
Department of Aerospace Studies

Air Force ROTC

Col. Ronald Scott Jr.

Chair

(TC 324) 480/965-3181
www.asu.edu/clas/afrotc

PROFESSOR SCOTT

ASSISTANT PROFESSORS
EVANCHO, GAGE, KORBAS

PURPOSE

The Department of Aerospace Studies curriculum consists of the general military course and history for freshmen and sophomores (AES 101, 103, 201, 203) and the professional officer course for juniors and seniors (AES 301, 303, 401, 403).

General Qualifications. A man or woman entering the Air Force Reserve Officers' Training Corps (AFROTC) must be the following:

1. a citizen of the United States (noncitizens may enroll but must obtain citizenship before commissioning);
2. of sound physical condition; and
3. at least 17 years of age for scholarship appointment or admittance to the Professional Officer Course (POC).

Additionally, scholarship recipients must be able to fulfill commissioning requirements by age 27. If designated for flying training, the student must be able to complete all commissioning requirements before age 26 and a half; persons in other categories must be able to complete all commissioning requirements before age 30.

FOUR-YEAR PROGRAM (GMC AND POC)

A formal application is not required for students entering the four-year program. A student may enter the program by simply registering for one of the general military course (GMC) classes at the same time and in the same manner as other courses. GMC students receive two semester hours for each AES 100- and 200-level class completed for a total of eight semester hours. GMC students not on AFROTC scholarship incur no military obligation. Each candidate for commissioning must pass an Air Force aptitude test and a physical examination and be selected by a board of Air Force officers. If selected, the student then enrolls in the POC the last two years of the AFROTC curriculum. Students attend a four-week field training course at an Air Force base normally between the sophomore and junior years. Upon successful completion of the POC and the college requirements

for a degree, the student is commissioned in the U.S. Air Force as a second lieutenant. The new officer then enters active duty or may be granted an educational delay to pursue graduate work.

TWO-YEAR PROGRAM (POC)

The basic requirement for entry into the two-year program is that the student have two academic years of college work remaining, either at the undergraduate or graduate level. Applicants seeking enrollment in the two-year program must pass an Air Force aptitude and medical examination and be selected by a board of Air Force officers. After successfully completing a six-week field training course at an Air Force base, the applicant may enroll in the professional officer course (POC) in the AFROTC program. Upon completion of the POC and the college requirements for a degree, the student is commissioned.

Qualifications. The following requirements must be met for admittance to the POC:

1. The four-year student must successfully complete the general military course and the four-week field training course.
2. The two-year applicant must complete a six-week field training course.
3. All students must pass the Air Force Officer Qualifying Test (AFOQT).
4. All students must pass the Air Force physical examination.
5. All students must maintain the minimum GPA required by the college.
6. All students must meet the physical fitness requirements.

Pay and Allowances. POC members in their junior and senior years receive \$200 per month for a maximum of 20 months of POC attendance. Students are also paid to attend field training. In addition, uniforms, housing, and meals are provided during field training at no cost to the student. Students are reimbursed for travel to and from field training.

Scholarships. AFROTC offers scholarships annually to outstanding young men and women on a nationwide competitive basis. Scholarships can cover college tuition for nonresident students and provide an allowance for books, fees, supplies and equipment, and a monthly tax-free allowance of \$200. Scholarships are available on a four-, three-, or two-year basis. To qualify for a four- or three-year scholarship, a student must be a U.S. citizen and submit an application before December 1 of the senior year in high school. Interested students should consult their high school counselors or call AFROTC at ASU for application forms to be submitted to

HQ AFROTC
MAXWELL AFB
AL 36112-6663

Students enrolled in AFROTC at ASU are eligible for a limited number of three- or two-year scholarships. Those

students interested must apply through the Department of Aerospace Studies. Consideration is given to academic grades, the score achieved on the AFOQT, and physical fitness. A board of officers considers an applicant's personality, character, and leadership potential.

AEROSPACE STUDIES (AES)

AES 101 Air Force Today I. (2) F

Introduction to U.S. Air Force and AFROTC. Topics include: the Air Force mission and organization, customs and courtesies, officer opportunities, officership, and professionalism.

AES 102 Leadership Lab. (0) F

Emphasis on common Air Force customs and courtesies, drill and ceremonies, health and physical fitness through group participation. Corequisite: AES 101.

AES 103 Air Force Today II. (2) S

Continuation of AES 101. Topics include: the Air Force mission and organization, customs and courtesies, officer opportunities, officership, and professionalism. Prerequisite: AES 101 or department approval.

AES 104 Leadership Lab. (0) S

Continuation of AES 102 with more in-depth emphasis on learning the environment of an Air Force officer. Corequisite: AES 103.

AES 201 The Evolution of USAF Air and Space Power I. (2) F

Further preparation of the AFROTC candidate. Topics include: Air Force heritage and leaders, communication skills, ethics, leadership, quality Air Force, and values. Prerequisite: AES 103 or department approval.

AES 202 Leadership Lab. (0) F

Application of advanced drill and ceremonies, issuing commands, knowing flag etiquette, and developing, directing, and evaluating skills to lead others. Corequisite: AES 201.

AES 203 The Evolution of USAF Air and Space Power II. (2) S

Continuation of AES 201. Topics include: the Air Force mission and organization, customs and courtesies, officer opportunities, officership, and professionalism. Prerequisite: AES 201 or department approval.

AES 204 Leadership Lab. (0) S

Continuation of AES 202 with an emphasis on preparation for field training. Corequisite: AES 203.

AES 301 Air Force Leadership Studies I. (3) F

Study of communication skills, leadership and quality management fundamentals, leadership ethics, and professional knowledge required of an Air Force officer. Prerequisite: AES 203 or department approval. *General Studies: L.*

AES 302 Leadership Lab. (0) F

Advanced leadership experiences applying leadership and management principles to motivate and enhance the performance of other cadets. Corequisite: AES 301.

AES 303 Air Force Leadership Studies II. (3) S

Continuation of AES 301. Topics include: communication skills, ethics, leadership, professional knowledge, and quality management required of an Air Force officer. Prerequisite: AES 203 or department approval. *General Studies: L.*

AES 304 Leadership Lab. (0) S

Continuation of AES 302 with emphasis on planning the military activities of the cadet corps and applying advanced leadership methods. Corequisite: AES 303.

AES 401 National Security Affairs. (3) F

Examines advanced ethics, Air Force doctrine, national security process, and regional studies. Special topics include: civilian control of the military, military justice, and officership. Prerequisite: AES 303 or department approval. *General Studies: L.*

AES 402 Leadership Lab. (0) F

Advanced leadership experience demonstrating learned skills in planning and controlling the military activities of the corps. Corequisite: AES 401.

AES 403 Preparation for Active Duty II. (3) S

Continuation of AES 401. Topics include: civilian control of the military, doctrine, ethics, military justice, the national security process, and officership. Prerequisite: AES 401 or department approval.

AES 404 Leadership Lab. (0) S

Continuation of AES 402 with an emphasis on preparation for transition from civilian to military life. Corequisite: AES 403.

African American Studies Program

Leonor Boulin Johnson

Director

(AG 201) 480/965-4399

www.asu.edu/clas/afamstu

CORE FACULTY

Associate Professor: Boulin Johnson;

Assistant Professor: Ramey;

Clinical Associate Professor: Cox

AFFILIATED FACULTY

Anthropology

Senior Lecturer: Winkelman

Art

Professor: Young

Education

Associate Professor: Hood;

Assistant Professors: Fisher, Matthews

English

Professor: Lester;

Associate Professors: Chancy, DeLamotte, Miller;

Assistant Professor: Fuse

Family Resources and Human Development

Associate Professor: Wilson

History

Associate Professor: Hendricks

Human Communication

Assistant Professor: Davis

Humanities

Assistant Professor: Lund

Journalism and Telecommunication

Associate Professor: Bramlett-Solomon

Justice Studies

Professors: Romero, Zatz

Life Sciences

Associate Professor: Graves (ASU West)

Music

Professor: Sunkett

Political Science

Associate Professor: Mitchell

Psychology

Faculty Associate: Obleton

Religious Studies

Associate Professor: Moore

Sociology

Associate Professor: Keith;

Assistant Professor: Rhea

African American Studies (AAS) is interdisciplinary and focuses on people of African descent throughout the world.

Focus is given to the diversity of past and present experiences of those who live in the United States as well as in Africa, the Caribbean, South America, and Central America. As an institutional program with a bidisciplinary emphasis, AAS is structured to

1. prepare students of all ethnicities to better understand, value, and more effectively participate in our increasingly diverse society;
2. combine knowledge of the African diaspora with intellectual and practical training in specific areas for the purpose of creating more effective community and global partnerships; and
3. provide students with a foundation for advanced studies in a variety of fields. While the program is dedicated to scholarly research, teaching, and creative activities, it also seeks to build partnerships with community based programs and organizations within Arizona and utilize channels for informing policies which affect the life of Blacks in the diaspora.

AFRICAN AMERICAN STUDIES—B.A.

Course Requirements. The major in African American Studies requires 45 semester hours of course work. A minimum of 30 semester hours must be AFH, AFR, and AFS courses. The remaining course work must be in a related field approved by an AAS advisor. All majors must take 18 hours in the following core courses:

AFH 353 African American Literature: Beginnings Through the Harlem Renaissance <i>L/HU, C</i>	3
or AFH 354 African American Literature: Harlem Renaissance to the Present <i>L/HU, C</i> (3)	
AFR 210 Introduction to African American Studies	3
AFR 429 African American Studies Theory and Methods.....	3
AFR 490 Field Studies in the Diaspora	3
or AFR 498 Pro-Seminar (3)	
AFS 363 African American History I <i>SB, C, H</i>	3
AFS 364 African American History II <i>SB, C, H</i>	3

Within the 45 semester hours, AAS majors must also take 12 semester hours in one of three concentrations: social and behavioral sciences, humanities/arts, or politics and society. These courses are in addition to the required 18 core course semester hours. Of the remaining course work, 15 hours must be taken in related courses (i.e., non-African American Studies' prefixes). These courses must be selected from the concentrations (at least one from each concentration) in consultation with the major advisor.

In addition, AAS majors are required to take a minor or a certificate program of a minimum of 18 hours in another academic field.

CERTIFICATE IN AFRICAN AMERICAN STUDIES

Course Requirements. The certificate requires 24 semester hours. Fifteen core hours must be taken from the following courses:

AFH 353 African American Literature: Beginnings Through the Harlem Renaissance <i>L/HU, C</i>	3
or AFH 354 African American Literature: Harlem Renaissance to the Present <i>L/HU, C</i> (3)	
AFR 210 Introduction to African American Studies	3
AFR 429 African American Studies Theory and Methods.....	3
AFS 363 African American History I <i>SB, C, H</i>	3
AFS 364 African American History II <i>SB, C, H</i>	3

In addition, one course from each of the three concentrations (i.e., social and behavioral sciences, humanities/arts, politics and society) must be taken. These courses are in addition to the required core courses. Courses should be selected in consultation with the major advisor.

MINOR IN AFRICAN AMERICAN STUDIES

Course Requirements. The minor requires 18 semester hours. All African American Studies minors must take nine core hours from the following courses:

AFH 353 African American Literature: Beginnings Through the Harlem Renaissance <i>L/HU, C</i>	3
or AFH 354 African American Literature: Harlem Renaissance to the Present <i>L/HU, C</i> (3)	
AFR 210 Introduction to African American Studies	3
AFS 363 African American History I <i>SB, C, H</i>	3
or AFS 364 African American History II <i>SB, C, H</i> (3)	

In addition, one course from each of the three concentrations (i.e., social and behavioral sciences, humanities/arts, politics and society) must be taken. These courses are in addition to the required core courses. A minimum of 12 hours of upper-division courses is required. Courses should be selected in consultation with the major advisor.

AFRICAN AMERICAN STUDIES (AFH)

- AFH 353 African American Literature: Beginnings Through the Harlem Renaissance.** (3) F
Thematic and cultural study of African American literature through the Harlem Renaissance. Cross-listed as ENG 353. Credit is allowed for only AFH 353 or ENG 353. *General Studies: L/HU, C.*
- AFH 354 African American Literature: Harlem Renaissance to the Present.** (3) S
Thematic and cultural study of African American literature from the Harlem Renaissance to the present. Cross-listed as ENG 354. Credit is allowed for only AFH 354 or ENG 354. *General Studies: L/HU, C.*

AFRICAN AMERICAN STUDIES (AFR)

- AFR 191 First Year Seminar.** (1–3) N
- AFR 194, 294, 394, 494, 598 Special Topics.** (1–4) N
- AFR 210 Introduction to African American Studies.** (3) F
Examination of the political, historical, and cultural origins of African American studies as an academic discipline. Lecture, discussion.
- AFR 298, 492 Honors Directed Study.** (1–6) N
- AFR 429 African American Studies Theory and Methods.** (3) S
Examines social and behavioral science theories and methodological procedures pertaining to African Americans. Prerequisite: senior standing.
- AFR 484, 584, 684, 784 Internship.** (1–12) N
- AFR 490 Field Studies in the Diaspora.** (3) S
Introduction to methods and principles of research applied to Black communities within and outside Arizona. Involves working with field officer and faculty. Lecture, field study. Prerequisite: senior standing. Pre- or corequisite: AFR 429.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

AFR 493 Honors Thesis. (1–6) N
General Studies: L.

AFR 497 Honors Colloquium. (1–6) N

AFR 498 Pro-Seminar. (3) S

Topic is selected by instructor in consultation with the student. Designed to integrate and develop research skills. Required for majors. Prerequisite: Senior standing. Pre- or corequisite: AFR 429.

AFR 499 Individualized Instruction. (1–3) N

AFRICAN AMERICAN STUDIES (AFS)

AFS 363 African American History I. (3) F

The African American in American history, thought, and culture from slavery to 1865. Cross-listed as HIS 363. Credit is allowed for only AFS 363 or HIS 363. *General Studies: SB, C, H.*

AFS 364 African American History II. (3) S

The African American in American history, thought, and culture from 1865 to the present. Cross-listed as HIS 364. Credit is allowed for only AFS 364 or HIS 364. *General Studies: SB, C, H.*

Department of Anthropology

John K. Chance
Chair

(ANTH A124) 480/965-6213
www.asu.edu/clas/anthropology

REGENTS' PROFESSOR TURNER

PROFESSORS

ALVAREZ, BAHR, BRANDT, CARR, CHANCE, CLARK,
COWGILL, EDER, HUDAK, JOHANSON, KINTIGH,
KOSS-CHIOINO, MARTIN, MARZKE, MERBS, NASH,
REDMAN, SPIELMANN, STARK, WILLIAMS

ASSOCIATE PROFESSORS

BARTON, FALCONER, HEGMON, KIMBEL,
B. NELSON, M. NELSON, RICE

ASSISTANT PROFESSORS

BAKER, HAENN, JONSSON, LOCKWOOD,
STEADMAN, WELSH

SENIOR LECTURER

WINKELMAN

ASSOCIATE RESEARCH PROFESSOR SIMON

ASSISTANT RESEARCH PROFESSORS McCARTNEY, REED

ANTHROPOLOGY—B.A.

Course Requirements. The Anthropology major consists of 45 semester hours of which 36 must be in anthropology and nine in related fields. At least 18 of the semester hours must be in upper-division courses (300–400 level). Three of the nine hours in related fields must be in statistics. Related fields are determined by the students in consultation with his or her advisor. No ASU courses are automatically classed as related, and no courses are automatically classed as unrelated. In effect, and depending on the student's own program and special interests, any ASU (or other university)

course may be defined as related. Course requirements for the major are distributed as follows:

Required Courses

ASB 102	Introduction to Cultural and Social Anthropology <i>SB, G</i>	3
ASB 222	Buried Cities and Lost Tribes: Our Human Heritage <i>HU/SB, G, H</i>	3
	or ASB 223 Buried Civilizations of the Americas <i>HU/SB, G, H</i> (3)	
ASM 101	Human Origins and the Development of Culture <i>SB</i>	3
Total	.....	9

Distribution Requirements

Archaeology	.....	6
Archaeology/physical anthropology	.....	3
Ethnographic	.....	3
Linguistics	.....	3
Physical anthropology	6
Social/cultural	6

Related Fields

Statistics and related fields	6
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Elective

Anthropology	3
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Course work in anthropology completed at other institutions is evaluated through the Anthropology Undergraduate Advising Office. The College of Liberal Arts and Sciences requires that transfer students complete at least 12 hours of upper-division course work at ASU in the department of their major to be eligible for graduation.

In addition to a cumulative GPA of 2.00 or higher, all Anthropology students must obtain a minimum grade of "C" in all upper- and lower-division Anthropology courses and all related fields.

Each student's program of study must be approved by his or her advisor in consultation with the student. Consultation with the advisor is recommended each semester.

Latin American Studies Certificate or Emphasis. Students majoring in Anthropology may elect to pursue a Latin American Studies certificate or emphasis, combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 340, for more information.

Certificate in Museum Studies. See the *Graduate Catalog* or contact the Department of Anthropology for more information.

MINOR IN ANTHROPOLOGY

The Anthropology minor requires 18 semester hours. Two courses, ASB 102 and ASM 101, are required. The other 12 hours must be upper-division and represent at least two of the three subfields of anthropology. The three subfields include sociocultural anthropology (and linguistics), archaeology, and physical anthropology. At least one course in each of the subfields selected should be drawn from the "Distribution Requirements" course table, on this page, for archaeology, physical anthropology, and sociocultural/linguistics. A minimum grade of "C" is required for all courses taken for an Anthropology minor.

The minor in Anthropology provides students with a great deal of flexibility in selecting courses. The program has been designed to allow students to focus on areas within the discipline which articulate well with their major. All stu-

dents interested in the Anthropology minor are encouraged to discuss the options available with the anthropology undergraduate advisor, whose office is located in ANTH A111.

SECONDARY EDUCATION—B.A.E.

Social Studies. The major teaching field consists of 63 semester hours, of which 30 hours must be in the anthropology courses required for the B.A. degree. Of the remaining hours, two groups of 15 hours are to be taken in related social sciences. Psychology or a single natural science may be used as one of the 15-hour fields. SED 480 is taken to provide the remaining three hours.

Anthropology	30
SED 480 Special Methods of Teaching Social Studies.....	3
Social sciences	15
Social sciences, natural sciences, or psychology	15
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Total	63

The minor teaching field consists of 24 semester hours in anthropology. Courses ASB 102 and ASM 101 and two upper-division courses in each subfield (archaeology, physical anthropology, and social-cultural anthropology) are required.

GRADUATE PROGRAM

The faculty in the Department of Anthropology offer programs leading to the M.A. and Ph.D. degrees. See the *Graduate Catalog* for requirements.

