located at ASU Main and to the Internet. Students may access ASU servers from home through their Internet service provider connections.

Technopolis, a student computing access center located on the lower level of Fletcher Library, contains networked IBM-compatible and Macintosh microcomputers, and high-quality peripherals such as laser printers and scanners. Software needed by ASU West students is provided on Technopolis computers and servers. Information and help for computer users, computer accounts services, adaptive technology for students with disabilities, and manuals for equipment and software are available at the center.

ASU West also has several classrooms and a multimedia presentation facility that facilitate the use of computers and audiovisual equipment during instruction. They are located in the Classroom Laboratory/Computer Classroom Building.

Student Affairs

Student Affairs is responsible for the delivery of a variety of services and developmental programs in support of students' extracurricular needs and educational pursuits. Special attention is given to the recruitment and retention of a culturally diverse student population. Student Affairs' stated purpose is to identify and respond to the support and student development needs of ASU West's diverse student population for the purpose of enhancing each student's social, cultural, personal, intellectual, and professional growth. The offices of Student Affairs are located in the University Center Building and currently offer programs for

1. admissions information and services,
2. career services and personal counseling,
3. disability support services,

4. financial aid,
5. tutoring services,
6. multicultural student services,
7. registration services,
8. student employment,
9. student health services,
10. student life, and
11. veterans services.

For more information, visit the University Center Building, e-mail westreg@asu.edu, call 602/543-8203, or write

STUDENT AFFAIRS
 ARIZONA STATE UNIVERSITY WEST
 PO BOX 37100
 PHOENIX AZ 85069-7100

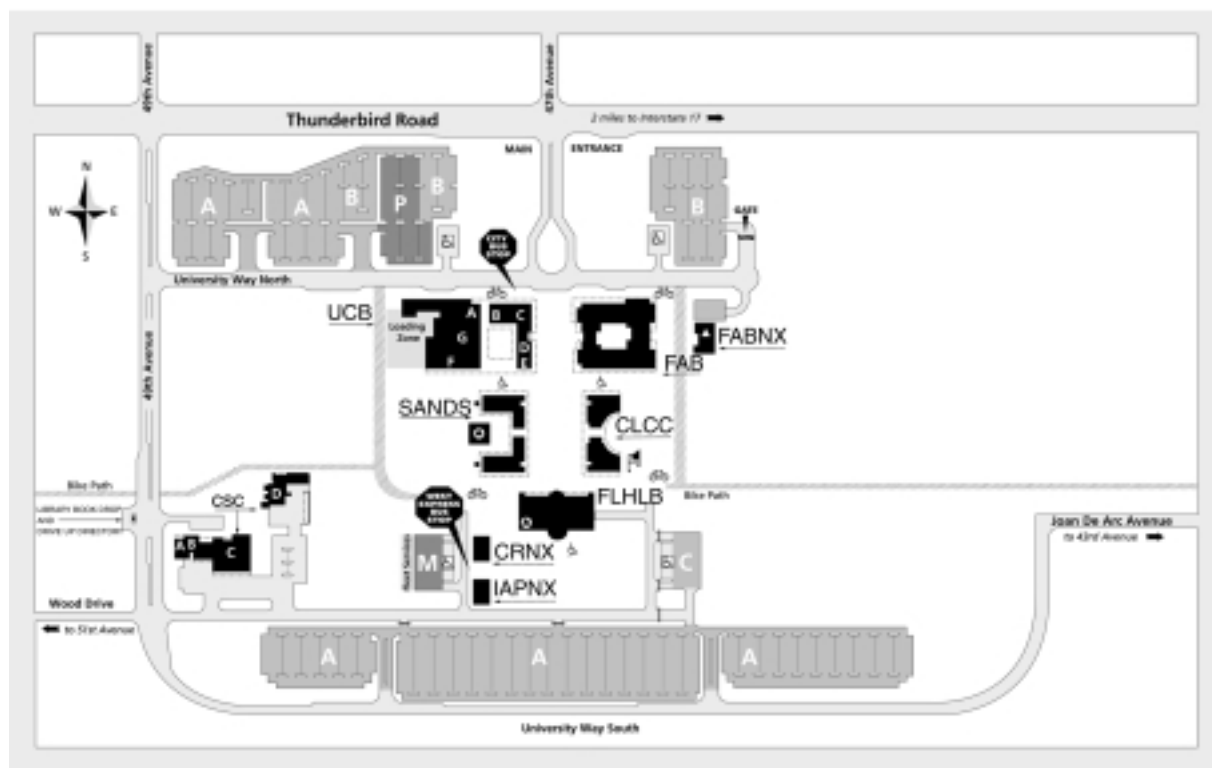
ASU West Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Business Administration	M.B.A.	—	School of Management
Communication Studies	M.A.	—	College of Human Services
Criminal Justice	M.A.	—	College of Human Services
Educational Administration and Supervision	M.Ed.	—	College of Education
Elementary Education	M.Ed.	Bilingual education, educational technology, ESL education, reading	College of Education
Interdisciplinary Studies	M.A.	—	College of Arts and Sciences
Secondary Education	M.Ed.	Educational technology	College of Education
Social Work	M.S.W.	—	College of Human Services
Special Education	M.Ed.	Infants and young children	College of Education



Students relax between classes on the beautiful ASU West campus. Scott Baxter photo

ASU West Map












University Center Building (UCB)

Admission Services
 Arizona State Savings and Credit Union
 Bank of America ATM
 Bookstore
 Cafeteria
 Career Services/Personal Counseling Center
 Cashier's Office
 Child Care Center
 Disability Resource Center
 Division of Collaborative Programs
 Financial Aid/Student Employment Information Desk
 La Sala A, B, C
 Multicultural Student Services
 Parking Office
 Registration Services
 Second Stage West Theatre
 Student Affairs Administration
 Student Health Services
 Student Life
 Student Support Services Program
 Transition and Outreach Services
 Tutoring Services
 University-College Center
 Veteran Services
 Wellness/Fitness Center
 Women's Resource Center

Faculty/Administration Building (FAB)

Academic Affairs
 Academic/Faculty Offices
 Basement Classrooms
 College of Arts and Sciences
 Education
 Human Services
 Copy Center
 Information Technology
 Instructional Technology Lab
 Information Desk
 Institutional Advancement
 Office of the Provost
 School of Management
FAB Annex (FABNX)
 Administrative Affairs
 Human Resources
Classroom Lab/Computer Classroom Building (CLCC)
Fletcher Library (FLHLB)
 Center for Writing Across the Curriculum
 Technopolis
Sands Classroom Building (SANDS)
 Copy Express
 Kiva Lecture Hall
 Sand Trap Snack Bar
Interdisciplinary Arts Annex (IAPNX)
Classroom Annex (CRNX)
Central Services Complex (CSC)

Map Symbols Legend

-  Disabled Parking
-  Disabled Decal Parking
-  Metered Parking
(25 cents per 15 minutes)
-  Visitor Parking
(\$1.00 exit fee; 24 hours)
-  Decal Parking
(Students, faculty, and staff only)
-  Faculty/Staff Decal Parking
(7 a.m.–5:30 p.m., student decal parking after 5:30 p.m.)
-  Faculty/Staff Decal Parking
(24 hours/day)
-  Bicycle Racks
-  Accessible Ramp

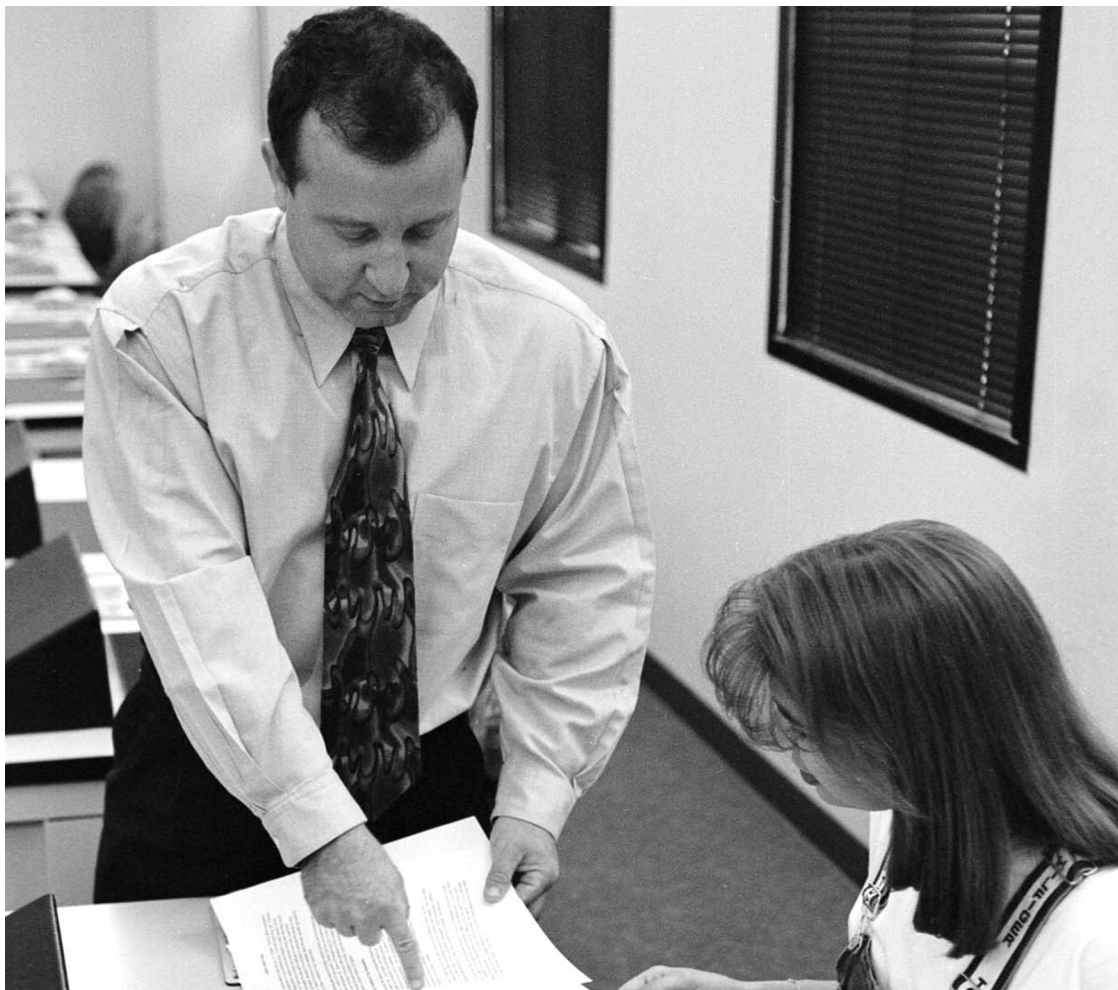
Parking regulations are enforced at all times.
 Decals are required on campus 7 a.m.–11 p.m.
 Meters are enforced from 7 a.m.–10 p.m.

ASU West Directory

For the "ASU Main Directory," see page 343. For the "ASU East Directory," page 427. For the "ASU Extended Campus Directory," see page 452.

Organization	Location	Telephone	Web Address
Academic Units (Administrative and Faculty Offices)			
Arts and Sciences, College of	FAB N201	602/543-6000	www.west.asu.edu/coas
American Studies, Department of	FAB N220B	602/543-6090	www.west.asu.edu/amerstud
Ethnic Studies Program	FAB N204	602/543-6007	www.west.asu.edu/ethnic
Integrative Studies, Department of	FAB N279-1	602/543-6003	www.west.asu.edu/iasweb
Interdisciplinary Arts and Performance, Department of	FAB N230F	602/543-6057	www.west.asu.edu/iap
Life Sciences, Department of	CLCC 210	602/543-6050	www.west.asu.edu/lifesci
M.A. Interdisciplinary Studies	FABN 201F	602/543-6241	www.west.asu.edu/mais
Social and Behavioral Sciences, Department of	FAB N250	602/543-6058	www.west.asu.edu/social
Women's Studies Program	FAB N291	602/543-3300	www.west.asu.edu/wsteam
Collaborative Programs, Division of	UCB 201	602/543-4600	www.west.asu.edu/dcp
Bachelor of Applied Science Program	UCB 201	602/543-4BAS	www.west.asu.edu/bas
Barrett Honors College	UCB 201	602/543-4503	www.asu.edu/honors
Native American Programs	UCB 201	602/543-8138	www.west.asu.edu/stuaffairs/nativeamprograms.htm
Research Consulting Center	UCB 201	602/543-3410	www.west.asu.edu/rcc/lab
Transition and Outreach Services	UCB 201	602/543-8217	www.west.asu.edu/tos
University-College Center	UCB 201	602/543-4222	www.west.asu.edu/ucc/
Writing Across the Curriculum, Center for	FLHLB LL2	602/543-6151	www.west.asu.edu/cwac/
Education, College of	FAB S210A	602/543-6300	www.west.asu.edu/coe
Human Services, College of	FAB S105-A	602/543-6600	www.west.asu.edu/chs
Administration of Justice, Department of	FAB S270C-1	602/543-6607	www.west.asu.edu/chs/aoj
Communication Studies, Department of	FAB S141C	602/543-6606	www.west.asu.edu/chs/comm
Gerontology Program	FAB S170-2	602/543-6642	www.west.asu.edu/chs/GRN
Nursing (ASU Main Program)	FAB N290A-2	602/543-6605	www.west.asu.edu/chs/nur
Recreation and Tourism Management, Department of	FAB S115A	602/543-6603	www.west.asu.edu/chs/RTM
Social Work, Department of	FAB S149	602/543-6602	www.west.asu.edu/chs/sw
Library, Fletcher	FLHLB	602/543-5717	www.west.asu.edu/library
Management, School of	FAB N101	602/543-6200	www.west.asu.edu/som
Accountancy Program	FAB S190	602/543-6275	www.west.asu.edu/som/acct
Master of Business Administration Program	FAB N151	602/543-6201	www.west.asu.edu/som/MBA
Undergraduate Global Business Program	FAB N101	602/543-6200	www.west.asu.edu/som/global
Admission Services	UCB 120	602/543-8203	www.west.asu.edu/asuw2/admcosts
Associated Students of ASU West	UCB 221	602/543-8186	www.west.asu.edu/asasuw
Bookstore	UCB 140	602/543-6800	www.west.asu.edu/adaff/auxs/bookstore
Campus Chief Executive Officer and Provost	FAB N303	602/543-7000	—
Career Services and Personal Counseling Center	UCB 320	602/543-8124	www.west.asu.edu/stuaffairs/cspc
Disability Resource Center	UCB 130	602/543-8145	www.west.asu.edu/stuaffairs/drc
TDD	—	602/543-4327	—
Financial Aid Services	UCB 120	602/543-8178	www.west.asu.edu/stuaffairs/fa/safs.html

Organization	Location	Telephone	Web Address
Graduate Studies	FAB S 301	602/543-4567	www.west.asu.edu/graduate/
Information Desk	FAB Lobby	602/543-5500	www.west.asu.edu/adaff/auxs/info
Multicultural Student Services	UCB 220	602/543-8148	www.west.asu.edu/stuaffairs/multicultural
Parking Services (Decals, Appeals)	UCB 105	602/543-7275	www.west.asu.edu/adaff/auxs/parking
Residency Classification	UCB 120	602/543-8203	www.asu.edu/registrar/residency
Student Employment	UCB 120	602/543-8178	www.west.asu.edu/stuaffairs/fa/stdemploy.htm
Student Health Services	UCB 170	602/543-8019	www.west.asu.edu/stuaffairs/studenthealth
Student Life	UCB 221	602/543-8200	www.west.asu.edu/stuaffairs/studentlife
Student Support Services Program	UCB 220	602/543-8121	www.west.asu.edu/stuaffairs/sasssp.html
Testing Services	UCB 120	602/543-8136	www.west.asu.edu/stuaffairs/testing
Transition and Outreach Services (General Advising)	UCB 201	602/543-8217	www.west.asu.edu/tos
Tutoring Services	UCB 322	602/543-8068	www.west.asu.edu/stuaffairs/multicultural/programs/tutoring
Veteran Student Services	UCB 120	602/543-8220	www.west.asu.edu/stuaffairs/sava.html
Vice Provost, Academic Affairs	FAB N301	602/543-4500	www.west.asu.edu/asuw/academic/aa/org.htm
Women's Studies Resource Center	UCB 323	602/543-3421	www.west.asu.edu/wsteam/resource.htm



ASU West Assessment Center

Tim Trumble photo

ASU West Faculty and Academic Professionals

A

- Abramson, Marianne** (1999), Visiting Assistant Professor of Psychology; B.A., Northern Arizona University; M.A., Ph.D., Arizona State University
- Achilles, Elaine R.** (1986), Associate Professor of Education; B.M.Ed., Temple University; M.M., Ed.D., Arizona State University
- Ackroyd, William S.** (2000), Lecturer of Social and Behavioral Sciences; B.A., M.A., M.S., Portland State University; Ph.D., University of Arizona
- Aguñaga, José** (1999), Assistant Librarian; B.A., University of San Diego; M.L.S., University of Arizona
- Aleshire, Peter** (1993), Senior Lecturer of Professional Writing; B.A., M.A., Stanford University
- Andereck, Kathleen L.** (1993), Associate Professor of Recreation and Tourism Management; B.S., University of Wisconsin, Stevens Point; M.S., Texas A&M University; Ph.D., Clemson University
- Anders, Gary C.** (1989), Professor of Economics; Director, Institute for International Business, School of Management; B.S., West Texas State University; M.A., Ph.D., University of Notre Dame
- Anderson, Laurel A.** (1989), Associate Professor of Marketing; B.S.N., University of Minnesota, Twin Cities; M.N., University of Washington; Ph.D., Arizona State University
- Anokye, Akua Duku** (1999), Visiting Associate Professor of American Studies; B.A., Michigan State University; M.A., Federal City College, District of Columbia; M.A., Ph.D., City University of New York Graduate School and University Center
- Armstrong, Gaylene S.** (2000), Visiting Assistant Professor of Administration of Justice; B.A., University of Manitoba (Canada); M.A., Ph.D., University of Maryland
- Armstrong, Todd A.** (1999), Assistant Professor of Administration of Justice; B.A., M.A., Ph.D., University of Maryland, College Park
- Atwater, Leanne E.** (1993), Professor of Management; B.A., M.A., San Diego State University; Ph.D., Claremont Graduate School
- Ávalos, Manuel** (1990), Associate Professor of Political Science; B.A., M.A., University of Arizona; Ph.D., University of New Mexico
- Awender, Michael A.** (2000), Professor of Education; Dean, College of Education; B.A., M.A., University of Windsor (Canada); M.Ed., University of Toronto (Canada); Ph.D., Claremont Graduate School
- Balthazard, Pierre A.** (1999), Associate Professor of Information Management Systems; B.S., McGill University (Canada); M.S., Ph.D., University of Arizona
- Beckett, E. Carol** (1996), Assistant Professor of Bilingual Education; B.A., M.Ed., Ed.D., Arizona State University
- Bellizzi, Joseph A.** (1988), Professor of Marketing; B.S., M.A., Ph.D., University of Nebraska, Lincoln
- Berman, Tressa** (1995), Assistant Professor of Anthropology; B.A., San Francisco State University; M.A., University of Colorado, Boulder; Ph.D., University of California, Los Angeles
- Bernat, Frances P.** (1993), Associate Professor of Administration of Justice; B.S., M.A., J.D., State University of New York, Buffalo; Ph.D., Washington State University
- Bonakdarian, Mansour** (1999), Visiting Assistant Professor of American Studies; B.A., M.A., Ph.D., University of Iowa
- Brawley, E. Allan** (1992), Professor of Social Work; Interim Dean, College of Arts and Sciences; Certificate of Social Work, University of Strathclyde (United Kingdom); D.S.W., University of Pennsylvania
- Bredbenner, Candice D.** (1990), Associate Professor of American History; Cochair, Department of American Studies; B.A., Russell Sage College; M.A., Ph.D., University of Virginia
- Brett, Joan F.** (1999), Associate Professor of Marketing; B.A., B.S., Ohio State University; Ph.D., New York University
- Bristol, Terry** (2000), Assistant Professor of Marketing; B.S., M.S., San Diego State University; Ph.D., Virginia Polytechnic Institute
- Britt, Chester L. III** (1999), Associate Professor of Administration of Justice; B.S., University of Iowa; M.A., Washington State University; Ph.D., University of Arizona
- Broadus, Dorothy C.** (1990), Associate Professor of English; Cochair, Department of American Studies; B.A., Eastern Kentucky University; M.Ed., Ph.D., University of Louisville
- Brodar, Valerie A.** (1999), Visiting Assistant Professor of Interdisciplinary Arts and Performance; B.A., Carnegie Mellon University; M.F.A., School of the Art Institute of Chicago; M.F.A., Ohio State University
- Bryn, Sandra L.** (1994), Assistant Professor of Curriculum and Instruction; B.S., Minot State College; M.A., Ed.D., Northern Arizona University
- Burleson, Mary H.** (1997), Assistant Professor of Psychology; B.A., M.S., New Mexico State University; Ph.D., Arizona State University
- Buss, Ray R.** (1990), Associate Professor of Educational Psychology; Assistant Dean, College of Education; B.S., M.S., Ph.D., University of Wisconsin, Madison
- Byam, L. Dale** (1999), Visiting Assistant Professor of Interdisciplinary Arts and Performance; B.A., Concordia University (Canada); M.A., Ph.D., New York University