ANTHROPOLOGY (ASB)

- ASB 102 Introduction to Cultural and Social Anthropology.** (3) F, S
Principles of cultural and social anthropology, with illustrative materials from a variety of cultures. The nature of culture. Social, political, and economic systems; religion, aesthetics, and language. *General Studies: SB, G.*
- ASB 202 Ethnic Relations in the United States.** (3) F, S
Processes of intercultural relations; systems approach to history of U.S. interethnic relations; psychocultural analysis of contemporary U.S. ethnic relations. *General Studies: C, H.*
- ASB 210 Sex, Marriage, and Evolution.** (3) F
Examination of the sexual nature and behavior of humans from both a biological and an anthropological point of view.
- ASB 211 Women in Other Cultures.** (3) N
Cross-cultural analysis of the economic, social, political, and religious factors that affect women's status in traditional and modern societies. *General Studies: HU/SB, G.*
- ASB 222 Buried Cities and Lost Tribes: Our Human Heritage.** (3) S
Archaeology through its most important discoveries: human origins, Pompeii, King Tut, the Holy Land, Southwest Indians, and methods of field archaeology. *General Studies: HU/SB, G, H.*
- ASB 223 Buried Civilizations of the Americas.** (3) F, S
Archaeology through examination of several ancient civilizations of Meso-, South, and North America. *General Studies: HU/SB, G, H.*
- ASB 231 Archaeological Field Methods.** (4) S
Excavation of archaeological sites and recording and interpretation of data. Includes local field experience. 2 hours lecture, 8 hours lab. Prerequisite: ASM 101 or instructor approval. *General Studies: SG.*

- ASB 240 Introduction to Southeast Asia.** (3) F
An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as GCU 240/HIS 240/POS 240/REL 240. Credit is allowed for only ASB 240 or GCU 240 or HIS 240 or POS 240 or REL 240. *General Studies: G.*
- ASB 242 Asian American Experiences: An Anthropological Perspective.** (3) F
The historical and contemporary experiences of Asian Americans in terms of the anthropological concepts of culture, ethnicity, and adaptation. *General Studies: L, C.*
- ASB 250 Anthropology Topics.** (3) S
Covers five areas of anthropological inquiry. Emphasizes library research, critical analysis, and communication skills relevant to upper-division anthropology course work. Prerequisites: ASB 102; ASM 101 (or equivalent); completion of the First-Year Composition requirement. *General Studies: L.*
- ASB 302 Ethnographic Field Study in Mexico.** (3) SS
Fieldwork study of cultural adaptation, Mexican culture, United States-Mexican cultural conflict, ethnographic research methods, and local culture. Lecture, discussion, field research. Pre- or corequisite: SPA 101 or equivalent. *General Studies: L/SB, G.*
- ASB 311 Principles of Social Anthropology.** (3) S
Comparative analysis of domestic groups and economic and political organizations in primitive and peasant societies. *General Studies: SB.*
- ASB 314 Comparative Religion.** (3) F, S
Origins, elements, forms, and symbolism of religion; a comparative survey of religious beliefs and ceremonies; the place of religion in the total culture. Prerequisite: ASB 102 or instructor approval.
- ASB 319 The North American Indian.** (3) A
Archaeology, ethnology, and linguistic relationship of the Indians of North America. Does not include Middle America. Prerequisite: ASB 102 or instructor approval.
- ASB 320 Indians of Arizona.** (3) F
The traditional cultures and the development and nature of contemporary political, economic, and educational conditions among Arizona Indians.
- ASB 321 Indians of the Southwest.** (3) S
Cultures of the contemporary Indians of the Southwestern United States and their historic antecedents. Prerequisite: ASB 102 or instructor approval. *General Studies: L/SB, C, H.*
- ASB 322 Indians of Mesoamerica.** (3) S
Historic tribes and folk cultures. Prerequisite: ASB 102 or instructor approval. *General Studies: SB, G.*
- ASB 323 Indians of Latin America.** (3) F
Indigenous cultures of the Amazon, the Andean region, Central America, and southern Mexico. Lecture, discussion. Prerequisite: ASB 102 or instructor approval. *General Studies: SB, G.*
- ASB 324 Peoples of the Pacific.** (3) N
Peoples and cultures of Oceania focusing particularly on societies of Melanesia, Micronesia, and Polynesia. Prerequisite: ASB 102 or instructor approval. *General Studies: G.*
- ASB 325 Peoples of Southeast Asia.** (3) F
A cultural-ecological perspective on the peoples of mainland and insular Southeast Asia. Subsistence modes, social organization, and the impact of modernization. Prerequisite: ASB 102 or instructor approval. *General Studies: G.*
- ASB 326 Human Impacts on Ancient Environments.** (3) S
A world survey of successful and unsuccessful ancient societies and their impacts on the environment. *General Studies: SB, H.*
- ASB 330 Principles of Archaeology.** (3) F, S
Methods and theories for reconstructing and explaining the lifeways of prehistoric peoples. Prerequisite: 3 hours of archaeology. *General Studies: SB.*
- ASB 333 New World Prehistory.** (3) F
The variety of archaeological patterns encountered in the Western Hemisphere. Covers the period from the appearance of humans in the New World to European contact; covers the area from Alaska to Tierra del Fuego. Prerequisite: completion of the First-Year Composition requirement. Pre- or corequisite: 1 upper-division ASU course. *General Studies: L/SB.*

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

ASB 335 Prehistory of the Southwest. (3) F, S

Anthropological understandings of major cultural processes and events in the prehistory of the American Southwest using evidence from archaeology. *General Studies: SB, C, H.*

ASB 337 Pre-Hispanic Civilization of Middle America. (3) S

Preconquest cultures and civilizations of Mexico. The Aztecs, Mayas, and their predecessors. Prerequisite: ASM 101 or instructor approval. *General Studies: HU/SB, G, H.*

ASB 338 Archaeology of North America. (3) N

Origin, spread, and development of the prehistoric Indians of North America up to the historic tribes. Does not include the Southwest. Prerequisite: ASM 101 or instructor approval. *General Studies: SB, H.*

ASB 350 Anthropology and Art. (3) A

Art forms of people in relationship to their social and cultural setting. Prerequisite: ASB 102 or instructor approval.

ASB 351 Psychological Anthropology. (3) S

Approaches to the interrelations between the personality system and the sociocultural environment. Prerequisite: ASB 102 or instructor approval. *General Studies: SB.*

ASB 353 Death and Dying in Cross-Cultural Perspective. (4) F

Humanistic and scientific study of aging, sickness, dying, death, funerals, and grief and their philosophy and ecology in non-Western and Western cultures. 3 hours lecture, 1 hour discussion. *General Studies: HU/SB, G.*

ASB 355 Shamanism, Healing and Consciousness. (3) S

World views, practices, and roles of shamans and traditional and contemporary healers; explanatory biopsychological models of consciousness. *General Studies: HU/SB.*

ASB 361 Old World Prehistory I. (3) F

Biosocial evolution in the Pleistocene, emphasizing technological achievements and the relationship between technology and environment in western Europe, sub-Saharan Africa. Prerequisite: ASM 101 or instructor approval. *General Studies: H.*

ASB 362 Old World Prehistory II. (3) S

Transition from hunting and collecting societies to domestication economies; establishment of settled village life, emphasizing the Near East, Egypt, Southwest Europe. Prerequisite: ASM 101 or instructor approval. *General Studies: H.*

ASB 400 Cultural Factors in International Business. (3) S

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) S

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 of anthropology or instructor approval.

ASB 412 History of Anthropology. (3) F

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) F

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) A

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) F

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 471 Introduction to Museums. (3) F

History, philosophy, and current status of museums. Exploration of collecting, preservation, exhibition, education, and research activities in different types of museums. Prerequisites: ASB 102 and ASM 101 or instructor approval. *General Studies: L.*

ASB 480 Introduction to Linguistics. (3) F

Descriptive and historical linguistics. Survey of theories of human language, emphasizing synchronic linguistics. *General Studies: SB.*

ASB 481 Language and Culture. (3) S

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) N

Relationships between linguistic and social categories; functional analysis of language use, maintenance, and diversity; interaction between verbal and nonverbal communication. Prerequisites: ASB 480 and ENG 213 (or FLA 400) or instructor approval. *General Studies: SB.*

ASB 485 U.S.-Mexico Border in Comparative Perspective. (3) S 2001

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 of anthropology or instructor approval.

ASB 501 Applied Medical Anthropology. (3) F

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) S

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) F

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) F

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) F

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) S

Relationships among gender and emotion across cultures. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 529 Culture and Political Economy. (3) N

Origin and spread of Western capitalism and its impact on non-Western societies. Ethnographic and historical case studies are utilized. Prerequisite: graduate standing.

ASB 530 Ecological Anthropology. (3) A

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) S

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 equivalent; instructor approval.

ASB 536 Ethnohistory of Mesoamerica. (3) N

Indigenous societies of southern Mexico and Guatemala at Spanish contact and their postconquest transformation. Emphasis is on the Aztec Empire. Prerequisite: graduate standing.

ASB 537 Topics in Mesoamerican Archaeology. (3) N

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 I. (3) F

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) S

Continuation of ASB 540. Prerequisite: ASB 540 or instructor approval.

ASB 542 Method and Theory of Archaeology II. (3) S

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 III. (3) F
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) N
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) F
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 equivalent.

ASB 547 Issues in Old World Domestication Economies. (3) S
Archaeological evidence for transitions in Old World subsistence economies from hunting and gathering to dependence on domesticated plants and animals. Prerequisite: ASB 362 or equivalent.

ASB 550 Economic Archaeology. (3) N
Prehistoric economies in hunter-gatherer, tribal, and complex societies. Subsistence strategies, craft production and specialization, and exchange covered. Prerequisite: instructor approval.

ASB 551 Prehistoric Diet. (3) N
Includes (1) a critical review of techniques for recovering dietary information and (2) theoretical models concerned with explaining diet and nutrition. Prerequisite: instructor approval.

ASB 555 Complex Societies. (3) S
Structural variations in hierarchically organized societies, along with origins, dynamics, and collapse, are examined. Seminar.

ASB 559 Archaeology and the Ideational Realm. (3) N
"Post-processual" and other views concerning relevance of mental phenomena for understanding sociocultural change. Various approaches to inferring prehistoric meanings.

ASB 563 Hunter-Gatherer Adaptations. (3) N
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) S
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) F
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) F
History, philosophy, and current status of museums. Exploration of collecting, preservation, exhibition, education, and research activities in different types of museums. Prerequisites: ASB 102 and ASM 101 or instructor approval.

ASB 572 Museum Collection Management. (3) S
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) S
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) S
Exhibition philosophies and development; processes of planning, designing, staging, installing, evaluating, and disassembling temporary and long-term exhibits. Prerequisites: ASB 571 and 572 or instructor approval.

ASB 575 Computers and Museums. (3) F
Basics of museum computer application; hardware and software; fundamentals of database management; issues of research, collections management, and administration.

ASB 576 Museum Interpretation. (3) F
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) S
Preservation of museum objects: nature of materials, environmental controls, and causes of degradation; recognizing problems, damage, and solutions; proper care of objects. Prerequisites: ASB 571 and 572 or instructor approval.

ASB 579 Critical Issues in Museum Studies. (3) F
Current debates of museum practice from an anthropological perspective. Issues of collection, presentation, authenticity, and authority are addressed. Seminar. Prerequisite: ASB 571 or instructor approval.

ASB 591 Seminar. (3) N
Selected topics in archaeology, linguistics, and social-cultural anthropology.

- (a) Archaeological Ceramics
- (b) Archaeology of North America
- (c) Cultural Anthropology
- (d) Culture and Personality
- (e) Evolution and Culture
- (f) Historical Archaeology
- (g) Interdepartmental Seminar
- (h) Language and Culture
- (i) Linguistics
- (j) Museum Studies
- (k) Problems in Southwestern Archaeology
- (l) Problems in Southwestern Ethnology
- (m) Social Anthropology

ANTHROPOLOGY (ASM)

ASM 101 Human Origins and the Development of Culture. (3) F, S
Physical anthropology and archaeology. Evidence and processes of human evolution and of culture change. Primates. Fossil hominids and their tools. Race, variation, and heredity. Environment and human biology. Prehistoric culture and society. *General Studies: SB.*

ASM 241 Biology of Race. (3) F, S
Human variation and its interpretation in an evolutionary context.

ASM 246 Human Origins. (3) F
History of discoveries and changing interpretations of human evolution. Earliest ancestors to emergence of modern humans. Humanity's place in nature.

ASM 301 Peopling of the World. (3) S
Course reviews all evidence for human dispersal during the last 100,000 years, origins of language, cultures, races, and beginnings of modern humans. Prerequisite: ASM 101. *General Studies: SB.*

ASM 338 Anthropological Field Session. (2–8) S
Anthropological field techniques, analysis of data, and preparation of field reports. May be repeated for credit. Prerequisite: instructor approval.

ASM 341 Human Osteology. (4) F
Osteology, human paleontology, and osteometry. Description and analysis of archaeological and contemporary human populations. 3 hours lecture, 3 hours lab. Prerequisite: ASM 101 or instructor approval.

ASM 342 Human Biological Variation. (4) S
Evolutionary interpretations of biological variation in living human populations, with emphasis on anthropological genetics and adaptation. Nutrition and disease and their relation to genetics and behavior. 3 hours lecture, 3 hours lab. Prerequisites: ASM 101 and MAT 106 (or equivalent) or instructor approval. *General Studies: SG.*

ASM 343 Primatology. (3) F
Evolution and adaptations of nonhuman primates, emphasizing social behavior. Includes material from fossil evidence and field and laboratory studies in behavior and biology. Prerequisite: ASM 101 or instructor approval.

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ASM 344 Fossil Hominids. (3) N

Ancient African, Asian, and European human and primate skeletal, dental, and cultural remains. Human biological, behavioral, and cultural evolution. Prerequisite: ASM 101 or instructor approval. *General Studies: H.*

ASM 345 Disease and Human Evolution. (3) F

Interaction of people and pathogens from prehistoric times to the present, with emphasis on disease as an agent of genetic selection. Prerequisite: ASM 101 or instructor approval.

ASM 348 Social Issues in Human Genetics. (3) S

Moral and social implications of developments in genetic science, particularly as they affect reproduction, medicine, and evolution. *General Studies: SB.*

ASM 365 Laboratory Methods in Archaeology. (4) N

Techniques of artifact analysis. Basic archaeological research techniques; methods of report writing. May be repeated for credit for total of 8 hours. Prerequisite: ASM 101 or instructor approval.

ASM 435 Archaeological Pollen Analysis. (3) F

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 450 Bioarchaeology. (3) S

Surveys archaeological and physical anthropological methods and theories for evaluating skeletal and burial remains to reconstruct bio-cultural adaptation and lifeways. Prerequisite: ASM 101 or instructor approval.

ASM 452 Dental Anthropology. (4) F

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) S

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) N

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) S

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 472 Archaeological Ceramics. (3) N

Analysis and identification of pottery wares, types, and varieties. Systems for ceramic classification and cultural interpretation. 2 hours lecture, 3 hours lab. Prerequisite: instructor approval.

ASM 507 Anthropological Study of Disease. (3) A

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) F

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) N

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) S

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) F

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) N

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. (3) N

Selected topics in archaeology and physical anthropology.

- (a) Bioarchaeology
- (b) Evolution and Culture
- (c) Interdepartmental Seminar
- (d) Physical Anthropology
- (e) Primates and Behavior

Department of Biology

James P. Collins

Chair

(LS C226) 480/965-3571

lsvl.ja.asu.edu/biology

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ASSISTANT PROFESSORS

DeNARDO, FAGAN, FEWELL, HOFMANN, KINZIG,
KUMAR, NEWFELD, ORCHINIK, RAWLS, STRICK

SENIOR RESEARCH PROFESSIONAL

KAZILEK

ACADEMIC PROFESSIONAL

DOUGLAS

RESEARCH PROFESSOR

PEARSON

RESEARCH ASSOCIATE PROFESSOR

DAVIDSON

BIOLOGY—B.S.

The major in Biology consists of a minimum of 43 semester hours in biology, and a minimum of 17 semester hours in related fields, plus a three-semester-hour mathematics proficiency. Required major courses are as follows:

BIO	193	The Nature of Biological Science <i>SQ</i>	4
		or BIO 181 General Biology <i>SQ</i> (4)	
		and BIO 182 General Biology <i>SG</i> (4)	
BIO	320	Fundamentals of Ecology	3
BIO	340	General Genetics	4
BIO	353	Cell Biology	3
BIO	360	Animal Physiology	4
		or MIC 360 Bacterial Physiology (3)	
		or PLB 308 Plant Physiology (4)	

BIO 370 Vertebrate Zoology.....	4
or BIO 385 Comparative Invertebrate Zoology (4)	
or MIC 206 Microbiology Laboratory <i>SG</i> * (1)	
and MIC 220 Biology of Microorganisms (3)	
or PLB 300 Comparative Plant Diversity <i>L/SG</i> (4)	
BIO 445 Organic Evolution.....	3
Total	25

* Both MIC 205 and 206 must be taken to secure *SG* credit.

The remaining hours to bring the total to 43 are selected from among upper-division courses in BIO, MIC, and PLB, in consultation with a Department of Biology advisor. The major must include at least three upper-division laboratory courses, and at least one upper-division course in plant biology (PLB) or microbiology (MIC). Required courses in related fields plus math proficiency are as follows:

CHM 113 General Chemistry <i>SQ</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i>	5
Choose between the combinations of organic chemistry courses below	4 or 8
CHM 231 Elementary Organic Chemistry <i>SQ</i> ¹ (3)	
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> ¹ (1)	
or	
CHM 331 General Organic Chemistry (3)	
CHM 332 General Organic Chemistry (3)	
CHM 335 General Organic Chemistry Laboratory (1)	
CHM 336 General Organic Chemistry Laboratory (1)	
MAT 210 Brief Calculus <i>MA</i>	3
or any calculus	
PHY 101 Introduction to Physics <i>SQ</i>	4
or PHY 111 General Physics <i>SQ</i> ² (3)	
and PHY 112 General Physics <i>SQ</i> ² (3)	
and PHY 113 General Physics Laboratory <i>SQ</i> ² (1)	
and PHY 114 General Physics Laboratory <i>SQ</i> ² (1)	
Total	20 or 24

¹ Both CHM 231 and 235 must be taken to secure *SQ* credit.

² Both PHY 111 and 113 or PHY 112 and 114 must be taken to secure *SQ* credit.

CONSERVATION BIOLOGY—B.S.

The major in Conservation Biology consists of a minimum of 45 semester hours in the required major courses and a minimum of 13 hours in related fields, plus a three-semester-hour mathematics proficiency. Required courses are as follows:

BIO 193 The Nature of Biological Science <i>SQ</i>	4
or BIO 181 General Biology <i>SQ</i> (4)	
and BIO 182 General Biology <i>SG</i> (4)	
BIO 317 Conservation Biology	3
BIO 320 Fundamentals of Ecology	3
BIO 340 General Genetics.....	4
BIO 360 Animal Physiology.....	4
BIO 410 Techniques in Wildlife Conservation Biology <i>L</i>	3
BIO 411 Advanced Conservation Biology I.....	3
BIO 412 Advanced Conservation Biology II.....	3
BIO 415 Biometry <i>CS</i>	4
Total	31

The remaining hours to bring the total to 45 will be selected from among relevant upper-division courses in BIO and PLB courses or in related departments, in consultation with the Department of Biology. Required courses in related fields plus math proficiency are as follows:

CHM 113 General Chemistry <i>SQ</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i>	5
Choose between the combinations of organic chemistry courses below	4 or 8
CHM 231 Elementary Organic Chemistry <i>SQ</i> * (3)	
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> * (1)	
or	
CHM 331 General Organic Chemistry (3)	
CHM 332 General Organic Chemistry (3)	
CHM 335 General Organic Chemistry Laboratory (1)	
CHM 336 General Organic Chemistry Laboratory (1)	
MAT 210 Brief Calculus <i>MA</i>	3
or any calculus	
Total	16 or 20

* Both CHM 231 and 235 must be taken to secure *SQ* credit.

Concentration in Biology and Society

The major in Biology with a concentration in biology and society is intended for students with a strong interest in life sciences and in the interaction between life sciences and the society within which science is done. This option consists of a minimum of 44 semester hours in life sciences and societal interface courses, and 12 hours in related fields, plus a three-semester-hour mathematics proficiency. Required courses are as follows:

BIO 193 The Nature of Biological Science <i>SQ</i>	4
or BIO 181 General Biology <i>SQ</i> (4)	
and BIO 182 General Biology <i>SG</i> (4)	
BIO 311 Biology and Society.....	3
BIO 320 Fundamentals of Ecology	3
or BIO 445 Organic Evolution (3)	
BIO 340 General Genetics.....	4
BIO 419 Research Colloquium in Biology and Society <i>L</i>	6
MAT 210 Brief Calculus <i>MA</i>	3
or any calculus	
Total	23

The remaining courses to complete the major are determined by the student in consultation with a biology and society advisor and must be distributed in the following areas:

- 12 hours of upper-division electives from BIO, MIC, PLB;
- 12 hours of interface courses from an approved list from at least three of these areas: ethics, history of science, philosophy of science, and social issues;
- 11 hours of physical sciences (CHM recommended); and
- four hours of an approved course in statistics.

MINOR IN BIOLOGY

The Biology minor consists of 24 semester hours, including BIO 193 The Nature of Biological Science or BIO 181

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General Biology and BIO 182 General Biology, and 16 to 20 hours selected with approval of an advisor in the Department of Biology; at least 12 hours must be in the upper division. Courses not available for credit in the Biology major cannot be used for the minor (e.g., BIO 100 The Living World and BIO 201 Human Anatomy and Physiology I). This minor is not available to students majoring in the life sciences.

SECONDARY EDUCATION—B.A.E.

Biological Sciences. The major teaching field consists of a minimum of 40 semester hours and at least 22 hours in supporting courses. Required major courses are as follows:

BIO 193 The Nature of Biological Science <i>SQ</i>	4
or BIO 181 General Biology <i>SQ</i> (4)	
and BIO 182 General Biology <i>SG</i> (4)	
BIO 320 Fundamentals of Ecology	3
BIO 340 General Genetics	4
BIO 360 Animal Physiology	4
BIO 370 Vertebrate Zoology	4
or BIO 385 Comparative Invertebrate Zoology (4)	
or PLB 300 Comparative Plant Diversity <i>L/SG</i> (4)	
or PLB 310 The Flora of Arizona (4)	
BIO 445 Organic Evolution	3
MIC 206 Microbiology Laboratory <i>SG*</i>	1
MIC 220 Biology of Microorganisms	3
PLB 308 Plant Physiology	4
Total	30

* Both MIC 205 and 206 must be taken to secure SG credit.

The remaining courses in the major (six hours minimum) should be selected to reflect a balance between BIO and PLB courses. Required supporting courses are as follows:

BIO 316 History of Biology: Conflicts and Controversies <i>H</i>	3
or HPS 330 History of Biology: Conflicts and Controversies <i>H</i> (3)	
CHM 113 General Chemistry <i>SQ</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i>	5
GLG 102 Introduction to Geology II (Historical) <i>SG</i> , ¹ <i>H</i>	3
or GLG 300 Geology of Arizona (3)	
MAT 170 Precalculus <i>MA</i>	3
PHY 101 Introduction to Physics <i>SQ</i>	4
or PHY 111, 112 General Physics <i>SQ</i> ² (6)	
and PHY 113, 114 General Physics Laboratory <i>SQ</i> ² (2)	
Minimum total	22

¹ Both GLG 102 and 104 must be taken to secure SG credit.

² Both PHY 111 and 113 or PHY 112 and 114 must be taken to secure SQ credit.

BIO 480 is required in the professional education program.

The minor teaching field consists of 24 semester hours as follows: BIO 181, 182; 16 additional hours in BIO, MIC, and PLB courses selected to reflect a balance across the disciplines and subdisciplines in biology. BIO 480 is required in addition to the 24 semester hours in biological sciences.

GRADUATE PROGRAM

The faculty in the Department of Biology offer programs leading to the degrees of Master of Natural Science, M.S.,

and Ph.D. (with a concentration in ecology for the M.S. and the Ph.D.). See the *Graduate Catalog* for requirements.