B

Baldwin, Bruce A. (1989), Professor of Accountancy; B.A., M.B.A., Michigan State University; Ph.D., Arizona State University

C

Cardelle-Elawar, Maria (1987), Associate Professor of Educational Psychology; B.A., Universidad Experimental Libertador (Venezuela); M.S., University of Southern California; Ph.D., Stanford University

Cárdenas, Lupe (1986), Associate Professor of Spanish; B.A., M.A., Ph.D., Arizona State University

Carey, James (1998), Lecturer, School of Management; B.S., M.B.A., Ph.D., Arizona State University

Carey, Jane M. (1988), Associate Professor of Management Information Systems; B.S., M.B.A., Eastern Illinois University; Ph.D., University of Mississippi

Carlile, Barbara J. (1993), Lecturer of Education; Coordinator, Field Placement for Education; B.A., Immaculate Heart College; M.Ed., Arizona State University; Ed.D., Northern Arizona University

Carter, Wendy (1997), Assistant Professor of Sociology; B.A., Stanford University; M.S., Carnegie Mellon University; M.S., Ph.D., University of Wisconsin, Madison

Chang, Stanley Y. (1992), Associate Professor of Accountancy; B.B.A., National Taiwan University (Taiwan); M.A., University of Missouri; Ph.D., Texas Tech University

Chavez, José G. (2000), Assistant Professor of Spanish; B.A., M.A., California State University, Sacramento; Ph.D., Arizona State University

Chisholm, Inés M. (1991), Associate Professor of Bilingual Education; B.A., M.Ed., University of Puerto Rico; Ph.D., University of Florida

Christie, Alice A. (1995), Assistant Professor of Technology and Education; B.A., Denison University; M.Ed., Boston University; Ph.D., Arizona State University

Cleland, Jo Ann V. (1991), Associate Professor of Reading/Language Arts; B.A., Saint Olaf College; M.A., Ed.D., Northern Arizona University

Coles, Jerilyn W. (1994), Assistant Professor of Management; B.S., Brigham Young University; Ph.D., University of Utah

Collins, Kathleen (1997), Assistant Librarian; B.A., University of Maine, Farmington; M.L.I.S., Dalhousie University (Canada)

Collins-Chobanian, Shari C. (1994), Associate Professor of Philosophy; B.A., Colorado State University; M.A., Ph.D., Washington University

Corrigan, John A. (1992), Professor of American Studies and Religious Studies; Director, Religious Studies Program; B.A., University of Dayton; M.A., Miami University; Ph.D., University of Chicago

Costantino, James (1998), Lecturer of Accountancy; B.S., M.Acc., Arizona State University; M.A., University of Southern California

Cuádriz, Gloria H. (1994), Assistant Professor of American Studies; Director, Ethnic Studies Program; B.A., University of California, Santa Cruz; M.A., Ph.D., University of California, Berkeley

Cutrer, Emily F. (1990), Associate Professor of American Studies; Dean, Division of Collaborative Programs; Interim Dean of Students; B.A., M.A., Ph.D., University of Texas, Austin

Cutrer, Thomas W. (1992), Professor of American Studies; B.A., M.A., Louisiana State University; Ph.D., University of Texas, Austin

D

D'Angelo, Barbara (1999), Assistant Librarian; B.A., Emmanuel College; M.S., University of Illinois, Urbana-Champaign

Dallmus, John T. (2000), Lecturer of Accountancy; B.S., Towson University; M.B.A., Loyola College in Maryland

Davidson, Ronald (1997), Associate Professor of Accountancy; B.Comm., University of Manitoba (Canada); M.B.A., York University (Canada); Ph.D., University of Arizona

De La Cruz, Yolanda (1991), Associate Professor of Mathematics Education; B.A., M.A., California State University, Northridge; Ed.D., University of California, Berkeley

Delgado, Fernando (1994), Associate Professor of Communication Studies; Associate Vice Provost for Academic Programs and Graduate Studies; B.A., San Jose State University; M.A., Ph.D., University of Iowa

Di Mare, Lesley (1992), Associate Professor of Communication Studies; Chair, Department of Communication Studies; B.A., California State University, Chico; M.A., California State University, Hayward; Ph.D., Indiana University, Bloomington

Dix, Clarence L. (1979), Senior Lecturer of Social Work; B.A., Buena Vista College; M.S.W., University of Chicago

Duncan, William A. (1991), Associate Professor of Accountancy; Director, Accountancy Program; B.S., Portland State University; Ph.D., University of Texas, Austin

E

Elenes, C. Alejandra (1992), Associate Professor of Women's Studies; Licenciada en Ciencias de la Información, University of Monterrey (Mexico); M.A., Ph.D., University of Wisconsin, Madison

Erfani, Julie A. Murphy (1989), Associate Professor of Political Science; B.A., Knox College; M.A., Ph.D., University of Minnesota, Twin Cities

F

Forest, Cynthia A. (1994), Assistant Professor of Reading Education; B.S., University of Texas, Austin; M.Ed., Houston Baptist University; Ph.D., University of Texas, Austin

farrelly, deg (1991), Associate Librarian; B.A., Illinois State University; M.L.S., Rutgers, The State University of New Jersey

Fedock, Patricia (1993), Assistant Professor of Science Education; B.A., M.A., Ph.D., Arizona State University

Feezor-Buttes, Barbara (1995), Assistant Professor of American Studies; B.A., University of California, Berkeley; M.A., Ph.D., University of California, Los Angeles

Firat, A. Fuat (1990), Professor of Marketing; Licencié en Economie, Istanbul University (Turkey); Ph.D., Northwestern University

Fitzpatrick, Tanya R. (2000), Associate Professor of Social Work; B.A., Clark University; M.S.W., Simmons School of Social Work; Ph.D., Boston College

Flint, G. David (1998), Lecturer of Management; B.A., Grand Canyon University; M.I.M., American Graduate School of International Management; Ph.D., Texas A&M University

Forster, Bruce A. (2000), Professor of Economics; Dean, School of Management; B.A., University of Guelph (Canada); Ph.D., Australian National University (Australia)

G

Gallegos, Bee (1984), Associate Librarian; B.S., University of North Alabama; M.L.S., George Peabody College for Teachers

Garcia, Mildred (1997), Professor of Social and Behavioral Sciences; Vice Provost for Academic Personnel; Associate Director, Hispanic Research Center; B.S., Bernard M. Baruch College; M.A., New York University; M.A., Ed.D., Columbia University

Garrett, Judith N. (1996), Assistant Professor of Early Childhood Education/Special Education; B.S., State University of New York, Fredonia; M.A., University of Tennessee, Knoxville; Ph.D., George Mason University

Georges-Abeyie, Daniel (1992), Professor of Administration of Justice; B.A., Hope College; M.A., University of Connecticut; Ph.D., Syracuse University

Gilkeson, John S. (1991), Associate Professor of History; A.B., Amherst College; M.A., University of Oklahoma; Ph.D., Brown University

Gitelson, Richard (1994), Professor of Recreation and Tourism Management; Chair, Department of Recreation and Tourism Management; B.A., M.A.T., M.S., University of North Carolina, Chapel Hill; Ph.D., Texas A&M University

Glass, Ronald D. (1996), Assistant Professor of Professional Core; B.A., Harvard College; M.A., Ph.D., Stanford University; Ed.M., Harvard University; C.Phil., University of California, Berkeley

Gonzalez-Jensen, Margaret (1994), Associate Professor of Bilingual Education; B.A., Our Lady of the Lake University; M.A., Ed.D., Texas A&M University

Gopalakrishnan, Mohan (1998), Associate Professor of Operations Production Management; B.E., College of Engineering (India); M.S., Ph.D., University of Alabama, Tuscaloosa

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Director, Curriculum and Academic Articulation.....	Julia R. Ramsden
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Vice Provost for Institutional Advancement.....	John E. Collins
Interim Dean, ASU West Library.....	Marilyn Myers
Interim Dean of Students.....	Emily F. Cutrer

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Dean, College of Extended Education.....	Bette F. DeGraw
Dean, Craig and Barbara Barrett Honors College.....	Ted Humphrey

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Interim Dean, College of Arts and Sciences.....	E. Allan Brawley
Cochair, American Studies.....	Candice Bredbenner
Cochair, American Studies.....	Dorothy C. Broadus
Chair, Integrative Studies.....	Linda L. Stryker
Chair, Interdisciplinary Arts and Performance.....	Robert Taylor
Chair, Life Sciences.....	Harvey F. Pough
Chair, Social and Behavioral Sciences.....	Paul A. Miller
Chair, Women's Studies.....	Astair G. M. Mengesha
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Dean, College of Human Services.....	Mark S. Searle
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Chair, Recreation and Tourism Management.....	Richard Gitelson
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Coordinator, University College Center.....	Christina Hahn
Director, Center for Writing Across the Curriculum Program.....	Robert W. Jones
Director, Research Consulting Center.....	Joseph M. Ryan
Liaison, Barrett Honors College.....	Joseph M. Ryan

School of Management

Dean, School of Management.....	Bruce Forster
Director, Accountancy Program.....	William Duncan
Director, Institute for International Business.....	Gary Anders
Director, Master of Business Administration Program.....	David Van Fleet
Director, Undergraduate Global Business Program.....	John Greenhut

ASU Extended Campus

Bette F. DeGraw, D.P.A., Dean, College of Extended Education

www.asu.edu/xed



The ASU Downtown Center specializes in extended education.

Tim Trumble photo

PURPOSE

The College of Extended Education was created in 1990 to extend the resources of ASU throughout Maricopa County, the state, and the region. The College of Extended Education is a university-wide college that oversees the ASU Extended Campus and forms partnerships with other ASU colleges to meet the instructional and informational needs of a diverse community.

For the most current information, visit the college's Web site at www.asu.edu/xed.

ASU EXTENDED CAMPUS

The ASU Extended Campus goes beyond the boundaries of the university's three physical campuses to provide access to quality academic credit and degree programs for working adults through flexible schedules; a vast network of off-campus sites; classes scheduled days, evenings, and weekends; plus innovative delivery technologies including television, the Internet, and independent learning. The ASU Extended Campus also offers a variety of professional continuing education and community outreach programs.

Graduate Degrees

DEGREE PROGRAMS

ASU offers degree programs through the ASU Extended Campus. Convenient times and locations as well as today's innovative technologies make it easier for working adults and other nontraditional students to earn a degree. The College of Extended Education facilitates the delivery of these programs. All courses and degrees are offered through the respective university academic departments. These courses are published each fall and spring semester in the *Extended Campus Catalog* and in the *Schedule of Classes*. All graduate degree programs offered through the college are shown in the "Graduate Degrees and Majors Offered in Collaboration with the College of Extended Education" table, page 447.

OFF-CAMPUS DEGREE PROGRAMS

Business Administration—M.B.A.

ASU Main. The technology M.B.A. is an evening program designed specifically for technology professionals. The degree program is offered at the ASU Research Park. Cases, applications, and examples emphasize technology, global competition, and rapid organizational change. For more information, call 480/965-3332.

The evening M.B.A. is offered at the ASU Downtown Center. It is designed to meet the needs of working professionals and combines theoretical concepts with practical applications. For more information, call 480/965-3332.

Graduate Degrees and Majors Offered in Collaboration with the College of Extended Education

Major	Degree	Concentration	Administered By
Business Administration	M.B.A.	—	College of Business (ASU Main) School of Management (ASU West)
Curriculum and Instruction	M.Ed.	Secondary education	College of Education
Educational Administration and Supervision	Ed.D.	—	College of Education
Electrical Engineering	M.S.E.	—	College of Engineering and Applied Sciences
Engineering	M.E.*	—	School of Engineering
Public Administration	M.P.A.	Public information management, public management, public policy analysis and evaluation, urban management and planning	School of Public Affairs

* This collaborative program is offered by the three state universities.

ASU West. The Scottsdale M.B.A. degree program meets in the Scottsdale Airpark in north Scottsdale. Classes emphasize the development of critical learning skills, with practical application in analyzing local industries. Students, faculty, and industry experts work together on projects for local companies. The integrated curriculum provides a comprehensive understanding of interrelated business issues. For more information, call 602/543-6201.

Public Administration—M.P.A.

ASU Main. The School of Public Affairs offers this interdisciplinary program. The program is designed to provide professional training for careers in public administration and management. Opportunities for completing course work leading to the M.P.A. are offered during evening hours at ASU Main, the ASU Downtown Center, and various off-campus sites. For more information, call 480/965-3926 or write

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TEMPE AZ 85287-0603

Curriculum and Instruction—M.Ed.

ASU Main. The Master of Education degree in Curriculum and Instruction is offered with concentrations in either multicultural education or secondary education. This is an off-campus degree program targeted to school district audiences. For more information, call 480/965-1644.

DELTA Doctorate

ASU Main. The DELTA Doctorate, which leads to the Doctor of Education degree in Educational Administration and Supervision, is available as an off-campus degree program. The program is targeted to qualified public school administrators. For more information, call 480/965-6357.

TECHNOLOGY-DELIVERED DEGREE PROGRAMS

Electrical Engineering—M.S.E.

ASU Main. The faculty in the Department of Electrical Engineering offer the Master of Science in Engineering degree in Electrical Engineering via interactive television.

This program meets the needs of the part-time student who is working full-time in industry. Ten graduate courses are required; six should constitute a major, two courses a minor, and two courses should be taken outside the Department of Electrical Engineering. After completing the required hours of course work, students in this program must pass a comprehensive examination covering topics in the major. Using the department's three-year schedule of courses, students are able to complete course requirements over the interactive television system. For more information, call 480/965-3590.

Business Administration—M.B.A.

ASU Main. The ASU MBA Online program leverages computer and communications technologies to offer the highly ranked ASU M.B.A. to managers and professionals who do not wish to attend a traditional, on-campus program. The program consists of on-site sessions, asynchronous technology-based materials, and electronic communication among faculty and students. This two-year program consists of 12 four-semester-hour courses. For more information, call 480/965-3332.

ASU West. The connectMBA from ASU West allows working professionals to complete a quality, AACSB-accredited M.B.A. without weekly attendance on campus. Course delivery combines classroom instruction (every seventh weekend) with self-paced, computer-assisted learning. The two-year program consists of 15 three-semester-hour courses. For more information, access the Web site at www.west.asu.edu/som/mba.

Engineering—M.E.

ASU Main. The tri-university Master of Engineering degree program is intended to meet the educational needs of Arizona's practicing engineers. With industry input, Arizona's three state universities—Arizona State University, Northern Arizona University, and University of Arizona—enhance the skills, knowledge, and understanding that are critical to today's practicing engineers. The courses are offered through a variety of distance-delivery methods in flexible formats at any of the three universities.

The M.E. degree offers the practicing engineer opportunities to design, in conjunction with an advisory committee, a

program of study that can reflect the increasingly interdisciplinary nature of engineering practice. The M.E. degree requires the completion of 30 semester hours of course work; students must complete a minimum of three hours in applied engineering mathematics as well as three hours of engineering management/business. Up to six semester hours from a practice-oriented project may be applied. A final examination is required.

For application information, call 480/965-1726, send e-mail to m.eng@asu.edu, or access the program's Web site at triuiv.engr.arizona.edu.

ON-CAMPUS EVENING DEGREE PROGRAM

Public Administration—M.P.A.

ASU Main. The School of Public Affairs offers this interdisciplinary program. The program is designed to provide professional training for careers in public administration and management. Opportunities for completing course work leading to the M.P.A. are offered during evening hours at ASU Main, the ASU Downtown Center, and various off-campus sites. For more information, call 480/965-3926 or write

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WINTER SESSION (MAIN)

The College of Extended Education schedules the winter session courses in collaboration with academic departments. The condensed, three-week session is offered between the fall and spring semesters. For more information about winter session, call 480/965-9797.

Certificate Programs

Certificate programs provide opportunities for those seeking to advance their careers, to begin a new career, to reenter the workplace, or simply to develop new knowledge. A practical choice for career development, certificate programs are recognized by employers as evidence of professional skill or accomplishment.

Gerontology Certificate Program

The Certificate in Gerontology, offered by the Graduate College, is available to graduate students enrolled in master's or doctoral degree programs in disciplines such as communication, exercise science, nursing, psychology, social work, and sociology. Unclassified graduate students may pursue the certificate. This program consists of 24 semester hours evenly divided between required and elective course work.

The Gerontology Program has an affiliated faculty of more than 60 members based in 22 different departments throughout the university. Students can work on independent study or participate with faculty in their aging-related research.