The department participates in the interdisciplinary program for the M.S. and Ph.D. degrees in Molecular and Cellular Biology. See the *Graduate Catalog* for more information.

BIOLOGY (BIO)

BIO 100 The Living World. (4) F, S, SS

Principles of biology. Cannot be used for major credit in the biological sciences. 3 hours lecture, 3 hours lab. *General Studies: SQ.*

BIO 120 Human Physiology. (4) N

Basic concepts of general science are discussed using current issues and basic concepts of human physiology as a focus. Cannot be used for major credit in biological sciences. 3 hours lecture, 3 hours lab. *General Studies: SG.*

BIO 181 General Biology. (4) F, S, SS

Biological concepts emphasizing fundamental principles and the interplay of structure and function at the molecular, cellular, organismal, and population levels of organization. Secondary school chemistry strongly recommended. 3 hours lecture, 3 hours lab. Prerequisite: biological sciences major or preprofessional student in health-related sciences. *General Studies: SQ.*

BIO 182 General Biology. (4) F, S, SS

Continuation of BIO 181. Secondary school chemistry strongly recommended. Prerequisite: BIO 181. *General Studies: SG.*

BIO 193 The Nature of Biological Science. (4) N

Creative and critical thinking skills in biological research; nature of biological knowledge; role of experimentation, predictions, hypotheses, theories, values. Lecture, lab, discussion. Prerequisite: high school biology. *General Studies: SQ.*

BIO 201 Human Anatomy and Physiology I. (4) F, S, SS

Structure and dynamics of the human mechanism. Cannot be used for major credit in the Department of Biology. 3 hours lecture, 3 hours lab. *General Studies: SG.*

BIO 202 Human Anatomy and Physiology II. (4) F, S, SS

Continuation of BIO 201. Cannot be used for major credit in the Department of Biology. 3 hours lecture, 3 hours lab. Prerequisite: BIO 201 or instructor approval.

BIO 218 Medical History. (1) N

Brief survey of humankind's important inventions and discoveries in the art and science of medicine, illustrating interrelationships of medical ideas.

BIO 241 Human Genetics. (4) F

Introduction to basic concepts in genetics as they are applied to human heredity. Cannot be used for major credit in the Department of Biology. 3 hours lecture, 3 hours lab. Prerequisite: a course in the life sciences. *General Studies: SG.*

BIO 300 Natural History of Arizona. (3) F, S

Plant and animal communities of Arizona. Cannot be used for major credit in the biological sciences. Prerequisite: junior standing.

BIO 301 Field Natural History. (1) N

Organisms and their natural environment. 2 weekend field trips, field project. Cannot be used for major credit in the biological sciences. Pre- or corequisite: BIO 300.

BIO 302 Cancer and Heart Disease. (3) F

Incidence and mortality statistics for cancer and heart disease; host and environmental risk factors; diagnosis, treatment and prevention strategies. Cannot be counted toward a Biology major. Prerequisites: 12 hours in life sciences and CHM 231 (or equivalent) and an L course or instructor approval. *General Studies: L.*

BIO 303 Radiation and Life. (3) S

Benefits and risks of radiation exposure in society; medical applications, food irradiation, nuclear power, solar UV, population health effects. Cannot be counted toward a Biology major. Prerequisites: 12 hours in life sciences and CHM 231 (or equivalent) and an L course or instructor approval. *General Studies: L.*

BIO 304 Radiation Medicine and Biology. (3) F

Uses of radiation in medicine, including CT, diagnostic x-ray, MRI, nuclear medicine, ultrasound; biological effects of radiation with emphasis on cancer. Prerequisites: 12 hours in life sciences and PHY 112 and an L course or instructor approval. *General Studies: L.*

BIO 310 Special Problems and Techniques. (1–3) F, S

Qualified undergraduates may investigate a specific biological problem under the direction of a faculty member. May be repeated for a total of 6 semester hours. Prerequisites: formal conference with the instructor; approval of the problem by the instructor and department chair.

BIO 311 Biology and Society. (3) S

Explores interactions between biological sciences and society, e.g., biomedical, environmental, ethical, historical, legal, philosophical, political, and social issues. Lecture, discussion. Prerequisite: BIO 193 (or BIO 100) or BIO 181 and 182.

BIO 316 History of Biology: Conflicts and Controversies. (3) A

Focuses on 19th and 20th centuries, considering biology as a discipline, evolution, and problems of heredity, development, and cell theory. Cross-listed as HPS 330. Credit is allowed for only BIO 316 or HPS 330. *General Studies: H.*

BIO 317 Conservation Biology. (3) F

The scientific and technical means for management, maintenance, protection, and restoration of biological resources on this planet. Prerequisite: 8 hours of biology.

BIO 318 History of Medicine. (3) A

Scientific study of the human body, changing theories of disease, evolution of practical opinions on treatment, and the emerging institutionalization of medical practice. Cross-listed as HPS 331. Credit is allowed for only BIO 318 or HPS 331. *General Studies: H.*

BIO 319 Environmental Science (Nonmajor). (3) F

Environmental and biological concepts used to understand ecological systems with specific references to problems caused by humans. Cannot be used for major credit in the biological sciences. Cross-listed as PLB 320. Credit is allowed for only BIO 319 or PLB 320. *General Studies: G.*

BIO 320 Fundamentals of Ecology. (3) F, S

Organization, functioning, and development of ecological systems; energy flow; biogeochemical cycling; environmental relations; population dynamics. Prerequisite: BIO 182 or instructor approval.

BIO 321 Introductory Ecology Laboratory. (3) S

Laboratory and field observations and experiments to test current concepts and theories in ecology. Lab. Pre- or corequisite: BIO 320. *General Studies: L.*

BIO 331 Animal Behavior. (3) F

Evolutionary, genetic, physiological, and ecological bases of animal behavior. Prerequisite: BIO 182 or equivalent.

BIO 336 Sociobiology. (3) S

Survey of animal and human social behavior examined from an evolutionary perspective. Suitable for nonmajors. BIO 331 is recommended.

BIO 340 General Genetics. (4) F, S, SS

Science of heredity and variation. 3 hours lecture, 1 hour recitation. Prerequisite: BIO 182.

BIO 341 Genetic Analysis. (5) N

General genetics: science of heredity and variation using critical inquiry. 3 hours lecture, 6 hours lab. Not open to students who have taken BIO 340. Lecture, lab. Prerequisites: BIO 182, 193 (or equivalent).

BIO 343 Genetic Engineering and Society. (4) F

Introduction to genetic engineering, with emphasis on applications (gene therapy, DNA fingerprinting, bioremediation, transgenic animals and plants). 3 hours lecture, 3 hours lab. Cross-listed as MBB 343. Credit is allowed for only BIO 343 or MBB 343. Prerequisite: BIO 181 or equivalent.

BIO 344 Origins, Evolution, and Creation. (3) F

Examines scientific, mythic, and religious ideas relating to origins (particularly human). Place of antievolutionism and "scientific creationism" in American culture. Lecture, discussion. Cross-listed as HPS 311/HUM 371/REL 383. Credit is allowed for only BIO 344 or HPS 311 or HUM 371 or REL 383.

BIO 346 The Darwinian Revolution. (3) S

Intellectual and cultural history of Darwinism and modern evolutionary theory and their impact on 19th- and 20th-century thought. Lecture, discussion. Cross-listed as HPS 332/HUM 372. Credit is allowed for only BIO 346 or HPS 332 or HUM 372.

BIO 351 Developmental Anatomy. (3) F

General developmental biology (embryology) and comparative structure of organ systems, illustrated mainly by vertebrate examples. Prerequisite: BIO 182.

BIO 352 Laboratory in Vertebrate Developmental Anatomy. (2) F, S

Morphology of representative embryonic and adult vertebrates. 2 3-hour labs. BIO 351 recommended. Prerequisite: BIO 182.

BIO 353 Cell Biology. (3) F

Survey of major topics in cell biology, including structural, biochemical, and molecular aspects of cell function. Prerequisite: BIO 182.

BIO 360 Animal Physiology. (4) F, S

Physiological mechanisms of the higher vertebrates. 3 hours lecture, 3 hours lab. Prerequisites: BIO 182; CHM 115; MAT 117.

BIO 370 Vertebrate Zoology. (4) F, S

Characteristics, classification, evolution, and natural history of the major groups of vertebrate animals. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182.

BIO 385 Comparative Invertebrate Zoology. (4) F

Characteristics, life cycles, adaptations, and evolution of invertebrate animals. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or instructor approval.

BIO 386 General Entomology. (4) N

Form, activities, and classification of insects. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182.

BIO 394 Special Topics. (2–3) N

Topics of current or special interest in one or more aspects of animal biology. Topics vary. Prerequisite: junior standing.

BIO 406 Computer Applications in Biology. (3) F

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: BIO 182 and MAT 117 (or 210) or instructor approval. *General Studies: CS.*

BIO 410 Techniques in Wildlife Conservation Biology. (3) F

Field and analytical techniques used in evaluating population structure, viability and environmental impacts. Lecture, lab. Prerequisites: BIO 317 and 320 or instructor approval. *General Studies: L.*

BIO 411 Advanced Conservation Biology I. (3) F

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) S

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) F

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 liberal arts general studies program. 3 hours lecture, 3 hours lab. Prerequisite: MAT 210 or equivalent. *General Studies: CS.*

BIO 416 Professional Values in Science. (2–3) A

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 419 Research Colloquium in Biology and Society. (3–6) F, S

Develops critical thinking abilities, research methods, and writing skills for research in the interactions between biological sciences and society. Discussion. Prerequisite: BIO 311 or instructor approval. *General Studies: L.*

BIO 420 Field Zoology. (3) N

Experience in zoological field techniques. Requires weekend or longer field trips. Prerequisite: instructor approval.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

BIO 423 Population and Community Ecology. (3) N

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) S

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) N

Physiological and behavioral adaptations of individual animals to both abiotic and biotic environments. Prerequisite: BIO 320.

BIO 426 Limnology. (4) S

Structure and function of aquatic ecosystems, with emphasis on freshwater lakes and streams. 3 hours lecture, 3 hours lab or field trip. Prerequisite: BIO 320 or instructor approval. *General Studies: L.*

BIO 428 Biogeography. (3) F

Environmental and historical processes determining distributional patterns of animals and plants, emphasizing terrestrial life. Prerequisites: BIO 182 (or equivalent); junior standing. *General Studies: L.*

BIO 431 Human Development and Fertility. (3) S

Global influences of human population development on the human environment, including understanding human fertility and clinical influences on fertility. Discussion, presentation. Prerequisite: general biology.

BIO 435 Research Techniques in Animal Behavior. (3) N

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) F

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) F

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 445 Organic Evolution. (3) F

Processes of adaptive change and speciation in sexual populations. Prerequisite: BIO 241 or 340.

BIO 446 Principles of Human Genetics. (3) A

Molecular and cellular analysis of the human genome. Prerequisite: BIO 340. *General Studies: L.*

BIO 450 Advanced Developmental Biology. (3) S

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) S

Microscopic study of animal tissues. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or instructor approval.

BIO 454 Aquatic Insects. (3) N

Systematics and ecology of aquatic insects. Prerequisite: BIO 386.

BIO 464 Photobiology. (3) F

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 of courses in life sciences.

BIO 465 Neurophysiology. (3) S

Detailed treatment of cellular and organismal neurophysiology and nervous system function. Prerequisite: BIO 360.

BIO 466 Neurophysiology Laboratory. (2) N

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) S 2001

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) S 2001

The biology of birds. 2 hours lecture, 3 hours lab, weekend field trips. Prerequisite: BIO 370 or instructor approval.

BIO 472 Mammalogy. (4) F

Classification, structure, habits, ecology, and distribution of mammals, emphasizing North American forms. 3 hours lecture, 3 hours lab or field trip, weekend field trips. Prerequisite: BIO 370 or instructor approval.

BIO 473 Ichthyology. (3) S 2001

Systematics and biology of recent and extinct fishes. 2 hours lecture, 3 hours lab or field trip, weekend field trips required. Prerequisites: BIO 370 and 425 or instructor approval.

BIO 474 Herpetology. (3) S

Systematics and biology of recent and extinct reptiles and amphibians. 2 hours lecture, 3 hours lab or field trip. Prerequisite: BIO 370.

BIO 480 Methods of Teaching Biology. (3) S

Methods of instruction, experimentation, organization, and presentation of appropriate content in biology. Prerequisite: 20 hours in the biological sciences.

BIO 494 Special Topics. (1–4) N

(a) Cell Biotechnology

BIO 495 Undergraduate Thesis. (3) F, S, SS

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 499 Individualized Instruction. (1–3) F, S**BIO 502 Transmission Electron Microscopy.** (3) F

Theory, use, and methods of preparing biological materials for transmission electron microscopy. Materials fee. Lecture, lab. Prerequisite: instructor approval.

BIO 505 Scanning Electron Microscopy. (3) S

Theory, use, and methods of preparing biological materials for scanning electron microscopy. Materials fee. 2 hours lecture, 3 hours lab. Prerequisite: instructor approval.

BIO 508 Scientific Data Presentation. (2) S

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) N

Factors affecting plant and animal life in the desert regions and adaptations of the organisms to these factors. Prerequisite: 10 hours of biological sciences or instructor approval.

BIO 522 Populations: Evolutionary Ecology. (3) N

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) F 2001

Structure and function of terrestrial and aquatic ecosystems, with emphasis on productivity, energetics, biogeochemical cycling, and systems integration. Prerequisite: BIO 320 or equivalent.

BIO 526 Quantitative Ecology. (3) N

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 equivalent); a course in ecology.

BIO 529 Advanced Limnology. (3) N

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) F

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) N

Mathematical models in the description and analysis of the genetics of populations. Prerequisites: BIO 320 and 415 and 445 or instructor approval.

BIO 547 Techniques in Evolutionary Genetics. (4) N

Practical experience in modern techniques for the study of evolution. Lecture, lab. Prerequisites: BIO 340, 445; instructor approval.

BIO 550 Advanced Cell Biology. (3) S

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 equivalent or PLB 360); CHM 231 (or 331 or equivalent).

BIO 551 Biomembranes. (3) N

Structure and function of biological membranes, emphasizing synthesis, fluidity, exocytosis, endocytosis, and cell responses to hormones and neurotransmitters. Prerequisites: BIO 353 (or equivalent); CHM 231 (or 331 or equivalent).

BIO 552 Developmental Genetics. (3) S

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) N

The analysis of function in invertebrates and vertebrates, emphasizing evolutionary trends in physiological systems. Prerequisite: BIO 360 or equivalent.

BIO 566 Environmental Physiology. (3) N

Physiological responses and adaptations of animals to various aspects of the physical environment. Prerequisites: BIO 320, 360.

BIO 568 Mammalian Physiology. (3) N

Detailed treatment of mammalian organ system functions emphasizing integrative mechanisms. Prerequisite: BIO 360 or equivalent.

BIO 569 Cellular Physiology. (3) N

Emphasizing the molecular basis for cell structure and function. Prerequisites: BIO 360; organic chemistry.

BIO 584 Internship. (1–12) F, S**BIO 591 Seminar.** (1–3) F, S

Topics such as the following are offered:

- Adaptations
- Behavior
- Cell Biology
- Ecology
- Evolution
- Genetic Engineering
- Genetics
- Physiology

May be repeated for credit.



View of the Agricultural building from the courtyard of the College of Business

Michael Martin photo

Department of Chemistry and Biochemistry

J. Devens Gust

Chair

(PS D102) 480/965-3461

www.asu.edu/clas/chemistry

REGENTS' PROFESSORS

ANGELL, BUSECK, MAYER, C. MOORE,
O'KEEFFE, PETTIT

PROFESSORS

ALLEN, BALASUBRAMANIAN, BIEBER, BIRK,
BLANKENSHIP, FUCHS, GLAUNSINGER, GLICK, GUST,
HOLLOWAY, LOHR, McMILLAN, A. MOORE, T. MOORE,
MUNK, PETUSKEY, ROSE, SKIBO, STEIMLE,
WILLIAMS, WOODBURY

ASSOCIATE PROFESSORS

KOUVETAKIS, WOLF

ASSISTANT PROFESSORS

BOOKSH, CAUDLE, FRANCISCO, GOULD,
HAYES, RANKO

CHEMISTRY—B.A.

The B.A. degree in Chemistry consists of 46 semester hours. Required courses are as follows:

Choose between the course combinations below	9 or 8
CHM 113 General Chemistry <i>SQ</i> (4)	
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i> (5)	
— or —	
CHM 117 General Chemistry for Majors I <i>SQ</i> * (4)	
CHM 118 General Chemistry for Majors II <i>SQ</i> * (4)	
Choose between the course combinations below	9 or 8
CHM 317 Organic Chemistry for Majors I* (3)	
CHM 318 Organic Chemistry for Majors II* (3)	
CHM 319 Organic Chemistry Laboratory for Majors I* (1)	
CHM 320 Organic Chemistry Laboratory for Majors II* (1)	
— or —	
CHM 331 General Organic Chemistry (3)	
CHM 332 General Organic Chemistry (3)	
CHM 335 General Organic Chemistry Laboratory (1)	
CHM 336 General Organic Chemistry Laboratory (1)	
CHM 325 Analytical Chemistry	3
CHM 326 Analytical Chemistry Laboratory	1
CHM 341 Elementary Physical Chemistry	3
CHM 343 Physical Chemistry Laboratory	1
CHM 453 Inorganic Chemistry	3
CHM electives	3
Minimum total	30

* CHM 117, 118, 317, 318, 319, and 320 are strongly recommended for qualified students.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

Related courses must include the following:

MAT 270 Calculus with Analytic Geometry I <i>MA</i> ¹	4
MAT 271 Calculus with Analytic Geometry II <i>MA</i> ¹	4
PHY 111 General Physics <i>SQ</i> ^{2,3}	3
PHY 112 General Physics <i>SQ</i> ^{2,3}	3
PHY 113 General Physics Laboratory <i>SQ</i> ^{2,3}	1
PHY 114 General Physics Laboratory <i>SQ</i> ^{2,3}	1
Total	16

¹ Equivalent courses may be taken in place of MAT 270 and 271.

² More advanced PHY courses may be taken in place of PHY 111, 112, 113, and 114.

³ Both PHY 111 and 113 or PHY 112 and 114 must be taken to secure SQ credit.

The remaining courses to complete the major are determined by students in consultation with their advisors.

CHEMISTRY—B.S.

The program consists of 45 semester hours in chemistry and 20 hours of related courses outside the major. Required courses are as follows:

Choose between the course combinations below.....	9 or 8
CHM 113 General Chemistry <i>SQ</i> (4)	
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i> (5)	
_____ or _____	
CHM 113 General Chemistry <i>SQ</i> (4)	
CHM 116 General Chemistry <i>SQ</i> (4)	
_____ or _____	
CHM 117 General Chemistry for Majors I <i>SQ</i> * (4)	
CHM 118 General Chemistry for Majors II <i>SQ</i> * (4)	
Choose between the course combinations below.....	8
CHM 317 Organic Chemistry for Majors I* (3)	
CHM 318 Organic Chemistry for Majors II* (3)	
CHM 319 Organic Chemistry Laboratory for Majors I* (1)	
CHM 320 Organic Chemistry Laboratory for Majors II* (1)	
_____ or _____	
CHM 331 General Organic Chemistry (3)	
CHM 332 General Organic Chemistry (3)	
CHM 335 General Organic Chemistry Laboratory (1)	
CHM 336 General Organic Chemistry Laboratory (1)	
Total	16 or 17

* CHM 117, 118, 317, 318, 319, and 320 are strongly recommended for qualified students.

Additional required chemistry courses are as follows:

CHM 240 Introduction to Physical Chemistry ¹	3
CHM 325 Analytical Chemistry	3
CHM 326 Analytical Chemistry Laboratory	1
CHM 327 Instrumental Analysis.....	3
CHM 328 Instrumental Analysis Laboratory.....	2
CHM 345 Physical Chemistry I ²	3
CHM 346 Physical Chemistry II ²	3
CHM 348 Physical Chemistry Laboratory I <i>L</i> ²	1
CHM 349 Physical Chemistry Laboratory II <i>L</i> ²	1
CHM 452 Inorganic Chemistry Laboratory <i>L</i> ²	1
CHM 453 Inorganic Chemistry.....	3
CHM 460 Biological Chemistry	3
Chemistry elective (choose from the courses below)	2
CHM 392 Introduction to Research Techniques (1–3)	
CHM 424 Separation Science (3)	
CHM 431 Qualitative Organic Analysis (3)	
CHM 471 Solid-State Chemistry (3)	

CHM 480 Methods of Teaching Chemistry (3)	
CHM 481 Geochemistry (3)	
CHM 485 Meteorites and Cosmochemistry (3)	

Total

¹ Completion of MAT 274 and 342 satisfies the CHM 240 requirement.

² CHM 348, 349, and 452 must all be taken to secure L credit.

Additional required related field courses are as follows:

MAT 270 Calculus with Analytic Geometry I <i>MA</i>	4
MAT 271 Calculus with Analytic Geometry II <i>MA</i>	4
MAT 272 Calculus with Analytic Geometry III <i>MA</i>	4
PHY 121 University Physics I: Mechanics <i>SQ</i> ¹	3
PHY 122 University Physics Laboratory I <i>SQ</i> ¹	1
PHY 131 University Physics II: Electricity and Magnetism <i>SQ</i> ²	3
PHY 132 University Physics Laboratory II <i>SQ</i> ²	1
Total	20

¹ Both PHY 121 and 122 must be taken to secure SQ credit.