Because of increased longevity, there could be more than 30 million Americans over the age of 85 by 2040, a demographic change with many ramifications. The certificate is designed for individuals interested in learning more about

the aging process. For more information, call 480/965-3225 (ASU Main) or 602/543-6642 (ASU West).

College Units by Program Area

Degree Programs and Credit Courses

The College of Extended Education facilitates the delivery of several degree programs and credit courses. Convenient times and locations as well as today's innovative technologies make it easier for working adults and other nontraditional students to earn a degree. All courses and degrees are offered through the respective university academic departments. These courses are published each fall and spring semester in the *Extended Campus Catalog* and the *Schedule of Classes*.

Academic and Professional Programs. As a convenience to students, courses are conducted off campus in locations throughout the state, and on campus in the evening and during the winter session.

Academic credits earned off campus are recorded on a student's permanent record in the same manner as those earned on campus and are equivalent in all academic considerations. All academic standards of the university, including policies related to admission and registration, apply to off-campus courses. It is the responsibility of the student to be aware of all applicable policies before registering. It is the responsibility of each dean to determine what courses to offer off campus and to make faculty assignments.

The tuition and fees for off-campus credit courses are the same as for those offered on campus. (See resident and non-resident rates in the latest *Schedule of Classes*.) Before the 21st calendar day of each semester, any combination of on-campus and off-campus resident credit courses resulting in a combined registration of seven or more semester hours requires that the student pay full-time tuition. Off-campus credit courses and programs that commence on or after the 21st calendar day of the start of each semester require full-time and part-time students to pay tuition separate from (but in addition to) those courses starting before the 21st calendar day of the semester.

Professional continuing education activities focus on professional and personal development as well as lifelong learning. Programs are planned and developed to complement the missions of the college and the university. These programs can be customized and transported to reach numerous target populations and levels of need.

Distance Learning Technology. Distance Learning Technology uses a variety of technologies. Semester-based courses are offered through Instructional Television Fixed Service, cable television, public television, satellite, microwave, videotape, and the Internet. In addition, independent learning courses are offered (print- or Internet-based). Distance Learning Technology makes it possible for many people to access and share educational resources locally, regionally, nationally, and internationally through a variety of electronic technologies and distribution systems. In addition to distance learning courses, other products and services are available, including teleconferencing and video production.

Many students are unable to attend class on campus due to schedule or commuting difficulties and prefer to participate in distance learning courses at convenient locations

such as the work site or home. The distance learning course schedule consists of approximately 135 courses offered by various ASU colleges each semester, and these courses are available for credit at a variety of remote locations, including students' homes. Students participating in televised courses from the work site or home can interact with faculty and students in the classroom on campus while class is in session via teleconferencing technology. Videotapes of most courses are available through University Libraries Video Resources. Other student support services are available to assist off-campus students.

Cable/Public Television. ASU offers credit courses that require students to view televised class sessions and complete work assignments at home. Exams usually are held on campus. Courses are available throughout the Phoenix area via KAET Channel 8, Cox Communications, Insight Cable, Cable America, Digital Choice TV, and other cable providers. Televised courses are also available in university residence halls.

Interactive Instructional Television Program (IITP). Students employed by companies participating in the IITP may take courses for credit at the work site. A daily courier service circulates course materials between faculty on campus and their students at remote sites. Exams typically are held at the work site. Each company has an on-site coordinator to assist with registration, to provide information, and to proctor exams. A Master of Science in Engineering degree with a major in Electrical Engineering is available through the IITP. More information about the degree is available from the College of Engineering and Applied Sciences at 480/965-6738.

Interactive Television (Public Sites). Certain sites are open to the public. Students can participate in most televised courses at locations such as ASU Downtown Center, ASU East, ASU West, select community college campuses, Cactus Shadows High School, and the Gila River Indian Community. Each public site has an on-site coordinator to assist with registration, to provide information, and to proctor exams.

Internet Courses. ASUonline is the university's gateway to an "online campus." Internet courses are offered by various departments through ASU Extended Campus, allowing students to participate from any location in the world. Through the Web, students can access lectures, participate in class assignments, interact with the instructor, collaborate with other students, and earn ASU credit at convenient times and locations. Students register for Internet courses through the normal university admissions and registration process. Certain computer hardware and software may be required for Internet courses. For more information about Distance Learning Technology, call 480/965-6738 or access the Web site at asuonline.asu.edu.

Independent Learning. These courses allow students to pursue ASU credit and to fulfill degree requirements or to enhance occupational, professional, and intellectual skills. Independent Learning courses are appropriate for students seeking flexibility in progressing through university courses. Any individual with a high school diploma or GED may enroll; however, enrollment in Independent Learning is not the same as admission to ASU. For ASU degree-seeking students, enrollment in these courses requires an advisor's and dean's approval. Generally, ASU students may take one

course at a time—other students can participate in two. A maximum of 60 semester hours earned by independent learning and/or by comprehensive examination may be applied toward the baccalaureate degree at ASU. Independent Learning courses are not applicable toward graduate credit, and pass/fail options are not available. Students have up to one year to complete courses. More information on registration, lesson formats, submission of assignments, correspondence with instructors, and other course details is available in a catalog from the Independent Learning Office, at 480/965-6563.

Professional Continuing Education

Academic and Professional Programs provides professional continuing education programs throughout the Phoenix metropolitan area. These ongoing programs are intended to improve professional competence and address current issues and trends, and are offered to adult learners in collaboration with ASU colleges, other educational providers, professional associations, and public and private organizations. In addition, the Elderhostel Program, a series of challenging, thought-provoking college-level courses, is offered to people over 55. For more information, call 480/965-9200.

The Nonprofit Management Institute is offered by the College of Extended Education and the Valley of the Sun United Way. This program is designed to enhance the management skills of those who serve nonprofit human services groups, hospitals, government agencies, churches, private schools, art organizations, environmental groups, and others in the nonprofit sector. For more information, see "Nonprofit Leadership and Management," page 278, or call 480/965-9200.

For more information about Academic and Professional Programs, call 480/965-9797.

Global and Community Outreach

American English and Culture Program. The American English and Culture Program (AECP) features an intensive course of study designed for adult international students who want to become proficient in English as a second language for academic, professional, or personal reasons. Applicants must be at least 18 years of age and must have a high school diploma or its equivalent. All conditions of the U.S. Immigration and Naturalization laws pertaining to full-time study in the United States must be met by all applicants. Students are required to take an English placement test before the beginning of classes. Certificates of achievement are awarded on completion of the course. Admission to the program does not constitute regular admission to ASU.

Beginning, intermediate, and advanced courses provide instruction in listening, reading, speaking, structure, and writing. Academic advising and orientation to Arizona and the United States are integral parts of the program.

Program-wide social activities each cycle include a field trip, a picnic, a cultural activity, visits to museums, historical sites, or musical presentations. Campus housing and American Homestays are available.

Advanced-level students may be permitted to enroll concurrently in up to two ASU credit classes with the approval of the director. Several special classes are offered through the AECP. Classes in conversation, speech improvement,

and the Test of English as a Foreign Language are offered during alternate terms.

The fall and spring semesters are divided into two eight-week cycles. Students may enroll for one or more cycles. An eight-week summer session of study is also offered. Inquiries concerning admission requirements, enrollment, and fee schedules should be sent to

AMERICAN ENGLISH AND CULTURE PROGRAM
DEPARTMENT 4
ARIZONA STATE UNIVERSITY
PO BOX 873504
TEMPE AZ 85287-3504

For more information, call 480/965-2376.

Extended Campus Programs. Extended Campus Programs was established in response to the rapidly expanding demand for educational services in Maricopa County and throughout Arizona. Analyzing community needs for course offerings, workshops and seminars, the unit oversees the planning, organizing, and staffing necessary to satisfy these educational needs.

A primary goal of this unit is to ensure that qualified students have access to effective, appropriate university programs. Extended Campus Programs focuses on developing and maintaining education, business, government, professional, and community links to further the university's and college's missions.

The major components of Extended Campus Programs are the classes and events at the ASU Downtown Center and emerging programs in the east Valley, Scottsdale, and Ahwatukee. For more information, call 480/965-3046.

ASU Downtown Center. The ASU Downtown Center is a university-wide resource located in downtown Phoenix that serves as an educational, applied-research, and community-service facility.

Responding to the needs of business, industry, and state and local governments, the center offers traditional and interdisciplinary upper-division and graduate-level courses. The center also offers professional and continuing education programs, lectures, and community forums, and serves as a meeting location for conferences, workshops and seminars.

ASU faculty, staff, and students may take advantage of the center's computer lab. A lab assistant is available during posted hours. Faculty, staff, and students also can access the ASU library online catalog and ASU library information and resources. Library books may be ordered and returned through the center.

Accommodations for small or large meetings or conferences are available at attractive rates and can include beverages, food service, and professional equipment. Meeting rooms include conference rooms, a board room, and two computer classrooms. Most meeting rooms can be configured in a variety of styles and setups. In addition, break-out areas are conveniently located throughout the facilities. Advice in logistics planning is available as are a wide range of related services. The center is available for use by outside organizations, subject to the limits of university policies and procedures. Contact the center's facility scheduler for details.

For more information about the programs and services provided at the center, call 480/965-3046 or write

ASU DOWNTOWN CENTER
502 E MONROE ST
PHOENIX AZ 85004-2337

Several ASU programs and partnerships are located at the ASU Downtown Center.

Academic and Professional Programs. As part of ASU Extended Campus and the College of Extended Education, Academic and Professional Programs brings the resources of ASU to many who may not be pursuing a traditional degree but are seeking professional and personal enrichment. See "Academic and Professional Programs," page 448, for a description.