² Both PHY 131 and 132 must be taken to secure SQ credit.

A course in a computer language, such as CSE 181 Applied Problem Solving with Visual BASIC or CSE 183 Applied Problem Solving with FORTRAN is strongly recommended.

Transfer students are interviewed and advised of possible preparatory work. They must contact the department to arrange for the interview in advance of registration. See "College Degree Requirements," page 332.

American Chemical Society Certification. A student who satisfactorily completes the B.S. degree program is certified by the Department of Chemistry and Biochemistry to the American Chemical Society (ACS) as having met the specific requirements for undergraduate professional training in chemistry. Graduates meeting ACS guidelines can receive a certificate to indicate this fact.

BIOCHEMISTRY—B.S.

The program consists of 36 semester hours in chemistry and 27 semester hours of related courses. Required courses are as follows:

Choose between the course combinations below.....	9 or 8
CHM 113 General Chemistry <i>SQ</i> (4)	
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i> (5)	
_____ or _____	
CHM 113 General Chemistry <i>SQ</i> (4)	
CHM 116 General Chemistry <i>SQ</i> (4)	
_____ or _____	
CHM 117 General Chemistry for Majors I <i>SQ</i> * (4)	
CHM 118 General Chemistry for Majors II <i>SQ</i> * (4)	
Choose between the combinations of courses below.....	8
CHM 317 Organic Chemistry for Majors I* (3)	
CHM 318 Organic Chemistry for Majors II* (3)	
CHM 319 Organic Chemistry Laboratory for Majors I* (1)	
CHM 320 Organic Chemistry Laboratory for Majors II* (1)	
_____ or _____	
CHM 331 General Organic Chemistry (3)	
CHM 332 General Organic Chemistry (3)	
CHM 335 General Organic Chemistry Laboratory (1)	
CHM 336 General Organic Chemistry Laboratory (1)	

Total 16 or 17

* CHM 117, 118, 317, 318, 319, and 320 are strongly recommended for qualified students.

Additional required chemistry courses are as follows:

BCH 461 General Biochemistry	3
BCH 462 General Biochemistry	3
BCH 463 Biophysical Chemistry	3
BCH 464 Biophysical Chemistry Laboratory	2
BCH 467 Analytical Biochemistry Laboratory <i>L</i>	3
CHM 341 Elementary Physical Chemistry*	3
Chemistry elective (choose from the courses below)	3
BCH 494 ST: Topics in Nucleic Acids Biochemistry (3)	
BCH 494 ST: Topics in Protein Biochemistry (3)	
CHM 327 Instrumental Analysis (3)	
CHM 424 Separation Science (3)	
CHM 431 Qualitative Organic Analysis (3)	
CHM 453 Inorganic Chemistry (3)	
CHM 471 Solid-State Chemistry (3)	

Total20

* CHM 345 may be taken in place of CHM 341.

Additional required related field courses are as follows:

BIO 193 The Nature of Biological Science <i>SQ</i>	4
BIO 340 General Genetics	4
BIO 353 Cell Biology	3
MAT 270 Calculus with Analytic Geometry I <i>MA</i>	4
MAT 271 Calculus with Analytic Geometry II <i>MA</i>	4
PHY 121 University Physics I: Mechanics <i>SQ</i> ¹	3
PHY 122 University Physics Laboratory I <i>SQ</i> ¹	1
PHY 131 University Physics II: Electricity and Magnetism <i>SQ</i> ²	3
PHY 132 University Physics Laboratory II <i>SQ</i> ²	1

Total27

¹ Both PHY 121 and 122 must be taken to secure SQ credit.

² Both PHY 131 and 132 must be taken to secure SQ credit.

Additional biology courses selected from BIO 343, 351, 360, 441, 450, and 465 are strongly recommended. Other biology courses may be substituted.

Additional biochemistry and chemistry courses, including CHM 392 Introduction to Research Techniques, may be taken by students and should be chosen in consultation with an advisor.

MINOR IN CHEMISTRY

A minor in Chemistry is awarded to students who complete the following required courses:

CHM 113 General Chemistry <i>SQ</i> ¹	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i> ¹	5
or CHM 116 General Chemistry <i>SQ</i> ¹ (4)	
CHM 325 Analytical Chemistry	3
CHM 326 Analytical Chemistry Laboratory	1
Choose between the course combinations below	7 or 8
BCH 361 Principles of Biochemistry (3)	
CHM 231 Elementary Organic Chemistry <i>SQ</i> ² (3)	
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> ² (1)	

_____ or _____

CHM 331 General Organic Chemistry (3)	
CHM 332 General Organic Chemistry (3)	
CHM 335 General Organic Chemistry Laboratory (1)	
CHM 336 General Organic Chemistry Laboratory (1)	

Choose between the course combinations below..... 4 or 8

CHM 341 Elementary Physical Chemistry (3)	
CHM 343 Physical Chemistry Laboratory (1)	

_____ or _____

CHM 345 Physical Chemistry I (3)	
CHM 346 Physical Chemistry II (3)	
CHM 348 Physical Chemistry Laboratory I (1)	
CHM 349 Physical Chemistry Laboratory II (1)	

Minimum total24

¹ Equivalent courses may be taken in place of CHM 113, 115, or 116.

² Both CHM 231 and 235 must be taken to secure SQ credit.

SECONDARY EDUCATION—B.A.E.

Chemistry. Students may pursue one of two options for the chemistry major teaching field.

Option One. The academic specialization consists of 43 semester hours in chemistry plus work in related fields.

Required courses are as follows:

BCH 361 Principles of Biochemistry	3
CHM 113 General Chemistry <i>SQ</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i>	5
CHM 325 Analytical Chemistry	3
CHM 326 Analytical Chemistry Laboratory	1
CHM 331 General Organic Chemistry	3
CHM 332 General Organic Chemistry	3
CHM 335 General Organic Chemistry Laboratory	1
CHM 336 General Organic Chemistry Laboratory	1
CHM 341 Elementary Physical Chemistry	3
or CHM 345 Physical Chemistry I (3)	
and CHM 346 Physical Chemistry II (3)	

Total27

The remaining chemistry courses to complete the specialization are determined by students in consultation with their advisors.

Additional required related field courses are as follows:

MAT 270 Calculus with Analytic Geometry I <i>MA</i>	4
MAT 271 Calculus with Analytic Geometry II <i>MA</i>	4
PHY 111 General Physics <i>SQ</i> *	3
PHY 112 General Physics <i>SQ</i> *	3
PHY 113 General Physics Laboratory <i>SQ</i> *	1
PHY 114 General Physics Laboratory <i>SQ</i> *	1

Total16

* Both PHY 111 and 113 or PHY 112 and 114 must be taken to secure SQ credit.

Option Two. The academic specialization consists of 30 semester hours of chemistry, which includes all of the required chemistry courses listed in option one and selection of the corresponding option in either mathematics or physics, that is, completion of an additional 30 semester

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

- CHM 240 Introduction to Physical Chemistry.** (3) S
Introduces mathematical/computational methods in chemical kinetics, thermodynamics, quantum chemistry. Mathematical-based computer laboratory. 2 hours lecture, 4 hours lab. Prerequisite with a grade of "C" or higher: MAT 272.
- CHM 302 Environmental Chemistry.** (3) S
Explores major environmental issues, problems, and solutions from analytical and chemistry perspectives. Prerequisites: CHM 114 (or 115 or 116 or 118), 231 (or 331).
- CHM 317 Organic Chemistry for Majors I.** (3) F
Structures, reaction mechanisms and kinetics, and systematic syntheses of organic compounds. Credit is allowed for *only* CHM 231, 317, or 331. Prerequisite: CHM 115 or 118. Corequisite: CHM 319.
- CHM 318 Organic Chemistry for Majors II.** (3) S
Continuation of CHM 317. Credit is allowed for *only* CHM 318 or 332. Prerequisite: CHM 317. Corequisite: CHM 320.
- CHM 319 Organic Chemistry Laboratory for Majors I.** (1) F
Emphasis on mechanisms, kinetics, and products of organic reactions. 1 conference, 3 hours lab. Credit is allowed for *only* CHM 319 or 335. Pre- or corequisite: CHM 317.
- CHM 320 Organic Chemistry Laboratory for Majors II.** (1) S
Continuation of CHM 319. 1 conference, 3 hours lab. Credit is allowed for *only* CHM 320 or 336. Prerequisite: CHM 319. Corequisite: CHM 318.
- CHM 325 Analytical Chemistry.** (3) F, SS
Principles and methods of chemical analysis. Prerequisite: CHM 115 or 116.
- CHM 326 Analytical Chemistry Laboratory.** (1) F, SS
Experiments in chemical analysis. 4 hours lab. Corequisite: CHM 325.
- CHM 327 Instrumental Analysis.** (3) S
Principles of instrumental methods in chemical analysis. Electroanalytical and optical techniques. Prerequisites: CHM 325, 326. Pre- or corequisite: CHM 346.
- CHM 328 Instrumental Analysis Laboratory.** (2) S
Experiments in chemical analysis by electroanalytical and optical techniques. 6 hours lab. Corequisite: CHM 327.
- CHM 331 General Organic Chemistry.** (3) F, S, SS
Chemistry of organic compounds. Credit is allowed for *only* CHM 231, 317, or 331. Prerequisite: CHM 115 or 116 or 118.
- CHM 332 General Organic Chemistry.** (3) F, S, SS
Continuation of CHM 331. Credit is allowed for *only* CHM 318 or 332. Prerequisite: CHM 331.
- CHM 335 General Organic Chemistry Laboratory.** (1) F, S, SS
Microscale organic chemical experiments in separation techniques, synthesis, analysis and identification, and relative reactivity. 4 hours lab. Credit is allowed for *only* CHM 319 or 335. Corequisite: CHM 331.
- CHM 336 General Organic Chemistry Laboratory.** (1) F, S, SS
Continuation of CHM 335. 4 hours lab. Credit is allowed for *only* CHM 320 or 336. Prerequisite: CHM 335. Corequisite: CHM 332.
- CHM 341 Elementary Physical Chemistry.** (3) F
Thermodynamics, equilibrium, states of matter, solutions, and chemical kinetics. For students in premedical, biological, and educational curricula. Prerequisites: CHM 115 (or 114 or 118 or 325), 231 (or 331); MAT 271; PHY 112.
- CHM 343 Physical Chemistry Laboratory.** (1) F
Physical chemistry experiments. 1 hour conference, 3 hours lab. Credit is allowed for *only* CHM 343 or CHM 348 and 349. Corequisite: CHM 341 or 345.
- CHM 345 Physical Chemistry I.** (3) F
Introduction to quantum chemistry with application to electronic structure and dynamics of atoms and molecules. Prerequisite: CHM 240 or MAT 272 and 274 (with grades of "C" or higher).
- CHM 346 Physical Chemistry II.** (3) S
Introduction to equilibrium and statistical thermodynamics. Laws of thermodynamics, equations of state, multicomponent chemical and phase equilibria, and electrochemistry. Prerequisite: CHM 345. Corequisite: MAT 274.
- CHM 348 Physical Chemistry Laboratory I.** (1) F
Laboratory experiments in spectroscopy and computational chemistry. 4 hours lab. Pre- or corequisite: CHM 345. *General Studies: L (if credit also earned in CHM 349 and 452).*
- CHM 349 Physical Chemistry Laboratory II.** (1) S
Laboratory experiments in thermodynamics, electrochemistry, and computational chemistry. 4 hours lab. Pre- or corequisite: CHM 346. *General Studies: L (if credit also earned in CHM 348 and 452).*
- CHM 392 Introduction to Research Techniques.** (1–3) F, S, SS
Instrumental methods and philosophy of research by actual participation in chemical research projects. May be repeated for a total of 6 semester hours. Prerequisites: approvals of advisor and research supervisor.
- CHM 424 Separation Science.** (3) N
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. Prerequisite: CHM 318 or 332 or 345 or instructor approval.
- CHM 431 Qualitative Organic Analysis.** (3) S
Systematic identification of organic compounds. 1 hour lecture, 6 hours lab. Prerequisites: CHM 118 (or 326) and 320 (or 336) or instructor approval.
- CHM 452 Inorganic Chemistry Laboratory.** (1–2) S
Preparation and characterization of typical inorganic substances, emphasizing methods and techniques. 1 conference, 5 hours lab. Prerequisite: instructor approval. *General Studies: L (if credit also earned in CHM 348 and 349).*
- CHM 453 Inorganic Chemistry.** (3) S
Principles and applications of inorganic chemistry. Prerequisite: CHM 341 or 346.
- CHM 460 Biological Chemistry.** (3) S
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) F
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) S
Organization and presentation of appropriate content of chemistry; preparation of reagents, experiments, and demonstrations; organization of stock rooms and laboratories; experience in problem solving. Prerequisite: instructor approval.
- CHM 481 Geochemistry.** (3) F
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) N
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) N
(a) Chemistry of Global Climate Change. (3)
- CHM 501 Current Topics in Chemistry.** (1) F, S
May be repeated for credit. Prerequisite: instructor approval.
- CHM 521 Computer Enhanced Analytical Chemistry.** (3) N
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) A
Theoretical principles of analytical instrumentation and measurements. Prerequisites: CHM 325 and 346 or instructor approval.
- CHM 525 Spectrochemical Methods of Analysis.** (4) N
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.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

CHM 526 X-ray Methods of Analysis. (4) N

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) N

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) F

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) S

Continuation of CHM 531. Prerequisite: CHM 531.

CHM 537 Organic Reactions. (3) S

Important synthetic reactions of organic chemistry emphasizing recently discovered reactions of preparative value. Prerequisite: CHM 531.

CHM 541 Advanced Thermodynamics. (3) F

Equilibrium thermodynamics, chemical reactions, and phase equilibria. Introduction to statistical thermodynamics, critical phenomena, and kinetics. Prerequisite: CHM 346.

CHM 545 Quantum Chemistry I. (3) F

Basic quantum theory, chemical bonding, and molecular structure. Prerequisite: CHM 346.

CHM 546 Quantum Chemistry II. (3) S

Quantum theory of rate processes. Principles of spectroscopy and nonlinear optics. Prerequisite: CHM 545.

CHM 548 Chemical Kinetics. (2) N

Kinetic theory and rate processes. Prerequisite: CHM 545.

CHM 553 Advanced Inorganic Chemistry. (3) S

Principles of modern inorganic chemistry and their applications over the entire periodic system. Prerequisites: CHM 346 and 453 or equivalents.

CHM 556 Topics in Inorganic Chemistry. (3) N

May be repeated for credit. Prerequisites: CHM 553; instructor approval.

CHM 579 Topics in Solid-State Chemistry. (3) N

May be repeated for credit. Prerequisite: instructor approval.

CHM 582 Topics in Geochemistry and Cosmochemistry. (3) N

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) N

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.

CHM 593 Applied Project. (1–12) N

(a) Glass Blowing

Department of Chicana and Chicano Studies

Vicki L. Ruiz

Chair

(GHALL 212) 480/965-5091

www.asu.edu/clas/chicana

PROFESSORS

CANDELARIA, MONTIEL, PADILLA, RUIZ

ASSOCIATE PROFESSOR

ESCOBAR

ASSISTANT PROFESSORS

ALDAMA, GUTIÉRREZ, MAGAÑA

The Chicana and Chicano Studies program is an interdisciplinary degree program that examines the experiences, culture, artistic endeavors, and current status of people of Mexican descent living in the United States. The curriculum focuses on the practical application of Chicana and Chicano Studies (CCS) for career development in selected professions and service to the community based on an understanding of the humanities, social sciences, and the arts.

CHICANA AND CHICANO STUDIES—B.A.

The major in Chicana and Chicano Studies requires 45 semester hours of course work. A minimum of 30 semester hours must be CCS, CSH, and CSS courses. The remaining course work must be in a related field to be approved by an advisor. All CCS majors must take 15 semester hours in the following core courses:

CCS 101 Introduction to Chicana and Chicano Studies C	3
CCS 111 Introduction to Chicana and Chicano Culture C	3
CCS 498 Pro-Seminar	3
Two semester sequence in Chicana and Chicano history	6

Within the 45 semester hours, CCS majors must also take 18 semester hours in one of two concentrations—humanities/cultural studies or social sciences/policy—and 12 hours in the other concentration for a total of 45 semester hours.

Majors are expected to fulfill the college's language requirement in Spanish. Although the department advisor can make exceptions on a case by case basis, all majors must demonstrate proficiency in Spanish.

All Chicana and Chicano Studies majors must take an established minor or credential of at least 18 semester hours in another field.

CHICANA AND CHICANO STUDIES MINOR

The Chicana and Chicano Studies minor requires 18 semester hours of course work. All Chicana and Chicano Studies minors must take the following courses:

CCS 101 Introduction to Chicana and Chicano Studies C	3
or CCS 111 Introduction to Chicana and Chicano Culture C (3)	
HIS 430 20th-Century Chicano History SB, C, H	3
Total	6

Students must also take at least three credits in both CCS concentrations: humanities/cultural studies and social sciences/policy.

Within the 18 semester hour requirement, students must take a minimum of 12 semester hours in CCS, CSH, and CSS courses. Any courses taken in a related field must be approved by an advisor.

CHICANA AND CHICANO STUDIES (CCS)

- CCS 101 Introduction to Chicana and Chicano Studies.** (3) F Historical and contemporary issues in the Chicana and Chicano community; focus on economic, sociological, cultural, and political status of Chicanas and Chicanos in the U.S. *General Studies: C.*
- CCS 111 Introduction to Chicana and Chicano Culture.** (3) S Interdisciplinary analysis of customs, values, belief systems, and cultural symbols; special attention is given to cultural continuity and change. *General Studies: C.*
- CCS 300 Chicana and Chicano Culture and Society.** (3) F Intensive analysis of how Mexican American writers, artists, film makers, entertainers, and academicians have interpreted aspects of the Chicana and Chicano experience. *General Studies: C.*
- CCS 445 Teaching Chicana and Chicano Studies in Native Language.** (3) A Approaches/techniques for infusion of Chicana and Chicano Studies content into elementary and secondary bilingual curriculum. Taught in Spanish. Prerequisite: proficiency in Spanish.
- CCS 446 Teaching Chicana and Chicano Studies in the Schools.** (3) A Approaches/techniques for infusion of Chicana and Chicano Studies content into elementary and secondary curriculum; designed for teachers who will work with Chicana and Chicano students.
- CCS 498 Pro-Seminar.** (3) A Required courses for majors on topic selected by instructor; writing intensive course related to the development of interdisciplinary research skills.

CHICANA AND CHICANO STUDIES (CSH)

- CSH 210 Chicana and Chicano Poetry.** (3) S Writing seminar on Chicana and Chicano poetics and intensive creative writing workshop. Workshop, seminar.
- CSH 220 Chicana and Chicano Cultural Expression.** (3) A Interrelation between economic, social and political status and forms of artistic expression, i.e., music, dance, drama, literature, and graphic arts.
- CSH 310 Chicana and Chicano Folklore.** (3) A Analysis of Chicana and Chicano folk beliefs, traditions, and practices. *General Studies: HU, C.*
- CSH 350 Mexican and Mexican American Artistic Production.** (3) A Overview of Mexican and Mexican American artistic production from colonial times to present; emphasis on religious and folk art.
- CSH 351 Contemporary Chicana and Chicano Art.** (3) A Intensive analysis of contemporary Chicana and Chicano art movement as appraised within the context of contemporary American art and the art of Mexico. *General Studies: HU, C.*
- CSH 363 Chicana and Chicano Literature.** (3) F Development of Chicana and Chicano literature; study of genres and themes; attention to literary antecedents. Cross-listed as ENG 363. Credit is allowed for only CSH 363 or ENG 363. *General Studies: L/HU, C.*

- CSH 485 Chicana Writers.** (3) A Critical reading of Mexican American women authors; emphasis on contemporary (post-1970) poetry, novels, short stories, and essays. *General Studies: L/HU, C.*
- CSH 498 Pro-Seminar.** (3) A Required course for majors on topic selected by instructor; writing intensive course related to the development of interdisciplinary research skills.

CHICANA AND CHICANO STUDIES (CSS)

- CSS 315 Chicano Family Structures and Perceptions.** (3) A Traditional and changing family relationships; emphasis on gender and intergenerational relations and impact of modern society on traditional family values.
- CSS 330 Chicana and Chicano Politics.** (3) A Historical/contemporary analysis of Chicana and Chicano political ideologies, attitudes, strategies, and movements; relations with governmental agencies; participation in political process. *General Studies: C.*
- CSS 331 Contemporary Issues in the Chicana and Chicano Community.** (3) S Historical, demographic, and sociological overview of the status of Chicanas and Chicanos in the U.S. and of salient issues affecting that community. *General Studies: C.*
- CSS 336 Issues in Immigration and Migration.** (3) A Historical/contemporary overview of Mexican immigration into and within the U.S.; factors affecting population movement, settlement patterns, and migrants' incorporation into society. *General Studies: C, H.*
- CSS 340 Chicanas and Chicanos in the U.S. Economy.** (3) S Historical/contemporary analysis of Chicanas' and Chicanos' relationship with the American economic system; emphasis on impact of changing American economy on Chicana and Chicano community. *General Studies: C.*
- CSS 432 Issues in Chicana and Chicano Gender.** (3) A Analysis of social construction of gender identities; emphasis on impact of American and Mexican cultural values on normative gender relations. *General Studies: C.*
- CSS 490 Field Studies in the Chicana and Chicano Community.** (3) A Introduction to principles and methods of qualitative research applied to the Chicana and Chicano community.
- CSS 498 Pro-Seminar.** (3) A Required course for majors on topic selected by instructor; writing intensive course related to the development of interdisciplinary research skills.

Computer Science

A major in Computer Science is offered in both the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences. For faculty and course descriptions, see "Department of Computer Science and Engineering," page 230.

COMPUTER SCIENCE—B.S.

The program in Computer Science consists of 34 hours of core course work and 15 semester hours of senior-level breadth courses in the major. Also required are 18 semester hours of technical elective and mathematics courses approved by the department. The university requirement for literacy and critical inquiry is to be met in part by ECE 400 or a departmental L.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

A minimum cumulative GPA of 2.50 is required to begin upper-division work in the major. A minimum grade of “C” is required in all CSE courses used for degree credit.

For more information, contact an advisor in the Office for Academic Programs, SS 111, or the Computer Science and Engineering Advising Center in GWC 224.

The degree is accredited by the Computer Science Accreditation Board, so more than 120 semester hours are required to complete the degree.

Economics

The College of Liberal Arts and Sciences and the College of Business offer a B.A. or B.S. degree in Economics. Faculty, course descriptions, and the major requirements in the College of Business are listed under “Department of Economics,” page 158.

ECONOMICS—B.A. OR B.S.

The program in Economics consists of 45 semester hours of course work, 24 of which, at a minimum, must be in economics, and the remainder in closely related fields to be selected from the “Approved List of Related Field Courses” in consultation with the faculty advisor.

The following lower-division courses are required and must be counted as part of the 45-hour major:

ECN 111 Macroeconomic Principles <i>SB</i>	3
ECN 112 Microeconomic Principles <i>SB</i>	3
MAT 210 Brief Calculus <i>MA</i>	3
STP 226 Elements of Statistics <i>CS</i>	3
Total	12

While MAT 210 meets the minimum mathematics requirement to major in Economics, all Economics majors who anticipate going on to graduate school in economics or in business or to law school are encouraged to take MAT 270 Calculus with Analytic Geometry I. Majors are encouraged to pursue further course work in mathematics. MAT 270 may be taken in lieu of MAT 210.

To qualify for upper-division course work in economics, the Economics major must earn a minimum grade of “C” in each of the previously listed courses, have junior class standing (56 semester hours), and have a minimum cumulative GPA of 2.50. ECN 313 Intermediate Macroeconomic Theory and ECN 314 Intermediate Microeconomic Theory are required and should be taken after the completion of the previously listed courses and before other upper-division courses in economics.

Credit earned by an Economics major in ECN 484 Economics Internship, whether as a legislative intern or through the Department of Economics Internship Program (and ECN 493 Honors Thesis), may not be used to satisfy the minimum 24 hours of economics course work requirement. However, up to six hours of ECN 484 and 493 may be used to meet the related fields requirement. See “College Degree Requirements,” page 332.

Latin American Studies Certificate or Emphasis. Students majoring in Economics may elect to pursue a Latin

American Studies Certificate or Emphasis, combining courses from the major with selected outside courses of wholly Latin American content. See “Latin American Studies,” page 340, for more information.

MINORS IN ECONOMICS

Minor in General Economics. The minor in General Economics consists of 18 semester hours of credit which includes ECN 111 and ECN 112 plus any 12 hours of upper-division economics courses for which all prerequisites have been met.

Minors in General Economics are encouraged to take calculus and statistics, which are prerequisites for ECN 313 Intermediate Macroeconomic Theory and ECN 314 Intermediate Microeconomic Theory so that these courses might be included in the minor. The College of Business does not permit its professional program students to enroll in this minor.

Minor in Economics for Students Planning a Career in Law. One of the most dramatic recent developments in law is the integration of economic analysis in legal theory and decision making. Curricula at all major law schools reflect this change. Consequently, future lawyers are being trained with courses that rely increasingly on microeconomic theory and econometrics.

The applications of economics to law have moved beyond the traditional areas of antitrust and regulation. First-year law courses now include microeconomic theory with applications to contracts, torts, criminal law, property, and constitutional law.

The minor in Economics for Students Planning a Career in Law provides an opportunity for prospective law students to take courses that provide them with analytical tools essential for the study of law. The prelaw minor consists of a minimum of 18 semester hours. The College of Business does not permit its professional program students to enroll in this minor.

Required courses are as follows:

ECN 111 Macroeconomic Principles <i>SB</i>	3
ECN 112 Microeconomic Principles <i>SB</i>	3
ECN 314 Intermediate Microeconomic Theory <i>SB</i>	3
ECN 450 Law and Economics <i>L</i>	3
ECN 453 Government and Business	3
Total	15

Also required is at least one additional course from the following:

ACC 316 Management Uses of Accounting	3
ECN 421 Earnings and Employment <i>L/SB</i>	3
ECN 480 Introduction to Econometrics <i>CS</i>	3
ECN 494 ST: Public Choice	3
FIN 361 Managerial Finance	3

SECONDARY EDUCATION—B.A.E.

The minor teaching field consists of 21 semester hours. ECN 111 Macroeconomic Principles and ECN 112 Microeconomic Principles and MAT 210 Brief Calculus are required. The remainder must be approved by the advisor in consultation with the student.

Social Studies. See “Social Studies,” page 438.

GRADUATE PROGRAMS

The faculty in the Department of Economics offer programs leading to the M.S. and Ph.D. degrees. See the *Graduate Catalog* for requirements.

For faculty and course descriptions see "Department of Economics," page 158.

Department of English

(LL 542) 480/965-3168
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REGENTS' PROFESSORS

DUBIE, RIOS

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, GOLDBERG, HORAN, LUSSIER, D.B. MAHONEY, McNALLY, MILLER, MORGAN, NELSON, RAMAGE, SAVARD, SCHWALM, van GELDEREN

ASSISTANT PROFESSORS

FUSE, GOGGIN, HARRIS, JOHNSON, PERRY, PRITCHARD, STEVENS, THOMPSON, TOHE, VOADEN, WEBB

SENIOR LECTURERS

COOK, COOPER, DUGAN, D. M. MAHONEY, OBERMEIER, SUDOL

LECTURERS

DUERDEN, DWYER, HEENAN, NORTON, RAY, WHEELER

ACADEMIC PROFESSIONAL

GLAU

ENGLISH—B.A.

The faculty in the Department of English offer courses in comparative literature, creative writing, English as a second language, English education, English linguistics, literature and language, and rhetoric and composition. Undergraduate degrees include the B.A. degree in English, with a concentration in either linguistics or literature, and a Secondary Education Bachelor of Arts in Education degree. The faculty also offer a Writing Certificate. Students interested in creative writing are encouraged to use electives to pursue a creative writing emphasis. Students should work with their advisors to design individual programs of study that take full advantage of the diversity within the department as well

as interdisciplinary and multicultural contexts available in the college and university.

The B.A. degree in English with a concentration in linguistics consists of 42 semester hours. Required courses are as follows:

ENG 200	Critical Reading and Writing About Literature <i>L/HU</i>	3
ENG 213	Introduction to the Study of Language	3
ENG 221	Survey of English Literature <i>HU, H</i>	3
	or ENG 222 Survey of English Literature <i>HU, H</i> (3)	
	or ENG 241 American Literature <i>HU</i> (3)	
	or ENG 242 American Literature <i>HU</i> (3)	
ENG 312	English in Its Social Setting <i>HU/SB</i>	3
ENG 313	Phonology and Morphology	3
ENG 314	Modern Grammar.....	3
ENG 413	History of the English Language <i>HU</i>	3
ENG 414	Studies in Linguistics (repeated for a total of nine semester hours)	9

Twelve additional hours are electives, chosen in consultation with the student's advisor. These courses must be at the 200 level or above. At least one must be a three-credit course in a modern language other than English at the 400 level or above. A grade of "C" or higher is required in all courses taken for the major. *No course may be used to satisfy more than one requirement.*

The B.A. degree in English with a concentration in literature consists of 45 semester hours. Required courses are as follows:

ENG 200	Critical Reading and Writing About Literature <i>L/HU</i>	3
ENG 221	Survey of English Literature <i>HU, H</i>	3
ENG 222	Survey of English Literature <i>HU, H</i>	3
ENG 241	American Literature <i>HU</i>	3
ENG 242	American Literature <i>HU</i>	3
ENG 421	Shakespeare <i>HU</i>	3
	Upper-division course in critical theory (3)	
	Upper-division course in gender, American ethnic literatures, and/or postcolonial studies (3)	
	Course in the history and/or structure of language (3)	
	Upper-division course in literature before 1660 exclusive of ENG 421 (3)	
	Upper-division course in literature between 1660 and 1900 (3)	
	Upper-division course in literature after 1900 (3)	

Courses may be used to satisfy more than one requirement. Additional hours needed to complete the 45 hours are free electives chosen from the department's offerings at the 200 level and above. At least 18 of the 45 hours must be taken at the 300 or 400 level. A grade of "C" or higher is required in all courses taken for the major.

MINORS

The minor in English with a Concentration in Linguistics consists of 24 semester hours. Required courses are as follows:

ENG 200	Critical Reading and Writing About Literature <i>L/HU</i>	3
ENG 213	Introduction to the Study of Language	3

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

ENG 221 Survey of English Literature <i>HU, H</i>	3
or ENG 222 Survey of English Literature <i>HU, H</i> (3)	
or ENG 241 American Literature <i>HU</i> (3)	
or ENG 242 American Literature <i>HU</i> (3)	
ENG 312 English in Its Social Setting <i>HU/SB</i>	3
ENG 314 Modern Grammar.....	3
ENG 413 History of the English Language <i>HU</i>	3

The six additional hours are electives chosen from the department's offerings, with at least one course (three hours) required at the 300 or 400 level. A grade of "C" or higher is required in all courses for the minor.

The minor in English with a Concentration in Literature consists of 24 semester hours. Required courses are as follows:

ENG 200 Critical Reading and Writing About Literature <i>L/HU</i>	3
ENG 221 Survey of English Literature <i>HU, H</i>	3
or ENG 222 Survey of English Literature <i>HU, H</i> (3)	
ENG 241 American Literature <i>HU</i>	3
or ENG 242 American Literature <i>HU</i> (3)	
ENG 421 Shakespeare <i>HU</i>	3

Also required are two upper-division courses in literature (six hours) and two electives (six hours) chosen from among the department's offerings, with at least one course (three hours) at the 300 or 400 level. A grade of "C" or higher is required in all courses taken for the minor.

WRITING CERTIFICATE

The Writing Certificate consists of 19 semester hours. Initial entry into the program requires a minimum GPA of 3.00 in English 101 and 102, 105, or 107 and 108. Students must also have completed at least 30 hours of course work and must have a minimum GPA of 3.00. Required courses are as follows:

ENG 216 Persuasive Writing on Public Issues <i>L</i>	3
or ENG 412 Professional Writing (3)	
ENG 301 Writing for the Professions <i>L</i>	3
ENG 372 Document Production <i>L</i>	3
ENG 472 Rhetorical Studies	3
ENG 484 Writing Internship.....	3
ENG 498 PS: Portfolio.....	1
Total	16

Also required is an additional writing course in English (three hours) or a writing or design course (three hours) selected from courses across campus. All students are required to submit a portfolio before receiving the certificate.

SECONDARY EDUCATION—B.A.E.

The major teaching field consists of 42 semester hours in English. Required courses are as follows:

ENG 200 Critical Reading and Writing About Literature <i>L/HU</i>	3
ENG 212 English Prose Style <i>L</i>	3
or ENG 215 Strategies of Academic Writing <i>L</i> (3)	
or ENG 216 Persuasive Writing on Public Issues <i>L</i> (3)	
or ENG 217 Writing Reflective Essays <i>L</i> (3)	
ENG 221 Survey of English Literature <i>HU, H</i>	3
ENG 222 Survey of English Literature <i>HU, H</i>	3
ENG 241 American Literature <i>HU</i>	3
ENG 242 American Literature <i>HU</i>	3

ENG 312 English in Its Social Setting <i>HU/SB</i>	3
or ENG 314 Modern Grammar (3)	
ENG 421 Shakespeare <i>HU</i>	3
ENG 471 Literature for Adolescents <i>HU</i>	3
ENG 480 Methods of Teaching English	3
Total	30

Also required is one course in women's literature or American ethnic literature. Nine additional hours are free electives chosen from Department of English offerings, six hours of which must be in the upper division. ENG 471 and 480 must be taken before student teaching.

The minor teaching field consists of the following required courses:

ENG 200 Critical Reading and Writing About Literature <i>L/HU</i>	3
ENG 212 English Prose Style <i>L</i>	3
or ENG 215 Strategies of Academic Writing <i>L</i> (3)	
or ENG 216 Persuasive Writing on Public Issues <i>L</i> (3)	
or ENG 217 Writing Reflective Essays <i>L</i> (3)	
ENG 221 Survey of English Literature <i>HU, H</i>	3
or ENG 222 Survey of English Literature <i>HU, H</i> (3)	
ENG 241 American Literature <i>HU</i>	3
or ENG 242 American Literature <i>HU</i> (3)	
ENG 312 English in Its Social Setting <i>HU/SB</i>	3
or ENG 314 Modern Grammar (3)	
ENG 471 Literature for Adolescents <i>HU</i>	3
ENG 480 Methods of Teaching English	3
Upper-division English elective.....	3
Total	24

These courses are also recommended for Elementary Education majors.

GRADUATE PROGRAMS

The faculty in the Department of English offer programs leading to the M.A. degree in English (with concentrations in comparative literature, English linguistics, literature and language, and rhetoric and composition), Master of Fine Arts degree in Creative Writing (options include fiction, nonfiction, poetry, and screenwriting), Master of Teaching English as a Second Language degree, and Ph.D. degree in English with concentrations in literature, rhetoric/composition, and linguistics. See the *Graduate Catalog* for requirements.

ENGLISH (ENG)

ENG 101 First-Year Composition. (3) F, S, SS
Discovering, organizing, and developing ideas in relation to the writer's purpose, subject, and audience. Emphasis on modes of written discourse and effective use of rhetorical principles. Foreign students, see ENG 107. Prerequisite: see "University Testing Requirements," page 72, and "First-Year Composition Requirement," page 83.

ENG 102 First-Year Composition. (3) F, S, SS
Critical reading and writing; emphasis on strategies of academic discourse. Research paper required. Foreign students, see ENG 108. Prerequisite with a grade of "C" or higher: ENG 101.

ENG 105 Advanced First-Year Composition. (3) F, S
A concentrated composition course for students with superior writing skills; intensive reading; research papers; logical and rhetorical effectiveness. Not open to students with credit in First-Year Composition. Prerequisite: see "University Testing Requirements," page 72, and "First-Year Composition Requirement," page 83.

ENG 107 English for Foreign Students. (3) F, S

For students from non-English speaking countries who have studied English in their native countries, but who require practice in the idioms of English. Intensive reading, writing, and discussion. Satisfies the graduation requirement of ENG 101.

ENG 108 English for Foreign Students. (3) F, S

For foreign students; critical reading and writing; strategies of academic discourse. Research paper required. Satisfies graduation requirement of ENG 102. Prerequisite with a grade of "C" or higher: ENG 107.

ENG 114 English Grammar and Usage. (3) F, S

The fundamentals of English grammar (word and phrase structure) and of English usage (punctuation, grammatical correctness).

Completion of the First-Year Composition requirement is a prerequisite for all English courses above the 100 level.

ENG 200 Critical Reading and Writing About Literature. (3) F, S

Introduction to the terminology, methods, and objectives of the study of literature, with practice in interpretation and evaluation. Prerequisite: English major or minor. *General Studies: L/HU.*

ENG 201 World Literature. (3) F

The classical and medieval periods. Selections from the great literature of the world in translation and lectures on the cultural background. *General Studies: HU, H.*

ENG 202 World Literature. (3) S

The Renaissance and modern periods. Selections from the great literature of the world in translation and lectures on the cultural background. *General Studies: HU, H.*

ENG 204 Introduction to Contemporary Literature. (3) A

Poetry, fiction, drama, and possibly other genres. *General Studies: HU.*

ENG 210 Introduction to Creative Writing. (3) F, S

Beginning writing of poetry, fiction, and drama (both stage and screen). Separate sections for each genre. Each genre may be taken once.

ENG 212 English Prose Style. (3) N

Analysis and practice of writing in various classical and modern prose styles. Prerequisite: English major or approval of advisor and instructor. Prerequisite with a grade of "B" or higher: ENG 102. *General Studies: L.*

ENG 213 Introduction to the Study of Language. (3) F, S

Language as code; phonetics, phonology, morphology, and syntax; the lexicon; language acquisition; sociolinguistics.

ENG 215 Strategies of Academic Writing. (3) F, S

Advanced course in techniques of analyzing and writing academic expository prose. Writing is research based. *General Studies: L.*

ENG 216 Persuasive Writing on Public Issues. (3) F, S

Advanced course in techniques of analyzing and writing persuasive arguments addressing topics of current public interest. Papers are research based. *General Studies: L.*

ENG 217 Writing Reflective Essays. (3) F, S

Critical examination of the influences discourse has on formation of identity; narrative analyses of self and culture. *General Studies: L.*

ENG 218 Writing About Literature. (3) F, S

Advanced writing course requiring analytical and expository essays about fiction, poetry, and drama. For non-English majors. *General Studies: L.*

ENG 221 Survey of English Literature. (3) F, S

Medieval, Renaissance, and 18th-century literature. Emphasis on major writers and their works in their literary and historical contexts. *General Studies: HU, H.*

ENG 222 Survey of English Literature. (3) F, S

Romantic, Victorian, and 20th-century literature. Emphasis on major writers and their works in their literary and historical contexts. *General Studies: HU, H.*

ENG 241 American Literature. (3) F, S

From colonial times to the Civil War, including the growth of nationalism and romanticism. *General Studies: HU.*

ENG 242 American Literature. (3) F, S

From the Civil War to the present. Development of realism, naturalism, and modernism, and contemporary trends in prose and poetry. *General Studies: HU.*

ENG 245 Popular Culture Issues. (3) F, S

Selected topics in various forms of popular culture related to written texts. May be repeated for credit when topic varies. *General Studies: L.*

ENG 294 Special Topics. (1–4) N

A term paper or equivalent out-of-class written work is required in all upper-division (300- and 400-level) ENG courses.

ENG 301 Writing for the Professions. (3) F, S

Advanced practice in writing and editing expository prose. Primarily for preprofessional majors. *General Studies: L.*

ENG 303 Classical Backgrounds of English Literature. (3) N

Selected readings of Greek and Latin literature in translation, emphasizing forms, ideas, and myths as they relate to literature in English. *General Studies: HU.*

ENG 307 Utopian Literature. (3) N

Selected works from the present to the classical period, including *Walden Two*, *Walden*, *Utopia*, and *The Republic*. *General Studies: L/HU, H.*

ENG 310 Intermediate Creative Writing. (3) F, S

Separate sections for fiction and poetry. May be taken once for poetry, once for fiction. Lectures, writing assignments, discussion, criticism. Prerequisite: ENG 210 or instructor approval.

ENG 312 English in Its Social Setting. (3) S

Introduction to the sociolinguistic study of the English language. *General Studies: HU/SB.*

ENG 313 Phonology and Morphology. (3) S

Introduction to English morphology, phonology, etymology, and phonetic aspects of rhyme, alliteration, and other sound-based literary devices.

ENG 314 Modern Grammar. (3) F, S

Modern descriptive models of English grammar.

ENG 321 Introduction to Shakespeare. (3) F, S

Shakespeare's major comedies, histories, and tragedies. *General Studies: L/HU.*

ENG 331 American Drama. (3) A

Major works in the development of American drama from its beginnings to the present. *General Studies: L.*

ENG 332 Major American Novels. (3) A

Novels from the 19th century to the present studied in their historical and cultural contexts. *General Studies: L.*

ENG 333 American Ethnic Literature. (3) A

Examination of America's multiethnic identity through works of literature that depict American ethnic, gender, and class sensibilities. *General Studies: L, C.*

ENG 345 Selected Authors or Issues. (3–4) N

Different topics may be offered. Film topics with lab may carry 4 credits. Repeat credit for different topics.

ENG 352 Short Story. (3) F, S

Development of the short story as a literary form; analysis of its technique from the work of representative authors. *General Studies: HU.*

ENG 353 African American Literature: Beginnings Through the Harlem Renaissance. (3) F

Thematic and cultural study of African American literature through the Harlem Renaissance. Cross-listed as AFH 353. Credit is allowed for only AFH 353 or ENG 353. *General Studies: L/HU, C.*

ENG 354 African American Literature: Harlem Renaissance to the Present. (3) S

Thematic and cultural study of African American literature from the Harlem Renaissance to the present. Cross-listed as AFH 354. Credit is allowed for only AFH 354 or ENG 354. *General Studies: L/HU, C.*

ENG 355 History of the Drama. (3) N

Development of European drama from the Greek to the Romantic period. *General Studies: L/HU.*

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

ENG 356 The Bible as Literature. (3) F, S

Readings in Old and New Testaments, emphasizing ideas, literary types, and sources as they appear in literature. *General Studies: HU.*

ENG 357 Introduction to Folklore. (3) N

Survey of the history, genres, and dynamics of folklore, with emphasis on oral traditions. *General Studies: HU.*

ENG 359 American Indian Literatures. (3) N

Selected oral traditions of American Indians and their influences on contemporary Native American literary works. *General Studies: L/HU, C.*

ENG 361 Silent Film. (4) F

Development of motion pictures from 1850 through 1930. 3 hours lecture, screenings. *General Studies: HU.*

ENG 362 Sound Film Genres. (4) S

Examination of the Western, the horror film, the comedy, and other genres. 3 hours lecture, screenings. *General Studies: HU.*

ENG 363 Chicana and Chicano Literature. (3) F

Development of Chicana and Chicano literature; study of genres and themes; attention to literary antecedents. Cross-listed as CSH 363. Credit is allowed for only CSH 363 or ENG 363. *General Studies: L/HU, C.*

ENG 372 Document Production. (3) F, S

Introduction to document design and production. Practice in critique and in writing the content of publications. Lecture, discussion. Prerequisite: First-Year Composition or instructor approval. *General Studies: L.*

ENG 374 Technical Editing. (3) F, S

Fundamentals of editing technical and professional materials. Role of editors in analyzing, revising, and polishing manuscripts. Successful writer/editor dialogues. Prerequisites: ENG 101 and 102 or equivalent.