Joint Urban Design Program. The Joint Urban Design Program, located in the ASU Downtown Center, is a partnership between the Colleges of Architecture and Environmental Design and Extended Education. The program directs institutional and public resources toward developing an understanding of issues that affect the urban quality of Phoenix. For more information, call 480/727-5146.

Urban Data Center. The Urban Data Center, a partnership with the College of Public Programs, serves as a resource for analysis and implementation of public policy in the Phoenix metropolitan area. The center works closely with ASU researchers and organizations such as the Joint Urban Design Program, the Morrison Institute for Public Policy, University Libraries, local governments, state agencies, and other independent organizations to build a comprehensive database on policy issues for urban planners and community leaders. For more information, call 480/965-3046.

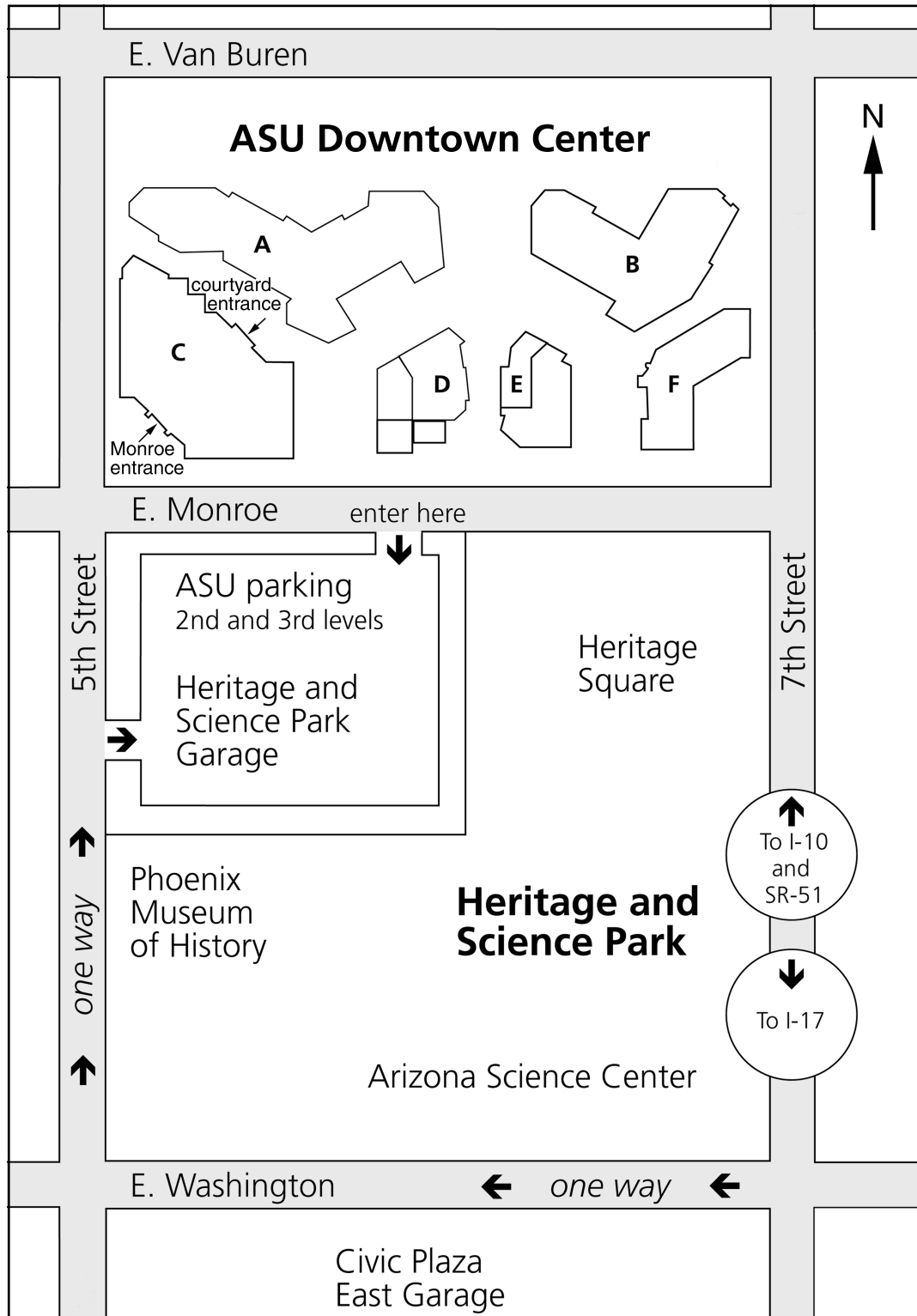
Advanced Public Executive Program. The Advanced Public Executive Program of the College of Public Programs is housed at the ASU Downtown Center. This program is designed to provide public managers and administrators with analytical approaches and skills through short courses and seminars to help mobilize ideas, people, and resources in support of public programs. For more information, call 480/965-4006.

Office of Youth Preparation and Project PRIME. The Office of Youth Preparation and Project PRIME (Project to Improve Minority Education) are housed at the Downtown Center with evaluation support services located at the Hispanic Research Center. The programs are designed to increase the pool of college-eligible minority students, who have historically been underrepresented in higher education, by providing instructional and support services to seventh-through 12th-grade students and their families at targeted Arizona schools. For more information, call 480/965-8510.

Arizona Drug and Gang Prevention Resource Center. The Arizona Drug and Gang Prevention Resource Center serves as a centralized source for individuals, schools, and communities throughout Arizona to support, enhance, and initiate prevention efforts.

For information about planning, mobilizing, training, and evaluating community prevention efforts, call the center at 480/727-2772.

ASU Downtown Center Map



ASU Extended Campus Administrative Personnel

Dean, College of Extended Education	Bette F. DeGraw
Associate Dean	William Verdini
Director, American English and Culture Program	Mark D. Rentz
Director, Communications and Marketing	Randy Bailey
Director, Development and Outreach	Scott Sheldon
Director, Distance Learning Technology	Elizabeth H. Craft
Director, Downtown Center	Bette F. DeGraw
Director, Extended Campus Programs	Jim Patzer
Director, Academic and Professional Programs	Patricia A. Feldman
Director, Operations and Finance	Cathie M. Fox

ASU Extended Campus Faculty and Academic Professionals

Backer, Linda R. (1997), Assistant Instructional Professional, College of Extended Education; Manager, Interdisciplinary Programs, Academic and Professional Programs, College of Extended Education; B.A., University of Colorado; M.S., Colorado State University

Craft, Elizabeth H. (1982), Senior Administrative Professional, College of Extended Education; Director, Distance Learning Technology, College of Extended Education; B.F.A., Ohio University; M.A., Arizona State University

DeGraw, Bette F. (1986), Administrative Professional, College of Extended Education; Associate Professor of Public Affairs; Dean, College of Extended Education; Director, Downtown Center, College of Extended Education; B.A., Thiel College; M.S.W., Rutgers, The State University of New Jersey; D.P.A., Arizona State University

Feldman, Patricia A. (1990), Associate Administrative Professional, College of Extended Education; Director, Academic and Professional Programs, College of Extended Education; B.S., M.Ed., Colorado State University

Kyselka, Christine K. (1990), Associate Administrative Professional, College of Extended Education; Assistant Director, Distance Learning Technology, College of Extended Education; B.S., M.P.A., Arizona State University

Pope, Donna (1999), Assistant Instructional Professional, College of Extended Education; Manager, Nonprofit Management Program, Academic and Professional Programs, College of Extended Education; B.S.W., Texas Women's University; M.S.S.W., University of Texas, Arlington

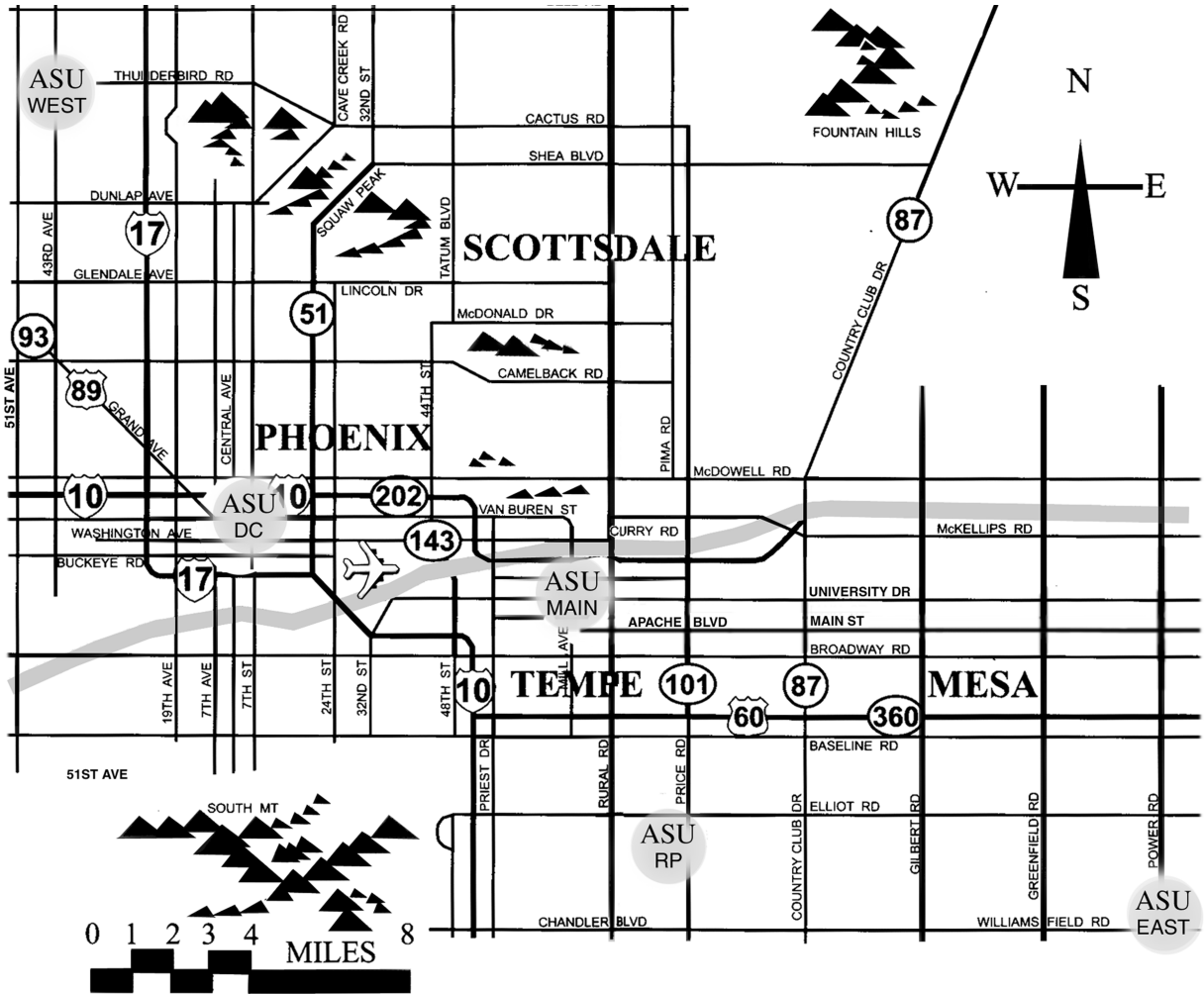
Verdini, William A. (1976), Associate Professor of Supply Chain Management; Associate Dean, College of Extended Education; B.S., Case Western Reserve University; M.B.A., D.B.A., Kent State University

ASU Extended Campus Directory

For the "ASU Main Directory," see page 343. For the "ASU East Directory," see page 427. For the "ASU West Directory," see page 437.

Organization	Location	Telephone	Web Address
Extended Education, College of	ASUDC C319	480/965-9696	www.asu.edu/xed
Academic and Professional Programs	RITT B132	480/965-9797	—
	ASUDC	480/965-9200	—
American English and Culture Program	MARIP	480/965-2376	www.asu.edu/xed/aecp/esl.html
ASU Downtown Center	ASUDC	480/965-3046	www.asu.edu/xed/dtc
Communications and Marketing	ASUDC C319	480/965-9696	—
Development and Outreach	ASUDC C250	480/727-5330	—
Distance Learning Technology	RITT A129	480/965-6738	www.dlt.asu.edu
Extended Campus Programs	ASUDC C250	480/965-3046	—
Independent Learning	RITT B132	480/965-6563 or 1-800-533-4806	www.dlt.asu.edu/info/indlearn.html
Operations and Finance	ASUDC C319	480/965-9696	—

ASU Vicinity Map




ASU MAIN ASU Main
Near Downtown Tempe

ASU DC ASU Downtown Center
Monroe and Fifth Streets,
Phoenix

ASU EAST ASU East
Power and Williams Field Roads,
Mesa

ASU RP ASU Research Park
Price and Elliot Roads,
Tempe

ASU WEST ASU West
43rd Avenue and
Thunderbird Road

 Phoenix Sky Harbor
International Airport

Accreditation and Affiliation

ASU Main and ASU East. Arizona State University Main is accredited by the North Central Association (NCA) Commission on Institutions of Higher Education. Arizona State University East is recognized by the NCA as a full-service campus and is accredited under the ASU Main umbrella. Programs in the various colleges, schools, divisions, and departments are accredited by, affiliated with, or members of national bodies as described in the “Academic Accreditation at ASU Main and East” table below; “Academic Affiliation” table, page 455; and “Academic Membership” table, page 456. Some programs in the College of Education are approved by the State Board of Education (Arizona) and the National Association of School Psychologists.

ASU West. ASU West is separately accredited by the NCA Commission on Institutions of Higher Education. Professional programs in the various academic areas are accredited by national bodies as described in the “Academic Accreditation at ASU West” table, page 455.

Academic Accreditation at ASU Main and East

Unit or Program	Accredited By
College of Architecture and Environmental Design	
B.S.D., Interior Design	Foundation for Interior Design Education Research
B.S.L.A.	Landscape Architectural Accreditation Board
M.Arch.	National Architectural Accrediting Board
M.E.P.	Planning Accreditation Board
College of Business	
All programs	AACSB—International Association for Management Education
School of Accountancy and Information Management	AACSB—International Association for Management Education
M.H.S.A. School of Health Administration and Policy	Accrediting Commission on Education for Health Services Administration
College of Education	
M.C., Counseling	Council for Accreditation of Counseling and Related Educational Programs
Ph.D., Counseling Psychology; Educational Psychology with a concentration in school psychology	American Psychological Association
College of Engineering and Applied Sciences	
B.S., Computer Science	Computer Science Accreditation Commission of the Computing Sciences Accreditation Board
B.S., Construction	American Council for Construction Education
B.S.E., Aerospace Engineering; Bioengineering; Chemical Engineering; Civil Engineering; Computer Systems Engineering; Electrical Engineering; Industrial Engineering; Materials Science and Engineering; Mechanical Engineering	Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.
College of Law	
J.D.	American Bar Association
College of Liberal Arts and Sciences	
B.S., Clinical Laboratory Sciences	National Accrediting Agency for Clinical Laboratory Sciences
M.S., Communication Disorders	American Speech-Language-Hearing Association
Ph.D., Psychology with a concentration in clinical psychology	American Psychological Association
College of Nursing	
B.S.N., M.S., Nursing	Arizona State Board of Nursing Commission on Collegiate Nursing Education National League for Nursing
College of Public Programs	
B.S., Recreation	Council on Accreditation of the National Recreation and Park Association

* This program is accredited through the ASU Main College of Business.

Academic Accreditation at ASU Main and East (continued)

Unit or Program	Accredited By
College of Public Programs (continued)	
B.S.W., M.S.W., School of Social Work	Council on Social Work Education
M.P.A.	National Association of Schools of Public Affairs and Administration
Walter Cronkite School of Journalism and Telecommunication	Accrediting Council on Education in Journalism and Mass Communications
College of Technology and Applied Sciences	
B.S., Aeronautical Engineering Technology; Electronics Engineering Technology; Manufacturing Engineering Technology	Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.
B.S., Aeronautical Management Technology, with concentrations in airway science flight management and airway science management	Council on Aviation Accreditation
East College	
B.S., Business Administration*	AACSB—International Association for Management Education
B.S., Nutrition (didactic program in dietetics); M.S., Nutrition (dietetic internship)	American Dietetic Association
Herberger College of Fine Arts	
Department of Theatre	National Association of Schools of Theatre
School of Music	National Association of Schools of Music

* This program is accredited through the ASU Main College of Business.

Academic Accreditation at ASU West

Unit or Program	Accredited By
College of Human Services	
B.S.W., Department of Social Work	Council on Social Work Education
Department of Recreation and Tourism Management	National Recreation and Park Association/American Association for Leisure and Recreation
School of Management	
All programs	AACSB—International Association for Management Education

Academic Affiliation

Unit or Program	Affiliated With
Barrett Honors College	National Collegiate Honors Council
College of Architecture and Environmental Design	
School of Architecture	American Institute of Architects, Central Arizona and Rio Salado Chapters
	Architectural Research Centers Consortium
	Association for Computer-Aided Design in Architecture
	Association of Collegiate Schools of Architecture
School of Design	American Society of Interior Designers
	Human Factors and Ergonomics Society
	Industrial Designers Society of America
	Interior Design Educators Council
	International Interior Design Association
	Society of Environmental Graphic Designers
School of Planning and Landscape Architecture	American Planning Association
	American Society of Landscape Architects
	Association of Collegiate Schools of Planning
	Council of Educators in Landscape Architecture
College of Education	American Association of Colleges for Teacher Education
	American Educational Research Association
	University Council for Educational Administration

Academic Affiliation (continued)

Unit or Program	Affiliated With
College of Nursing Continuing Extended Education Program	Arizona Nurses Association (American Nurses Credentialing Center's Commission on Accreditation)
Morrison School of Agribusiness and Resource Management B.S., M.S., Environmental Resources	Society for Range Management Soil and Water Conservation Society Wildlife Society

Academic Membership

Unit or Program	Membership With
Barrett Honors College	National Collegiate Honors Council
College of Education	American Association of Colleges for Teacher Education Association of Colleges and Schools of Education in State Universities and Land Grant Colleges University Council for Educational Administration
College of Law	Association of American Law Schools
College of Liberal Arts and Sciences	
Department of Anthropology	American Anthropological Association Council for Museum Anthropology
Department of Biology	American Institute of Biological Sciences American Society of Naturalists American Society of Zoologists Animal Behaviorists' Society Sigma Psi
Department of Chemistry and Biochemistry	American Association for the Advancement of Science American Chemical Society American Society for Advancement of Science
Department of Exercise Science and Physical Education	American Academy of Kinesiology and Physical Education American Alliance for Health, Physical Education, Recreation, and Dance American College of Sports Medicine American Society of Biomechanics Committee on Allied Health Education Council on Physical Education for Children International Society of Biomechanics National Association for Physical Education in Higher Education North American Society for Sports Psychology and Physical Activity Physiological Society Society for Experimental Biology Society for Neuroscience
Department of Geography	Association of American Geographers
Department of Geological Sciences	American Association of Petroleum Geologists American Geophysical Union American Institute of Professional Geologists Geological Society of America Mineralogical Society of America Society of Economic Paleontologists and Mineralogists
Department of History	American Association for State and Local History American Association of Museums American Historical Association Coordinating Committee for History in Arizona Institute of Historical Research National Council on Public History Western History Association