English majors and minors are expected to have completed ENG 200 before taking 400-level literature courses.

ENG 400 History of Literary Criticism. (3) N

Major critics and critical traditions in the western world. Prerequisite: 6 hours of literature or instructor approval. *General Studies: HU.*

ENG 405 Style and Stylistics. (3) N

Linguistic, rhetorical, and literary approaches to the analysis of style in poetry, fiction, and other forms of written discourse.

ENG 409 Advanced Screenwriting II. (3) N

Application of the principles taught in a complete feature-length screenplay.

ENG 411 Advanced Creative Writing. (3) F, S

Separate poetry and fiction workshops for experienced writers, emphasizing individual style. May be taken once for poetry, once for fiction. Prerequisite: ENG 310 or instructor approval.

ENG 412 Professional Writing. (3) N

Lectures and conferences concerning techniques of writing for publication. Prerequisite: ENG 310 or instructor approval.

ENG 413 History of the English Language. (3) A

Development of English from the earliest times to the modern period. Prerequisite: junior standing or instructor approval. *General Studies: HU.*

ENG 414 Studies in Linguistics. (3) F, S

The relationship of linguistics to literature, gender, power, and other social issues. May be repeated for credit. Prerequisite: junior standing.

ENG 415 Medieval Literature. (3) N

Medieval English literature in translation, from *Beowulf* to Malory (excluding Chaucer), emphasizing cultural and intellectual backgrounds; includes continental works. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 416 Chaucer: *Canterbury Tales*. (3) A

Chaucer's language, his last work, and its relationship to continental and insular traditions. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 417 Chaucer: *Troilus and Criseyde* and the *Minor Works*. (3) N

Chaucer's language, his major poem, and his early works in their medieval context. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 418 Renaissance Literature. (3) F

Topics, authors, and themes in English literature, 1485–1603. Prerequisite: ENG 221 or instructor approval. *General Studies: L/HU.*

ENG 419 English Literature in the Early 17th Century. (3) F

Topics, authors, and themes in English literature, 1603–1660. Prerequisite: ENG 221 or instructor approval. *General Studies: L/HU.*

ENG 421 Shakespeare. (3) F, S

A selection of comedies, histories, and tragedies. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 422 Studies in Shakespeare. (3) A

Topics for close examination in selected dramatic and/or nondramatic works. May be repeated for credit when topics vary. Prerequisite: ENG 421 or instructor approval. *General Studies: HU.*

ENG 423 Renaissance Drama. (3) S

Topics, authors, and themes in the drama of the Tudor and early Stuart periods. Prerequisite: ENG 221 or instructor approval. *General Studies: L/HU.*

ENG 424 Milton. (3) A

Selected prose and poetry, emphasizing *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 425 Studies in English Romanticism. (3) F

All genres of Romantic literature in cultural contexts, Blake to the death of Wordsworth. May be repeated for credit. *General Studies: HU.*

ENG 426 Victorian Poetry. (3) F

Poetry of the second half of the 19th century. May include such poets as Tennyson, Browning, and Arnold. Prerequisite: ENG 222 or instructor approval. *General Studies: L/HU.*

ENG 427 Restoration and Early 18th Century. (3) N

Writers and movements in the nondramatic literature of the Restoration and early 18th century. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 428 The Later 18th Century. (3) N

Writers, movements, and books during the second half of the 18th century. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 430 Victorian Cultural Backgrounds. (3) N

Social, religious, and other cultural issues of the period. May include Carlyle, Ruskin, Darwin, Arnold, Pater, and Morris. Prerequisite: ENG 222 or instructor approval. *General Studies: L/HU.*

ENG 435 19th-Century American Poetry. (3) N

Themes and developments in American poetry to 1900, including Poe, Whitman, and Dickinson. *General Studies: HU.*

ENG 439 Restoration and 18th-Century Drama. (3) S

English drama 1600–1800. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 440 Studies in American Literature to 1815. (3) N

Thought and expression from the time of first contact to 1815. May be repeated for credit. Prerequisite: ENG 241 or instructor approval. *General Studies: HU.*

ENG 441 20th-Century American Drama. (3) N

American drama since World War I, especially experimental techniques. Prerequisite: ENG 241 or 242 or instructor approval. *General Studies: HU.*

ENG 442 20th-Century British and Irish Poetry. (3) N

Theory and practice of poetry since 1900. Prerequisite: ENG 222 or instructor approval.

ENG 443 American Poetry, 1900–1945. (3) N

Developments in theory and practice of major poets. Prerequisite: ENG 241 or 242 or instructor approval. *General Studies: HU.*

ENG 444 Studies in American Romanticism, 1830–1860. (3) F

Cultural expression in works of representative writers. May be repeated for credit. Prerequisite: ENG 241 or instructor approval. *General Studies: HU.*

ENG 445 Studies in American Realism, 1870–1910. (3) S

Writers and influences that shaped the development of literary realism. May be repeated for credit. Prerequisite: ENG 242 or instructor approval. *General Studies: L/HU.*

ENG 448 20th-Century British and Irish Novel. (3) N

Theory and practice of the novel since 1900. Prerequisite: ENG 222 or instructor approval. *General Studies: HU.*

ENG 451 The Novel to Jane Austen. (3) N

From origins of prose fiction through the 18th century. *General Studies: HU, H.*

- ENG 452 The 19th-Century Novel.** (3) S
May include such novelists as Austen, Dickens, Eliot, and Conrad.
General Studies: HU.
- ENG 453 The American Novel to 1900.** (3) N
The rise and development of the novel to Dreiser. Prerequisite: ENG 241 or instructor approval. *General Studies: HU.*
- ENG 454 The American Novel, 1900–1945.** (3) N
Developments in theory and practice of major novelists. Prerequisite: ENG 241 or 242 or instructor approval. *General Studies: HU.*
- ENG 455 The Form of Verse: Theory and Practice.** (3) N
Types, history, criticism, and schools of theory of metrical form. Analysis of lyric, narrative, and dramatic poetry.
- ENG 457 American Poetry Since 1945.** (3) A
Major American poets of the period. Developments in theory and practice. Prerequisite: ENG 241 or instructor approval. *General Studies: HU.*
- ENG 458 American Novel Since 1945.** (3) N
Major novelists of the period. Developments in theory and practice. Prerequisite: ENG 242 or instructor approval. *General Studies: L/HU.*
- ENG 460 Western American Literature.** (3) A
Critical examination of ideas and traditions of the literature of the western United States, including the novel. *General Studies: L/HU.*
- ENG 461 Women and Literature.** (3) N
Selected topics in literature by or about women. May be repeated for credit when topics vary. *General Studies: HU.*
- ENG 462 20th-Century Women Authors.** (3) N
Critical examination of literature by 20th-century women writers. May be repeated for credit when topics vary. *General Studies: HU.*
- ENG 463 European Drama from Ibsen to 1914.** (3) N
Chief continental and British dramatists of the period, emphasizing the beginnings and development of realism. *General Studies: HU.*
- ENG 464 European Drama from 1914 to the Present.** (3) N
Chief continental and British dramatists of the period, emphasizing experimental techniques. *General Studies: HU.*
- ENG 470 Symbols and Archetypes in Children's Literature.** (3) F
Various critical approaches and recurring themes are studied in relation to classical and contemporary children's literature. Lecture, discussion, reading.
- ENG 471 Literature for Adolescents.** (3) F, S
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. *General Studies: HU.*
- ENG 472 Rhetorical Studies.** (3) F, S
Developments in theory and practice of major rhetorical inquiries. Seminar, workshop. Prerequisite: junior standing.
- ENG 480 Methods of Teaching English: Composition.** (3) F, SS
Methods of instruction, organization, and presentation of appropriate content in the teaching of composition and other writing skills.
- ENG 482 Methods of Teaching English: Language.** (3) S
Methods of instruction, organization, and presentation of appropriate content in language and usage for junior and senior high schools. Lecture, discussion, lab.
- ENG 484 Writing Internship.** (3) F, S
Tutor children in after-school programs in the community and assist them with reading, homework, and computer skills. Three afternoons a week from 3:00 p.m. to 5:00 p.m., Monday through Thursday.
- ENG 498 Pro-Seminar.** (1) N
(a) Portfolio
- ENG 500 Research Methods.** (3) A
Methodology and resource materials for research. Analysis of criticism and scholarship, including evaluation of sources.
- ENG 501 Introduction to Comparative Literature.** (3) N
Problems, methods, and principles, illustrated by selected critical essays and literary texts.
- ENG 502 Contemporary Critical Theory.** (3) A
An 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) N
Elements of Old English grammar, with selected readings.
- ENG 508 Old English Literature.** (3) N
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) N
A study of the principal dialects of the language, with selected readings. Prerequisite: graduate standing.
- ENG 512 The Teaching of Composition.** (3) N
The theory and practice of teaching writing at all levels. Emphasis on current research. Prerequisites: teaching experience; instructor approval.
- ENG 515 Middle English Literature.** (3) N
English literature from the 12th through the 15th centuries, exclusive of Chaucer. Prerequisite: ENG 509 or instructor approval.
- ENG 517 Contemporary Rhetorical Theory.** (3) A
Investigation of the work of such important rhetorical theorists as Burke, Toulmin, Perelman, Gates, and Cixous.
- ENG 520 Renaissance Literature.** (3) N
Poetry and prose of the English Renaissance, excluding drama.
- ENG 521 Shakespeare.** (3) A
A 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) N
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) F
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) S
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) N
Intensive study in the rhetorical categories of invention, arrangement, style, aims, modes, and forms of written discourse.
- ENG 545 Studies in English Literature.** (3) N
This course offers selected authors or issues and may be repeated for credit.
- ENG 547 Studies in American Literature.** (3) N
This course offers selected authors or issues and may be repeated for credit.
- ENG 549 Studies in Comparative Literature.** (3) N
This course offers selected authors or issues and may be repeated for credit.
- ENG 550 Contemporary Comparative Literature.** (3) N
Comparative studies in modern literature in English and other literatures in translation. May be repeated for credit when content varies.
- ENG 560 Studies in Dramatic Forms.** (3) F, N
Selected topics in dramatic and cinematic literature, history, criticism, theory, and cross-disciplinary study. May be repeated for credit when topics vary. Lecture, studio.
- ENG 571 Advanced Study in Literature for Adolescents.** (3) N
History and criticism of adolescent literature. Prerequisite: ENG 471 or instructor approval.
- ENG 573 Censorship and Literature.** (3) N
The history of censorship, primarily in the United States, and significant court decisions that affected writers and books.
- ENG 580 Practicum.** (1–12) N
- ENG 591 Seminar.** (3) F, S
Selected topics regularly offered in the various areas of English studies.
- ENG 594 Conference and Workshop.** (1–12) N
- ENG 598 Special Topics.** (1–4) N
- ENG 599 Thesis.** (1–12) N

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

LINGUISTICS (LIN)

See the *Graduate Catalog* for the LIN courses.

WRITING ACROSS THE CURRICULUM (WAC)**WAC 101 Introduction to Academic Writing.** (3) F, S

Combines classroom and supplemental instruction to teach academic genres of writing, including definition, summary, and analysis.

WAC 107 Introduction to Academic Writing for International Students. (3) F, S

For students from non-English speaking countries. Combines classroom and supplemental instruction with intensive reading, writing, and discussion.

Department of Exercise Science and Physical Education

William J. Stone

Chair

(PEBW 201) 480/965-3591

www.asu.edu/clas/espe

REGENTS' PROFESSOR
LANDERS

PROFESSORS

BURKETT, CORBIN, DARST, KRAHENBUHL, MARTIN,
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ASSOCIATE PROFESSORS

HINRICHS, MATT, MORGAN, PAGLIASOTTI, WILLIS

ASSISTANT PROFESSORS

ETNIER, GERRITSEN, McMAHAN, PHILLIPS,
ROBERTSON, SANTELLO, SWAN, TREASURE

SENIOR LECTURER

LANDERS

LECTURERS

JONES, PRIDE, WOODRUFF

EXERCISE SCIENCE/PHYSICAL EDUCATION— B.S.

The B.S. degree in Exercise Science/Physical Education consists of 42 semester hours, including 21 semester hours of required EPE core courses (EPE 110 may be repeated for credit). The remaining 21 semester hours of EPE and other courses are prescribed by the specific concentration the student selects.

The required EPE core courses are as follows:

EPE 110	Movement Analysis Laboratory	6
EPE 200	Introduction to Exercise Science and Physical Education	3
EPE 335	Biomechanics	3
EPE 340	Physiology of Exercise	3
EPE 345	Motor and Developmental Learning	3
EPE 352	Psychosocial Aspects of Physical Activity.....	3
Total	.....	21

Each EPE core course has specific prerequisite courses that must be taken before taking the respective core course. These prerequisite courses include the following:

BIO 201	Human Anatomy and Physiology I <i>SG</i>	4
BIO 202	Human Anatomy and Physiology II.....	4
CHM 101	Introductory Chemistry <i>SQ</i>	4
MAT 117	College Algebra <i>MA</i>	3
PGS 101	Introduction to Psychology <i>SB</i>	3
PHY 111	General Physics <i>SQ*</i>	3
Total	.....	21

* Both PHY 111 and 113 must be taken to secure SQ credit.

All prerequisite and EPE courses must be completed with a minimum grade of "C." The requirements for the specific concentrations are described below.

Majors must elect either the exercise science, exercise and wellness, or physical education concentration.

Exercise and Wellness Concentration. Candidates for the exercise and wellness concentration must complete 21 semester hours beyond the required EPE core courses by taking the following:

EPE 300	Foundations of Exercise and Wellness <i>L</i>	3
EPE 320	Program Development and Leadership.....	3
EPE 420	Exercise Testing	3
EPE 425	Exercise Prescription	3
EPE 484	Internship	6
Total	.....	18

Three semester hours must be selected from an approved list of concentration electives that includes EPE courses and courses from nutrition, computer science/statistics, and business/communication.

Exercise Science Concentration. Candidates for the exercise science concentration must complete 21 semester hours beyond the core courses in the major field, at least 12 of which must carry EPE prefixes, be upper-division courses, and concern the theoretical subjects of the core. The remaining nine semester hours may carry either EPE prefixes or prefixes from related disciplines selected with the advice and consent of a faculty advisor. Activity courses may not be used to fulfill part of the 21 semester hour requirement. No more than six semester hours may be in independent study courses.

Physical Education Concentration. Candidates must complete 21 semester hours beyond the EPE core courses, 12 of which must carry EPE prefixes from the required course list below.

EPE 361	Physical Education in the Secondary School.....	3
EPE 376	Physical Education for the Elementary School.....	3
EPE 382	Physical Education for the Atypical Student	3
EPE elective*	.....	3
Total	.....	12

* See advisor for approved electives.

The remaining nine semester hours of related course work can carry either EPE, psychology, special education, child development, and/or education prefixes. Activity courses (EPE 110) may be used to fulfill part of the 21-semester-hour requirement (additional four semester hours



The Student Recreation Complex extols the benefits of good physical health with state-of-the-art facilities. H. Val Peterson photo

maximum). No more than six semester hours may be taken in internship. Internship experiences may only be in elementary and secondary school teaching and coaching settings. A maximum of six semester hours may be in independent study.

EXERCISE SCIENCE/PHYSICAL EDUCATION MINOR

The minor in Exercise Science/Physical Education consists of the core sequence in exercise science and physical education as follows, plus all prerequisite courses:

EPE 110	Movement Analysis Laboratory	6
EPE 200	Introduction to Exercise Science and Physical Education	3
EPE 335	Biomechanics	3
EPE 340	Physiology of Exercise	3
EPE 345	Motor and Developmental Learning	3
EPE 352	Psychosocial Aspects of Physical Activity.....	3
Total	.....	21

SECONDARY EDUCATION—B.A.E.

Physical Education. Candidates for the B.A.E. degree are required to complete the following courses in physical education in addition to the required EPE core courses:

EPE 361	Physical Education in the Secondary School.....	3
EPE 376	Physical Education for the Elementary School.....	3
EPE 382	Physical Education for the Atypical Student	3
EPE 480	Methods of Teaching Physical Education.....	3
EPE elective*	.....	3
Total	.....	15

* See advisor for approved electives.

Students must also complete a four-semester Physical Education Teacher Preparation Program professional sequence in the College of Education (38 semester hours). Entry into this degree program requires filing an application, passing scores on a Pre-Professional Skills Test (PPST) or American College Test (ACT), 56 semester hours of completed university study, and a minimum GPA of 2.50. See “College of Education,” page 174, for additional requirements.

GRADUATE PROGRAMS

The faculty in the Department of Exercise Science and Physical Education offer programs leading to the Master of Physical Education degree and the M.S. degree in Exercise Science/Physical Education. The department also participates with the Graduate College in the program leading to the Ph.D. degree in Exercise Science and with the College of Education and the Graduate College in the program leading to the Ph.D. degree in Curriculum and Instruction with concentrations in exercise and wellness and in physical education. See the *Graduate Catalog* for requirements.

EXERCISE SCIENCE/PHYSICAL EDUCATION (EPE)

A \$5.00 towel and locker fee is required each semester by students using towel and locker facilities for physical education classes and intramural activities.

Physical education activity classes (EPE 105, 205, 305, 310) may not be taken for audit. Excessive absences and/or tardiness are considered disruptive behavior.

EPE 100 Introduction to Health and Wellness. (3) F, S, SS
Current concepts of health and wellness. Cross-listed as HES 100. Credit is allowed only for EPE 100 or HES 100.

EPE 105 Physical Education Activity. (1) F, S, SS
Beginning instruction in a wide variety of sports such as aerobics, aquatics, racquet sports, physical conditioning, and golf. 3 hours/week. “Y” grade only. May be repeated for credit.

EPE 191 First-Year Seminar. (1–3) F, S

EPE 110 Movement Analysis Laboratory. (1–2) F, S, SS
Practical application of biomechanical, physiological, psychological, and learning principles in the analysis of skill acquisition and performance. May be repeated for credit. Prerequisites: EPE 105 proficiency; ESPE major.

EPE 200 Introduction to Exercise Science and Physical Education. (3) F, S, SS
Introduction to the disciplines and professions associated with ESPE, including an overview of historical and philosophical foundations.

EPE 205 Physical Education Activity. (1) F, S, SS
Intermediate levels. Continuation of EPE 105. 3 hours/week. May be repeated for credit.

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EPE 283 Prevention and Care of Athletic Injuries. (3) F

Taping, injury recognition, emergency care, and observation procedures in athletic training. Prerequisites: BIO 201, 202.

EPE 290 Sports Officiating. (3) F

Rules and mechanics of officiating used in football, basketball, and volleyball.

EPE 292 Sports Officiating. (3) S

Rules and mechanics of officiating used in softball (slow and fast pitch), baseball, and track and field.

EPE 300 Foundations of Exercise and Wellness. (3) F

Analysis of research in various disciplines which contribute to health promotion and wellness. *General Studies: L.*

EPE 301 Fitness for Living. (1) F, S

Application of principles of physical activity to personal fitness testing and program planning for people of all ages. Telecampus course. Not open to Exercise Science and Physical Education majors or to students who have credit for EPE 325.

EPE 305 Physical Education Activity. (1) F, S, SS

Advanced levels. Continuation of EPE 205, with instructor's approval. 3 hours a week. May be repeated.

EPE 310 Collegiate Sports. (1) F, S

Participation in men's or women's intercollegiate competition. May be repeated for 4 credits, 1 per year. "Y/E" grade.

EPE 320 Program Development and Leadership. (3) S

Principles of planning, organizing, promoting, and leading fitness and wellness programs. For majors only.

EPE 325 Fitness for Life. (3) F, S

Physical fitness and benefits of exercise with emphasis on self-evaluation and personalized program planning for a lifetime. Not open to students with credit in EPE 301.

EPE 334 Functional Anatomy and Kinesiology. (3) S

Muscles, bones, joints, and nerves and how they produce movement. Emphasis on muscle origins, insertions, actions, and innervations. Lecture, lab. Prerequisite: BIO 201.

EPE 335 Biomechanics. (3) F, S, SS

Basic anatomical and mechanical principles applied to human movement. Emphasis is placed on kinematic and kinetic concepts. Lecture, recitation, lab. Prerequisites: BIO 201; MAT 117; PHY 111.

EPE 340 Physiology of Exercise. (3) F, S, SS

Physiological mechanisms of acute responses and chronic adaptations to exercise. Lecture, recitation, lab. Prerequisites: BIO 202; CHM 101.

EPE 345 Motor and Developmental Learning. (3) F, S, SS

Principles of motor skill acquisition across the life span, focusing on the learner and the learning environment. Lecture, recitation, lab. Prerequisites: BIO 201; PGS 101.

EPE 348 Psychological Skills for Optimal Performance. (3) F, S, SS

Application of psychological techniques and their use to improve effectiveness and performance in sport and related areas.

EPE 352 Psychosocial Aspects of Physical Activity. (3) F, S, SS

Interrelationships between physical activity and psychosocial variables, including socialization, cultural values, aggression, and motivation. Includes the psychological benefits of physical activity and exercise adherence. Lecture, recitation. Prerequisites: BIO 201; PGS 101.

EPE 361 Physical Education in the Secondary School. (3) F, S

Current trends and theories, such as elective programs, coed classes, legal issues, contract teaching, curriculum, and administration.

EPE 370 Advanced First Aid. (3) N

Assessment, management, treatment of wounds, injuries, shock, poisoning, burns, sudden illness, emergency rescue, and cardiopulmonary resuscitation. Lecture, lab.

EPE 376 Physical Education for the Elementary School. (3) F, S

Scope and values of physical education in the elementary school. Methods, materials, and practice in teaching activities for primary, intermediate, and upper grades.

EPE 382 Physical Education for the Atypical Student. (3) F, S, SS

Teaching individuals with handicapping conditions physical skills and activities. Prerequisites: BIO 201, 202.

EPE 412 Biomechanics of the Skeletal System. (3) F

Biomechanics of tissues, structures, and major joints of the musculoskeletal system. Discussion of injury mechanisms. Lecture, discussion, some labs. Prerequisite: EPE 335 or instructor approval.

EPE 413 Qualitative Analysis in Sport Biomechanics. (3) S

Developing 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) F

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 420 Exercise Testing. (3) F, S, SS

Theoretical basis and practical application of screening, exercise testing, estimates of energy expenditure, and interpretation of results. Lecture, studio. Prerequisite: EPE 340.

EPE 425 Exercise Prescription. (3) S

Theoretical bases for and application of general principles of exercise prescription to various ages, fitness levels, and health states. Prerequisite: EPE 420.

EPE 440 Exercise Biochemistry. (3) F

Study of bioenergetics and metabolism of cellular (skeletal muscle, heart, and liver) organelles and proteins during exercise. Prerequisite: EPE 340.

EPE 441 Physiology of Women in Sport. (3) S

Physiological aspects of women engaging in physical activity. Factors affecting performance and health throughout life are emphasized. Prerequisite: EPE 340. *General Studies: L.*

EPE 442 Physical Activity in Health and Disease. (3) F

The role of physical activity and physical fitness in the development of morbidity and mortality throughout the human life span. Prerequisites: BIO 201, 202; EPE 340. *General Studies: L.*

EPE 443 Exercise Endocrinology. (3) S

Discussions of current research and theory concerning hormonal changes during exercise. Lecture, discussion. Prerequisite: EPE 340 or instructor approval. *General Studies: L.*

EPE 444 Metabolic Adaptations to Exercise Training. (3) F, S, SS

Examination of physiologic adaptations to exercise training as they relate to metabolism and tissue functions. Prerequisite: EPE 340.

EPE 448 Applied Sport Psychology. (3) S

Psychological theories and techniques applied to a sport to enhance the performance and personal growth of athletes and coaches. Lecture, discussion. Prerequisite: EPE 352 or equivalent. *General Studies: L.*

EPE 452 Exercise Psychology. (3) S

Contemporary research and theory as related to human behavior and health in an exercise setting. Prerequisite: EPE 352.

EPE 460 Theory of Strength Training. (3) S

Research and theories on developing muscular strength; programs for developing muscular strength. Lecture, discussion. Prerequisites: EPE 335, 340. *General Studies: L.*

EPE 478 Student Teaching in Secondary Schools. (3–12) F, S

The practice of teaching. The relationship of practice and theory in teaching. Prerequisite: two complete semesters of block or equivalent.

EPE 480 Methods of Teaching Physical Education. (3) F, S

Methods of instruction, organization, and presentation of appropriate content in elementary and secondary physical education. Concurrent with student teaching or instructor approval. Prerequisites: EPE 361, 376.

EPE 484 Internship. (6) N**EPE 485 Advanced Techniques of Athletic Training.** (3) S

An advanced course in athletic training designed for students seeking NATA certification. Emphasis on therapeutic modalities and rehabilitation procedures. Prerequisites: EPE 283, 370; CPR certification.

EPE 500 Research Methods. (3) F

An 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) S

Statistical procedures; sampling techniques; exercise testing, exercise prescription, hypothesis testing, and experimental designs as they relate to research publications.

EPE 505 Applied Exercise Physiology Techniques. (3) F

Investigative techniques used in the applied exercise physiology laboratory. Emphasis on pulmonary function, body composition, and cardiorespiratory assessment. Lecture, lab. Prerequisite: EPE 340.

EPE 510 Introduction to Biomechanics Research Methods. (3) F
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. (4) F
Current research in sport psychology. Includes questionnaire, psychophysiological, and behavioral research techniques. Lecture, discussion. Prerequisites: EPE 448, 500.

EPE 521 Motor Development, Control, and Learning. (4) S
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) S
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) F
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) S
Physiological aspects of women engaging in physical activity. Factors affecting performance and health throughout life are emphasized. Prerequisite: EPE 340.

EPE 534 Sports Conditioning. (3) F
Bases of sports conditioning, including aerobic and anaerobic power, strength, flexibility, and analysis of conditioning components for sports.

EPE 536 Physiology of Physical Activity, Exercise and Chronic Disease. (3) F, S
Role of physiological mechanisms associated with acute and long-term physical exercise and its influence on chronic disease and wellness.

EPE 542 Health Promotions. (3) S
Theory and research concerning fitness and wellness programs in nutrition, physical activity, smoking cessation, and stress management.

EPE 544 Fitness/Wellness Management. (3) F
Development of the fitness/wellness industry. Planning, organizing, promoting, and managing fitness/wellness programs.

EPE 561 Administration of Athletics. (3) N
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) F
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) S
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) F

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) N

Use of systematic, direct observation techniques in analyzing and evaluating instruction in sport and physical education. Lecture, lab.

EPE 575 Teaching Lifetime Fitness. (3) S

Organizing and implementing physical fitness programs in the schools with emphasis on individual problem solving.

EPE 576 Physical Education for Elementary School Children. (3) F

Current practices and research pertaining to elementary school physical education programs.

EPE 578 Student Teaching in Secondary Schools. (6–12) F, S

The practice of teaching. Relationship of theory and practice in teaching. Prerequisite: completion of all required course work or equivalent prior to student teaching.

EPE 599 Thesis. (1–12) N

EPE 610 Advanced Topics in Biomechanics. (3) S

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) S 2001

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) F

Discussion of contemporary research issues in motor learning and control. Includes behavioral and neurophysiological issues. Lecture, discussion. Prerequisite: EPE 521.

EPE 642 Exercise Epidemiology. (3) S

Physical activity, exercise, and physical fitness and the development of chronic disease. Not open to students who have taken EPE 442. Prerequisites: EPE 340, 500, 501.

HEALTH SCIENCE (HES)

HES 100 Introduction to Health and Wellness. (3) F, S, SS

Current concepts of health and wellness. Cross-listed as EPE 100. Credit is allowed for only EPE 100 or HES 100.

Students who satisfactorily complete selected HES 494 courses are eligible to qualify for a certificate of accomplishment from the Centers for Disease Control, U.S. Department of Health and Human Services. See "Omnibus Courses," page 60, for information on 494 and other omnibus courses.

Department of Family Resources and Human Development

Richard Fabes
Chair
(COWDN 106) 480/965-6978
www.asu.edu/clas/frhd

PROFESSORS

CHRISTOPHER, FABES, GRIFFIN, HOOVER, MARTIN,
MERMIS, MORGAN, ROOSA

ASSOCIATE PROFESSORS

BOULIN JOHNSON, DUMKA, WILSON

ASSISTANT PROFESSORS

ESTRADA, FROSCHE, HANISH,
MADDEN-DERDICH, UPDEGRAFF

SENIOR LECTURER

WEIGAND

LECTURER

BODMAN

FAMILY RESOURCES AND HUMAN DEVELOPMENT—B.S.

For the B.S. degree in Family Resources and Human Development at ASU Main, students must pursue the concentration in family studies/child development.

Family Studies/Child Development

The concentration in family studies/child development consists of the following core courses:

CDE 232 Human Development <i>SB</i>	3
CDE 430 Infant/Toddler Development in the Family <i>SB</i>	3
CDE 498 Pro-Seminar	3
or FAS 498 Pro-Seminar (3)	
FAS 331 Marriage and Family Relationships <i>SB</i>	3
FAS 361 Introduction to Family/Child Research Methods <i>L</i>	3
FAS 370 Family Ethnic and Cultural Diversity <i>SB, C</i>	3
FAS 431 Parent-Adolescent Relationships <i>SB</i>	3
FAS 435 Advanced Marriage and Family Relationships <i>L/SB</i>	3
FAS 440 Fundamentals of Marriage and Family Therapy	3
FON 100 Introductory Nutrition	3
Total	30

In addition, 15 hours of electives must be taken, with at least nine hours from the following:

CDE 337 Early Childhood Intervention	3
CDE 338 Child Development Practicum	2-4
CDE 437 Observational and Naturalistic Methods of Studying Children <i>L/SB</i>	3
CDE 444 Children and Poverty	3
CDE 498 Pro-Seminar	3
or FAS 498 Pro-Seminar (3)	
or FAS 499 Individualized Instruction (3)	
FAS 330 Personal Growth in Human Relationships <i>SB</i>	3
FAS 332 Human Sexuality <i>SB</i>	3

FAS 390 Supervised Research Experience	1-3
FAS 432 Family Development	3
FAS 436 Conceptual Frameworks in Family Studies	3
FON 450 Nutrition in the Life Cycle	3
FAS 484 Internship	1-3

The remaining courses are selected in consultation with an advisor.

FAMILY RESOURCES AND HUMAN DEVELOPMENT MINOR

The minor in Family Resources and Human Development consists of 18 semester hours in which students specialize in family studies/child development.

At least 12 of the 18 hours must be in upper-division courses.

Students take the following courses:

CDE 232 Human Development <i>SB</i>	3
CDE 337 Early Childhood Intervention	3
FAS 331 Marriage and Family Relationships <i>SB</i>	3
FAS 440 Fundamentals of Marriage and Family Therapy	3
Total	12

Two courses (or six semester hours) must be selected from the following:

CDE 430 Infant/Toddler Development in the Family <i>SB</i>	3
CDE 444 Children and Poverty	3
FAS 370 Family Ethnic and Cultural Diversity <i>C</i>	3
FAS 431 Parent-Adolescent Relationships <i>SB</i>	3
FAS 498 Pro-Seminar	3

SECONDARY EDUCATION—B.A.E.

Family Resources and Human Development (Home Economics). The major teaching field consists of 42 semester hours in family resources and human development and six hours in interior design. Major courses required are as follows:

CDE 232 Human Development <i>SB</i>	3
CDE 337 Early Childhood Intervention	3
FAS 330 Personal Growth in Human Relationships <i>SB</i>	3
FAS 331 Marriage and Family Relationships <i>SB</i>	3
FAS 431 Parent-Adolescent Relationships <i>SB</i>	3
FON 100 Introductory Nutrition	3
FON 142 Applied Food Principles	3
FRD 451 Field Experience	1-12
HEE 461 Presentations in Home Economics	3
HEE 480 Methods of Teaching Home Economics	3-4
HEE 481 Teaching Occupational Home Economics	3
Total	31-43

Also required are two interior design courses.

The College of Education has additional requirements for teacher certification: Arizona Teacher Proficiency Exam (professional knowledge only); 35 hours within the Professional Teacher Preparation Program; and the following courses:

POS 110 Government and Politics <i>SB</i>	3
or POS 310 American National Government <i>SB</i> (3)	
POS 311 Arizona Constitution and Government	2
or POS 417 The Arizona Political System <i>SB</i> (3)	

Applications to this program are not being accepted at this time.

GRADUATE PROGRAMS

The faculty in the Department of Family Resources and Human Development offer programs leading to the M.S. and Ph.D. degrees. See the *Graduate Catalog* for requirements.

CHILD DEVELOPMENT (CDE)

CDE 232 Human Development. (3) F, S

Lifespan development from conception through adulthood, with emphasis on family influences. Recognition of individuality within the universal pattern of development. Prerequisites: PGS 101; SOC 101. *General Studies: SB.*

CDE 337 Early Childhood Intervention. (3) F

Explores how child development theory affects practice with children and families, emphasizing development of young children and early intervention. Prerequisite: CDE 232 or equivalent.

CDE 338 Child Development Practicum. (2–4) F, S

Supervised practicum in the Child Development Lab preparing students for work in child care centers and agencies serving young children and families. Laboratory. Pre- or corequisite: CDE 337.

CDE 430 Infant/Toddler Development in the Family. (3) F

An examination of the development of infants/toddlers, the socialization processes of families, and the interactions of these processes. Prerequisite: CDE 232 or equivalent. *General Studies: SB.*

CDE 437 Observational and Naturalistic Methods of Studying Children. (3) N

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 of psychology. *General Studies: L/SB.*

CDE 444 Children and Poverty. (3) F

The impact that poverty has on children and their families. 2 hours lecture, 3 hours lab. Prerequisites: CDE 232 (or equivalent); 6 hours of upper-division social science credits.

CDE 498 Pro-Seminar. (3) N**CDE 499 Individualized Instruction.** (3) N**CDE 531 Theoretical Issues in Child Development.** (3) S

Major developmental theories, related research, and their application to family interaction. Prerequisites: CDE 430 and 437 (or equivalent) or instructor approval.

CDE 533 Research Issues in Child Development. (3) S

An 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) S

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) S

Advanced training in research and theory-based approaches to developing and evaluating prevention programs for children at risk. Prerequisite: CDE 534 or instructor approval.

FAMILY STUDIES (FAS)

FAS 301 Introduction to Parenting. (3) F, S

Integrated approach to understanding parenting and parent-child interactions. Television course. Prerequisites: PGS 101; SOC 101 (or equivalent).

FAS 330 Personal Growth in Human Relationships. (3) F, S

Personal development and behavior as related to competency in interpersonal relationships within the family. Processes of family interaction. Prerequisites: PGS 101; SOC 101 (or equivalent). *General Studies: SB.*

FAS 331 Marriage and Family Relationships. (3) F, S

Issues, challenges, and opportunities relating to present-day marriage and family living. Factors influencing interrelations within the family. Prerequisite: course in psychology or sociology. *General Studies: SB.*

FAS 332 Human Sexuality. (3) F, S

Relationship of sexuality to family life and to major societal issues. Emphasis on developing healthy, positive, and responsive ways of integrating sexual and other aspects of human living. Prerequisite: PGS 101. *General Studies: SB.*

FAS 361 Introduction to Family/Child Research Methods. (3) S

Examines basic methods applied to family/child research, critiques current research literature, and applies methods in current topics. Prerequisites: CDE 232; FAS 331. *General Studies: L.*

FAS 370 Family Ethnic and Cultural Diversity. (3) S

An integrative approach to understanding historical and current issues related to the structure and internal dynamics of diverse American families. Prerequisite: PGS 101 or SOC 101. *General Studies: SB, C.*

FAS 390 Supervised Research Experience. (1–3) F, S, SS

Practical, firsthand experience within current faculty research projects in family studies or child development. “Y” grade only; may be repeated for total of 6 hours. Prerequisites: FAS 361; 3.00 GPA in major; approval of supervising faculty member before registration.

FAS 431 Parent-Adolescent Relationships. (3) F

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) N

Normative changes in families over time from formation until dissolution. Emphasis on the marital subsystem in middle and later years. Prerequisites: CDE 232 and FAS 331 or instructor approval.

FAS 435 Advanced Marriage and Family Relationships. (3) F

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) S

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) S

Introduction to the fundamental orientations of marriage and family therapy.

FAS 484 Internship. (1–3) N**FAS 498 Pro-Seminar.** (3) N**FAS 499 Individualized Instruction.** (3) N**FAS 500 Research Methods.** (4) F

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) F

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) S

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) N

A critical review of current theory and empirical evidence connecting marital and family interaction patterns with aberrant behavior. Prerequisite: PGS 466 or PSY 573 (or equivalent) or instructor approval.

FAS 537 Interpersonal Relationships. (3) F

Critical examination of current theoretical and research developments in the area of interpersonal relationships. Applications for research and intervention emphasized. Prerequisite: FAS 435 (or equivalent) or instructor approval.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see “General Studies,” page 87. For graduation requirements, see “University Graduation Requirements,” page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see “Classification of Courses,” page 60.

FAS 538 Advanced Techniques in Marriage and Family Therapy.

(3) N

An 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) F

Critical review of current and past research in the area of family dynamics. Emphasizes interactional processes within the family. Prerequisite: FAS 435 (or equivalent) or instructor approval.

FAS 540 Assessment in Marriage and Family Therapy. (3) S

Instruction in the assessment and outcome evaluation of couples and families involved in marital and family therapy. Lecture, lab. Prerequisites: FAS 500 (or equivalent); PSY 530; instructor approval.

FAS 580 Marriage and Family Therapy Practicum. (3) F, S

Supervised clinical experience in marriage and family therapy; includes development of assessment and outcome evaluation skills. Lecture, lab.

- (a) First semester (3)
- (b) Second semester (3)
- (c) Third semester (3)

Prerequisite: instructor approval.

FAMILY RESOURCES AND HUMAN DEVELOPMENT (FRD)

FRD 451 Field Experience. (1–12) N

Supervised field placement in the area of student's concentration with a community business or agency. Students must make arrangements with instructor 1 semester in advance of enrollment. Prerequisites: completion of 60 hours; instructor approval.

HOME ECONOMICS EDUCATION (HEE)

HEE 461 Presentations in Home Economics. (3) F

Presentation and demonstration techniques in teaching home economics. Development of audiovisual materials for home economics content areas. Prerequisites: junior standing; instructor approval.

HEE 480 Methods of Teaching Home Economics. (3–4) F

Instruction, organization, presentation, and evaluation of subject matter in home economics. HEE students register for 4 semester hours. Dietetic students register for 3 semester hours.

HEE 481 Teaching Occupational Home Economics. (3) S

Career orientation related to home economics, cooperative work-related instruction, programs, and youth club advisement associated with secondary home economics programs. May include field trips. Prerequisite: Family Resources and Human Development major or minor.

Department of Geography

Breandán Ó hUallacháin

Chair

(SCOB 330) 480/965-7533

geography.asu.edu

REGENTS' PROFESSOR

GRAF

PROFESSORS

ARREOLA, BALLING, BRAZEL, BURNS, COMEAUX,
DORN, GOBER, Ó hUALLACHÁIN, PASQUALETTI

ASSOCIATE PROFESSORS

ALDRICH, CERVENY, FALL, KUBY, McHUGH

ASSISTANT PROFESSORS

ELLIS, SIERRA-MALDONADO, WENTZ

LECTURER

HUMBECK

Geography is a discipline that brings together the physical and human dimensions of the world in the study of places, people, and environments. The mission of the Department of Geography is the creation, dissemination, and application of geographic knowledge and scholarship in a liberal arts and sciences tradition.

Undergraduate students may choose to pursue a B.A. degree in Geography, B.S. degree in Geography, B.A.E. degree in Secondary Education, or minor in Geography. A grade of "C" or higher is necessary in all required Department of Geography courses. Both B.A. and B.S. degrees in Geography consist of 45 semester hours. A minor consists of 18 semester hours.

GEOGRAPHY—B.A.

A student choosing a B.A. degree in Geography may be interested in a liberal arts and sciences focus on the breadth of the field. A B.A. degree may also focus on a geographic region. In either case, the student crafts an individualized program of study in consultation with an advisor.

The 45–47 hours for a B.A. degree consist of classes in core geographic knowledge (9–11 semester hours), geographic skills (12 hours), a regional course (three hours), and electives (12 hours), for a minimum of 36 hours in geography. At least 18 hours in geography must be in upper-division courses. The remaining nine hours are made up of electives from geography classes or related fields of study, chosen in consultation with an advisor.

Core Geographic Skills

GCU 495 Quantitative Methods in Geography <i>CS</i>	3
GCU 496 Geographic Research Methods <i>L</i>	3
GPH 371 Cartography <i>CS</i>	3
GPH 491 Geographic Field Methods	3
Choose one spatial analysis course (GCU or GPH 300 or above) in consultation with an advisor	3
Total	15

Geographic Region

Choose one of the courses below, in consultation with an advisor.....	3
GCU 322 Geography of U.S. and Canada <i>SB, C</i> (3)	
GCU 323 Geography of Latin America <i>SB, G</i> (3)	
GCU 325 Geography of Europe <i>SB, G</i> (3)	
GCU 326 Geography of Asia <i>SB, G</i> (3)	
GCU 327 Geography of Africa <i>SB, G</i> (3)	
GCU 328 Geography of Middle East and North Africa <i>SB, G</i> (3)	
GCU 332 Geography of Australia and Oceania <i>SB, G</i> (3)	
GCU 344 Geography of Hispanic Americans <i>SB, C</i> (3)	
GCU 421 Geography of Arizona and Southwestern United States <i>SB, C</i> (3)	
GCU 423 Geography of South America <i>SB, G</i> (3)	
GCU 424 Geography of Mexico and Middle America <i>SB, G</i> (3)	
GCU 425 Geography of the Mexican American Borderland <i>L/SB, G</i> (3)	
GCU 426 Geography of Russia and Surroundings <i>SB, G</i> (3)	
GCU 433 Geography of Southeast Asia (3)	
GPH 433 Alpine and Arctic Environments <i>G</i> (3)	

A student can design, in consultation with an advisor, a general B.A. degree in Geography. In addition, there are three cooperative programs whereby a student receives a B.A. degree in Geography and an emphasis in Asian Studies, Southeast Asian Studies, or Latin American Studies.