Academic Membership (continued)

Unit or Program	Membership With
Department of Languages and Literatures	American Council on Teaching Foreign Language International Studies Association Modern Language Association
Department of Mathematics	American Mathematical Society Mathematical Association of America Rocky Mountain Mathematics Consortium Society for Industrial and Applied Mathematics
Department of Microbiology	American Association of Immunologists American Association of Immunology American Society for Virology American Society of Microbiology Society for Neuroscience
Department of Military Science	Association of the U.S. Army
M.S., Ph.D., Molecular and Cellular Biology	American Society of Medical Technology
Department of Philosophy	American Philosophical Association
Department of Physics and Astronomy	Acoustical Society of America American Association of Physicists in Medicine American Association of Physics Teachers American Astronomical Society American Crystallographic Association American Physical Society American Vacuum Society International Astronomical Union Materials Research Society Optical Society of America
Department of Plant Biology	American Chemical Society American Institute of Biological Sciences American Society for Biochemistry and Molecular Biology American Society for Photobiology American Society of Cell Biology American Society of Horticultural Science American Society of Plant Physiologists American Society of Plant Taxonomy Arizona-Nevada Academy of Science Botanical Society of America Botanical Society of Japan California Botanical Society Ecological Society of America International Association for Study of Plant Succulents International Association of Landscape Ecology International Association of Plant Taxonomy International Association of Wood Anatomists International Organization of Paleobotany International Photosynthesis Society International Phycological Society International Society of Arboriculture International Society of Ecological Modeling International Society of Plant Molecular Biology International Society of Plant Propagators International Union of Woody Plant Physiologists Microscopy Society of America Mycological Society of America Phycological Society of America Phytochemical Society of North America Sigma Xi Society for Economic Botany Society of Ecological Restoration Society of Wetlands Scientists

Academic Membership (continued)

Unit or Program	Membership With
Department of Plant Biology (continued)	Soil Science Society of America Southwestern Association of Naturalists
Department of Political Science	American Political Science Association Inter-University Consortium for Political and Social Research
Department of Psychology	American Society of Clinical Psychologists
Department of Sociology	American Sociological Association
Women's Studies Program	Association for Women in Science National Women's Studies Association
College of Nursing	American Association of Colleges of Nursing Western Institute of Nursing
College of Public Programs	
Department of Recreation Management and Tourism	American Humanics, Inc. Arizona American Indian Tourism Association Arizona Heritage Alliance Arizona Park and Recreation Association Arizona State Therapeutic Recreation Association Association for Research on Nonprofit and Voluntary Action Association for Volunteer Administration College Fund/UNCF Learning Institute National Center for Nonprofit Boards National Park and Recreation Association National Society of Fund Raising Executives National Training Institute for Community Youth Work Nonprofit Risk Management Center Peter F. Drucker Foundation for Nonprofit Management Society for Nonprofit Organizations Travel Tourism Research Association
Hugh Downs School of Human Communication	National Communication Association Western States Communication Association
School of Justice Studies	Arizona Justice Educators Association of Criminal Justice Doctoral Programs National Academic Advising Onati International Institute for the Sociology of Law
School of Public Affairs	National Association of Schools of Public Affairs and Administration
School of Social Work	Baccalaureate Program Directors Association Council on Social Work Education Group for the Advancement of Doctoral Education National Association of Deans and Directors of Social Work National Association of Social Workers
Walter Cronkite School of Journalism and Telecommunication	Association of Schools of Journalism and Mass Communication Broadcast Education Association
East College	
Department of Nutrition	American Dietetic Association
Graduate College	Council of Graduate Schools
Herberger College of Fine Arts	
Department of Theatre	American Alliance for Theatre and Education Association for Theatre in Higher Education
Morrison School of Agribusiness and Resource Management	
B.S., Agribusiness with a concentration in professional golf management	Professional Golfer's Association of America

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Building Abbreviations

ADM (Wings A–B)	Administration	LL	G. Homer Durham Language and Literature Building
AED	College of Architecture and Environmental Design/North	LSA	Life Sciences A-Wing
AG	Agriculture Building	LSC	Life Sciences C-Wing
AGB1–4	ASU East Agribusiness Quads 1–4 ¹	LSE	Life Sciences E-Wing
AGBFS	ASU East Agribusiness Food Science Lab ¹	LYC	Lyceum Theatre
AIP	ASU East American Indian Programs ¹	MAIN	Old Main
ALTCH	ASU East Altitude Chamber ¹	MANZH	Manzanita Hall
ANTH	Anthropology Building	MARIP	Mariposa Hall
ANX	Visual Arts Annex	MCENT	A.J. Matthews Center
AQUAT (Wings A and B)	Mona Plummer Aquatics Center	MCL	James H. McClintock Hall
ARCH	College of Architecture and Environmental Design/South	MB	M.O. Best Hall
ARCV	University Archives	MHALL	Carrie Matthews Hall
ART	Art Building	MOEUR	B.B. Moeur Administration
ARWH	Art Warehouse	MTCHL	Mitchell School (Tempe)
ASUDC	Downtown Center	MU	Memorial Union
BA	Business Administration Building	MUR	John Murdock Lecture Hall
BAC	Business Administration C-Wing	MUSIC (Wings E and W)	Music Building
BKSTR	ASU Bookstore	NEEB	L.S. Neeb Hall
CERA (Wings A and B)	Ceramics Annex	NOBLE	Daniel E. Noble Science and Engineering Library
CFS	Center for Family Studies	NUR	Nursing Building
CHAPL	Danforth Chapel	PBS	Packard Baseball Stadium
CLCC	Classroom Laboratory/Computer Classroom Building ²	PEBE	Physical Education Building East
CLRB	ASU East Classroom Building ¹	PEBW	Physical Education Building West
CMPIN	Campus Inn	PGM	ASU East Professional Golf Management ¹
CNTR	ASU East Academic Center Building ¹	PPS	Physical Plant Shops
COMM2	ASU East Communications Building ¹	PRNT	ASU East IMT Print Facility ¹
COWDN	Cowden Family Resources Building	PS (Wings A–G)	George M. Bateman Physical Sciences Center
CP	Central Plant	PSH	Physical Science H-Wing
CPCOM	Computing Commons Building	PSY	Psychology Building
CRI	Cancer Research Institute	PVE	Palo Verde East
CRNX	Classroom Annex ²	PVM	Palo Verde Main
CSB	Community Services Building	PVW	Palo Verde West
CSC	Central Services Complex ²	RITT (Wings A and B)	Ritter Building
DPSMN	Department of Public Safety—Main	SANDS	Sands Classroom Building ²
EAW	ASU East Exercise and Wellness ¹	SCOB	John W. Schwada Classroom Office Building
EAW2	ASU East Exercise and Wellness Annex ¹	SCRED	Sonora Center Residence Education Center
ECA	Engineering Center A-Wing	SDH	Solar Demonstration Facility
ECB	Engineering Center B-Wing	SHS (Wings A and B)	Student Health Service
ECC	Engineering Center C-Wing	SIM	ASU East Flight Simulator Building ¹
ECD	Engineering Center D-Wing	SOLAR	ASU East Photovoltaics Testing Laboratory ¹
ECE	Engineering Center E-Wing	SRC	Student Recreation Complex
ECF	Engineering Center F-Wing	SS	Social Sciences Building
ECG	Engineering Center G-Wing	SSV	Student Services Building
ECANX	Engineering Center Annex	STAD	Sun Devil Stadium
ED	Hiram B. Farmer Education Building	STAUF (Wings A and B)	Charles Stauffer Communication Arts Building
EDB	Ira D. Payne Education Hall	TC	Technology Center
EDC	Education Lecture Hall	TCB	Aeronautics Building
ELAB	Electronics Laboratory Building ²	TCC	Technology Center Annex
ENGR	Engineering Research Center	TECH	ASU East Technology Center ¹
FAB	Faculty and Administration Building ²	TECH2	ASU East Technology Center Annex ¹
FABNX	Faculty and Administration Building Annex ²	THWH	Theatre Warehouse
FAC	Nelson Fine Arts Center	TOWER (Wings A and B)	University Tower Center
FIELD	University Field Lab	TRACK	Joe Selleh Track
FLHLB	Fletcher Library ²	UASB	Undergraduate Academic Services Building ²
GGMA	Grady Gammage Memorial Auditorium	UCB	University Center Building ²
GHALL	Dixie Gammage Hall	UCLUB	University Club
GWC	Barry M. Goldwater Center for Science and Engineering Research	UNION	ASU East Williams Campus Union Building ¹
HSC	ASU East Health Sciences Center ¹	UVCMN	University Commons
HSC2	ASU East Health Sciences Center Annex ¹	VISIT	ASU Visitor's Information Center
IAPNX	Interdisciplinary Arts and Performance Annex ²	WFA	Wells Fargo Arena
ICA	Intercollegiate Athletics	WFLD	ASU West Alternate Locations ²
IRISH (A–C)	Frederick M. Irish Hall	WH	Warehouse
LAW	John S. Armstrong Hall	WHALL	West Hall
LAWLB	John J. Ross-William C. Blakley Law Library	WILSN	George W. Wilson Hall
LIB	Charles T. Hayden Library	WTC	Whiteman Tennis Center

¹ Located at ASU East.

² Located at ASU West.