Asian and Southeast Asian Emphasis. Students majoring in Geography may elect to pursue an Asian or Southeast Asian emphasis combining courses from the major with selected courses of wholly Asian or Southeast Asian content. The Asian program requires 30 semester hours of Asian content courses, selected from the list drawn up by the Center for Asian Studies. Also required is knowledge of an Asian language; this is deemed to be fulfilled by 20 semester hours or equivalent in Chinese, Indonesian, Japanese, Thai, or Vietnamese. The Certificate in Southeast Asian Studies is awarded to Geography students who emphasize regional studies specialization in Geography and one year of Indonesian, Thai, or Vietnamese. For more information, see “Asian Studies,” page 340, and “Southeast Asian Studies,” page 341.

Latin American Studies Emphasis. Students majoring in Geography may elect to pursue a Latin American studies concentration combining courses from the major with selected outside courses of wholly Latin American content. At least 30 upper-division semester hours of the program must be in Latin American content courses, including 15 hours in geography (or in courses approved by the Department of Geography advisor) and 15 in other disciplines. A reading knowledge of Spanish or Portuguese is required and a reading knowledge of the other language is suggested. The program must be approved by the Latin American Studies Center. See “Latin American Studies,” page 340, for more information.

GEOGRAPHY—B.S.

The 45–47 hours for a B.S. degree consist of classes in core geographic knowledge (9–11 semester hours), core

geographic skills (15 hours), and electives (12 hours)—for a minimum of 36 hours in geography. At least 18 hours in geography must be in upper-division courses. The remaining 9–12 hours are to be made up of electives from geography classes or related fields of study, chosen in consultation with an advisor.

Core Geographic Skills

GCU 495 Quantitative Methods in Geography <i>CS</i>	3
GCU 496 Geographic Research Methods <i>L</i>	3
GPH 371 Cartography <i>CS</i>	3
GPH 491 Geographic Field Methods	3
Choose one spatial analysis course (GCU or GPH 300 or above) in consultation with an advisor.....	3
Total	15

Technique Class

Choose one of the courses below, in consultation with an advisor.....	3
GPH 372 Air Photo Interpretation (3)	
GPH 373 Geographic Information Science (3)	
GPH 471 Cartographic Design (3)	

Students seeking the B.S. degree take the required core of eight courses. The remaining four courses (12 hours) of geography electives and 9–12 hours of geography or related fields of study vary among the options available for a B.S. degree in Geography. There are two specific departmental concentrations: meteorology-climatology and urban studies. In addition, a student can design, in consultation with an advisor, an individualized B.S. degree emphasizing other areas within the major.

Meteorology-Climatology Concentration. See an undergraduate advisor in the Department of Geography for the latest National Weather Service certification requirements. The required courses for the meteorology-climatology concentration include a minimum of 39 semester hours in geography plus eight hours of related mathematics:

Core Courses

GCU 102 Introduction to Human Geography <i>SB</i>	3
GCU 121 World Geography <i>SB, G¹</i>	4
GCU 495 Quantitative Methods in Geography <i>CS</i>	3
GCU 496 Geographic Research Methods <i>L</i>	3
GPH 111 Introduction to Physical Geography <i>SQ</i>	4
or GPH 411 Physical Geography (3)	
GPH 371 Cartography <i>CS</i>	3
GPH 373 Geographic Information Science <i>CS</i>	3
or another three-hour techniques course if GPH 373 is taken to meet a core requirement	
GPH 491 Geographic Field Methods.....	3
Choose one spatial analysis course (GCU or GPH 300 or above) in consultation with an advisor.....	3
Total	28–29

Required Meteorology Courses

GPH 213 Introduction to Meteorology II	3
GPH 215 Introduction to Meteorology Laboratory II.....	1
GPH 409 Synoptic Meteorology I.....	4
GPH 410 Synoptic Meteorology II.....	4

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see “General Studies,” page 87. For graduation requirements, see “University Graduation Requirements,” page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see “Classification of Courses,” page 60.

GPH 412 Physical Climatology	3
or GPH 413 Meteorological Instruments and Measurement (3)	
or GPH 414 Climate Change <i>G</i> (3)	
Total	15

Mathematics and Physics-Related Courses

MAT 270 Calculus with Analytic Geometry I <i>MA</i>	4
MAT 271 Calculus with Analytic Geometry II <i>MA</i>	4
MAT 272 Calculus with Analytic Geometry III <i>MA</i>	4
PHY 121 University Physics I: Mechanics <i>SQ</i> ²	3
PHY 122 University Physics Laboratory I <i>SQ</i> ²	1
PHY 131 University Physics II: Electricity and Magnetism <i>SQ</i> ³	3
PHY 132 University Physics Laboratory II <i>SQ</i> ³	1
Total	20

¹ Three semester hours in transfer courses can also fulfill this requirement.

² Both PHY 121 and 122 must be taken to secure SQ credit.

³ Both PHY 131 and 132 must be taken to secure SQ credit.

Urban Studies Concentration. The required courses for the urban studies concentration are as follows:

Core Courses

GCU 102 Introduction to Human Geography <i>SB</i>	3
GCU 121 World Geography <i>SB, G*</i>	4
GCU 495 Quantitative Methods in Geography <i>CS</i>	3
GCU 496 Geographic Research Methods <i>L</i>	3
GPH 111 Introduction to Physical Geography <i>SQ</i>	4
or GPH 411 Physical Geography (3)	
GPH 371 Cartography <i>CS</i>	3
GPH 373 Geographic Information Science	3
or another three-hour techniques course if GPH 373 is taken to meet a core requirement	
GPH 491 Geographic Field Methods	3
Choose one spatial analysis course (GCU or GPH 300 or above) in consultation with an advisor	3
Total	28–29

Required Urban Geography

Choose one of the courses below	3
GCU 351 Population Geography <i>SB, G</i> (3)	
GCU 357 Social Geography <i>SB</i> (3)	
GCU 364 Energy in the Global Arena <i>SB, G</i> (3)	
GCU 441 Economic Geography <i>SB</i> (3)	
GCU 442 Geographical Analysis of Transportation <i>SB</i> (3)	
One upper-division or graduate-level GCU course chosen in consultation with an advisor (3)	
Choose two of the courses below	6
GCU 359 Cities of the World I <i>SB, G, H</i> (3)	
GCU 360 Cities of the World II <i>SB, G</i> (3)	
GCU 444 Geographic Studies in Urban Transportation <i>SB</i> (3)	
GCU 494 ST: Geography of Phoenix (3)	
GCU 361 Urban Geography <i>SB</i>	3
GCU 484 Internship	3
or one upper-division elective course outside the department in a related field of study chosen in consultation with an advisor (3)	
Urban geography total	15

* Three semester hours in transfer courses can also fulfill this requirement.

SECONDARY EDUCATION—B.A.E.

The Department of Geography, in conjunction with the College of Education, offers courses toward a Bachelor of Arts in Education degree. The B.A.E. degree consists of 45 semester hours, of which a minimum of 30 must be in geography and 15 in a related teaching field or fields. The following courses are required:

GCU 102 Introduction to Human Geography <i>SB</i>	3
GCU 121 World Geography <i>SB, G*</i>	4
GPH 111 Introduction to Physical Geography <i>SQ</i>	4
or GPH 411 Physical Geography (3)	
Total	10–11

* Three semester hours in transfer courses can also fulfill this requirement.

In conjunction with an advisor, students choose remaining credits from three groups of human, physical, and regional courses.

MINOR IN GEOGRAPHY

A minor in Geography is awarded to students who complete a minimum of 18 hours in geography. A letter grade of “C” or higher is required for all courses taken for the minor.

The following lower-division courses are required:

GCU 102 Introduction to Human Geography <i>SB</i>	3
GPH 111 Introduction to Physical Geography <i>SQ</i>	4
or GPH 411 Physical Geography (3)	
Total	6–7

The remaining courses are selected in conjunction with an advisor. At least one course should be a geographic skill, for example, map reading (GPH 271), cartography (GPH 371), air photo interpretation (GPH 372), geographic field methods (GPH 491), or a class in geographic information science (GPH 373). At least four courses should be upper-division classes in human, physical, or regional geography.

CULTURAL GEOGRAPHY (GCU)

GCU 102 Introduction to Human Geography. (3) F, S
Systematic study of human use of the earth. Spatial organization of economic, social, political, and perceptual environments. *General Studies: SB.*

GCU 121 World Geography. (4) F, S
Description and analysis of areal variations in social, economic, and political phenomena in major world regions. *General Studies: SB, G.*

GCU 141 Introduction to Economic Geography. (3) F
Production, distribution, and consumption of various types of commodities of the world and relationships to the activities of humans. *General Studies: SB, G.*

GCU 200 Orientation to Geography. (1) F
Basic introduction to the Department of Geography faculty, undergraduate graduation requirements, and possible jobs and skills in geography. Cross-listed as GPH 200. Credit is allowed for only GCU 200 or GPH 200.

GCU 240 Introduction to Southeast Asia. (3) F
An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as ASB 240/HIS 240/POS 240/REL 240. Credit is allowed for only ASB 240 or GCU 240 or HIS 240 or POS 240 or REL 240. *General Studies: G.*

GCU 253 Introduction to Cultural and Historical Geography. (3) N
Cultural patterns, including such phenomena as language, religion, and various aspects of material culture. Origins and diffusion and division of the world into cultural areas. *General Studies: SB, G.*

GCU 294 Special Topics. (4) A
Topics include global awareness.

- GCU 322 Geography of U.S. and Canada.** (3) F
Spatial distribution of relevant physical, economic, and cultural phenomena in the United States and Canada. *General Studies: SB, C.*
- GCU 323 Geography of Latin America.** (3) F
Spatial distribution of relevant physical, economic, and cultural phenomena in South, Middle, and Caribbean America. *General Studies: SB, G.*
- GCU 325 Geography of Europe.** (3) A
Broad and systematic overview of Europe, emphasizing physical, economic and cultural phenomena. *General Studies: SB, G.*
- GCU 326 Geography of Asia.** (3) F
Spatial distribution of relevant physical, economic, and cultural phenomena in Asia, excluding the former Soviet Union. *General Studies: SB, G.*
- GCU 327 Geography of Africa.** (3) N
Spatial distribution of relevant physical, economic, and cultural phenomena in Africa. *General Studies: SB, G.*
- GCU 328 Geography of Middle East and North Africa.** (3) N
Spatial distribution of relevant physical, economic, and cultural phenomena in the Middle East and North Africa. Prerequisite: GCU 121 or instructor approval. *General Studies: SB, G.*
- GCU 332 Geography of Australia and Oceania.** (3) A
Spatial distribution of relevant physical, economic, and cultural phenomena in Australia, New Zealand, and Pacific Islands. *General Studies: SB, G.*
- GCU 344 Geography of Hispanic Americans.** (3) S
Examines the homelands, migrations, settlements, landscapes, roles, and selected cultural traditions of Hispanic Americans. *General Studies: SB, C.*
- GCU 350 The Geography of World Crises.** (3) F, S
Contemporary world crises viewed from a perspective of geographic concepts and techniques. *General Studies: SB, G.*
- GCU 351 Population Geography.** (3) F
Demographic patterns; spatial, temporal, and structural investigation of the relationship of demographic variables to cultural, economic, and environmental factors. *General Studies: SB, G.*
- GCU 352 Political Geography.** (3) N
Relationship between the sociophysical environment and the state. *General Studies: SB, G.*
- GCU 357 Social Geography.** (3) A
Environmental perception of individuals and groups. The spatial aspect of social and physical environments is stressed. *General Studies: SB.*
- GCU 359 Cities of the World I.** (3) F
Historical evolution of urban patterns and structures in the Middle East, India, Southeast Asia, China, Japan, and Europe. *General Studies: SB, G, H.*
- GCU 360 Cities of the World II.** (3) N
Historical evolution of urban patterns and structures in Latin America, North America, Sub-Saharan Africa, and Australasia. *General Studies: SB, G.*
- GCU 361 Urban Geography.** (3) F, S
External spatial relations of cities, internal city structure, and spatial aspects of urban problems in various parts of the world, particularly in the United States. *General Studies: SB.*
- GCU 364 Energy in the Global Arena.** (3) S
Production, transportation, and consumption of energy, emphasizing the electric power industry and its environmental problems. *General Studies: SB, G.*
- GCU 394 Special Topics.** (1–4) F, S
- GCU 421 Geography of Arizona and Southwestern United States.** (3) F, S
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) S
Prerequisite: GCU 323 or instructor approval. *General Studies: SB, G.*
- GCU 424 Geography of Mexico and Middle America.** (3) A
Central America and Mexico. Prerequisite: GCU 323 or instructor approval. *General Studies: SB, G.*
- GCU 425 Geography of the Mexican American Borderland.** (3) S
Geography of a binational and bicultural region. Examination of settlement, boundary issues, ethnic subregions, population change, industrial development, and urban growth. *General Studies: L/SB, G.*
- GCU 426 Geography of Russia and Surroundings.** (3) N
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) S
Examines the biophysical and social features of Southeast Asian nations and peoples. Prerequisite: GCU 326 or instructor approval.
- GCU 441 Economic Geography.** (3) A
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) S
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) S
Current urban transportation issues in metropolitan Phoenix. Lecture, team project. Prerequisite: GCU 361. *General Studies: SB.*
- GCU 453 Recreational Geography.** (3) N
Examination of problems surrounding the organization and use of space for recreation. Introducing 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) N
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) F
Geographic aspects of federal public lands, policy, management, and issues. Emphasis on western wilderness and resource development problems. *General Studies: SB.*
- GCU 484 Internship.** (3) N
- GCU 494 Special Topics.** (3) N
(a) Geography of Phoenix
- GCU 495 Quantitative Methods in Geography.** (3) F, S
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) F, S
Scientific techniques used in geographic research. Prerequisites: GCU 495; GPH 371, 491. *General Studies: L.*
- GCU 515 Human Migration.** (3) F
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) N
Determination, classification, and analysis of spatial variations in land-use patterns. Examination of the processes affecting land-use change. Prerequisite: 15 hours of geography or instructor approval.
- GCU 529 Contemporary Geographic Thought.** (3) F
Comparative evaluation of current philosophy concerning the nature and trends of geography. Prerequisites: 15 hours of geography; instructor approval.
- GCU 585 Advanced Research Methods in Geography.** (3) S
Specialized research techniques and methodologies in economic, political, or cultural geography.
- GCU 591 Seminar.** (1–3) F, S, SS
Selected topics in economic, political, or cultural geography. Field trips may be required.
- GCU 596 History of Geographic Thought.** (3) F
Historical development of geographic thought from pre-Greek days to the early 20th century.
- GCU 599 Thesis.** (6) N

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

PHYSICAL GEOGRAPHY (GPH)

GPH 111 Introduction to Physical Geography. (4) F, S

Spatial and functional relationships among climates, landforms, soils, water, and plants. 3 hours lecture, 3 hours lab. Field trips are required. *General Studies: SQ.*

GPH 200 Orientation to Geography. (1) F

Basic introduction to the Department of Geography faculty, undergraduate graduation requirements, and possible jobs and skills in geography. Cross-listed as GCU 200. Credit is allowed for only GCU 200 or GPH 200.

GPH 210 Society and Environment. (3) F

Examines the interaction between social processes, key environmental issues and nature's role as a resource at global and regional scales. *General Studies: G.*

GPH 211 Landform Processes. (3) S

Geographic characteristics of landforms and earth-surface processes, emphasizing erosion, transportation, deposition, and implications for human management of the environment. Prerequisite: GPH 111. *General Studies: L.*

GPH 212 Introduction to Meteorology I. (3) F

Fundamentals of weather and climate, including basic atmospheric processes and elements. Students whose curricula require a laboratory course must also register for GPH 214. Prerequisite: GPH 111 or instructor approval. *General Studies: SG (if credit also earned in GPH 214).*

GPH 213 Introduction to Meteorology II. (3) S

Fundamentals of meteorological/climatological analysis, including terminology and symbology. Recommended for meteorology/climatology program students. Prerequisite: GPH 212 or instructor approval.

GPH 214 Introduction to Meteorology Laboratory I. (1) F

Introduction to basic meteorological/climatological data and measurements. 3 hours lab. Suggested concurrent enrollment in GPH 212. *General Studies: SG (if credit also earned in GPH 212).*

GPH 215 Introduction to Meteorology Laboratory II. (1) S

Fundamentals of Meteorological/climatological map analysis and interpretation. Recommended for meteorology/climatology program students. May be taken concurrently with GPH 213. Prerequisite: GPH 214 or instructor approval.

GPH 271 Maps and Map Reading. (3) A

Map types, uses, limitations and evolution. Communication via paper and digital medium. Navigation, interpretation, projections, sources, symbols, classification, case, handling.

GPH 314 Global Change. (3) F

Response of Earth's natural systems (atmosphere, hydrosphere, lithosphere, biosphere) to past environmental change, and effects of potential future changes. *General Studies: G.*

GPH 371 Cartography. (3) F, S

Philosophy and practical aspects of map production; communications, symbolism, data manipulation, presentation, decision making, generalization, linework, lettering, digital media employed. Prerequisite: GPH 111. *General Studies: CS.*

GPH 372 Air Photo Interpretation. (3) S

Subset, remote sensing, includes: photography, films, aerial geometry, image components, stereoscopy, photogrammetry, ground truthing, interpret physical, cultural, economic, intelligence information. Prerequisite: GPH 211 or any Cultural Geography (GCU) course or instructor approval.

GPH 373 Geographic Information Science I. (3) F

History and basic aspects of GIS including map and data file structure, conversions, and synthesis with a computerized environment. Prerequisite: GPH 394 ST: Geographic Information Technologies. *General Studies: CS.*

GPH 381 Geography of Natural Resources. (3) A

Nature and distribution of natural resources and the problems and principles associated with their use. *General Studies: G.*

GPH 394 Special Topics. (3) F, S

- (a) Geographic Information Science
- (b) Geographic Information Technologies

GPH 401 Topics in Physical Geography. (1–3) A

Open to students qualified to pursue independent studies. Field trips may be required. Prerequisite: instructor approval.

GPH 405 Energy and Environment. (3) S

Sources, regulatory and technical controls, distribution, and consequences of the supply and human use of energy. Prerequisite: courses in the physical or life sciences or instructor approval.

GPH 409 Synoptic Meteorology I. (4) F 2001

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) S

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) A

Introduction to physiography and the physical elements of the environment. Open only to students who have not taken GPH 111. Field trips.

GPH 412 Physical Climatology. (3) A

Physical processes in the earth-atmosphere system on regional and global scales; concepts and analysis of energy, momentum, and mass balances. Prerequisites: GPH 212 and 213 or instructor approval.

GPH 413 Meteorological Instruments and Measurement. (3) A

Design and operation of ground-base and aerological weather measurement systems. Collection, reduction, storage, retrieval, and analysis of data. Field trips are required. Prerequisites: GPH 212 and 213 or instructor approval.

GPH 414 Climate Change. (3) S

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) A

Study 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. Prerequisites: GPH 211 (or equivalent); completion of L class. *General Studies: L.*

GPH 422 Plant Geography. (3) N

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. Prerequisite: BIO 182 or GPH 111.

GPH 433 Alpine and Arctic Environments. (3) N

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. Field trips are required. Prerequisite: GPH 111 or instructor approval. *General Studies: G.*

GPH 471 Cartographic Design. (3) F

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) F

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) F

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) S

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) A

Problems of environmental quality, including uses of spatial analysis, research design, and field work in urban and rural systems. Field trips are required. Prerequisite: instructor approval.

GPH 484 Geography Internship. (3) F, S

Assist in teaching sixth-grade students a simplified version of GPH 111 using hands-on activities.

GPH 491 Geographic Field Methods. (3) SS

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. Travel fees required. Prerequisites: GCU 102, 121; GPH 111.

GPH 511 Fluvial Processes. (3) A

Geographical aspects of processes of river erosion, transportation, sedimentation: emphasizing spatial characteristics of forces, resistance, landforms, sediment; includes computer applications. Prerequisites: GPH 111 (or GLG 101) and 211 (or GLG 362) or instructor approval.

GPH 533 Snow and Ice. (3) S

Processes, distribution, climatic interactions of snow/ice emphasizing mass balance, snow stratigraphy/metamorphism and glacier/snow-pack climatology. Lecture, field work. Prerequisite: instructor approval.

GPH 573 Computer Mapping and Graphics. (3) A

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) N

Use of imaging and nonimaging methods of remote acquisition of data, including satellite sensors, airborne radar, multiband scanning, conventional photographic sensors, and ground-based equipment. Field trips are required. Prerequisites: GCU 585 (or GPH 491); GPH 372.

GPH 591 Seminar. (1–3) F, S

Selected topics in physical geography. Field trips may be required.

GPH 596 Advanced Spatial Statistics. (3) S

Multivariate and advanced statistical techniques including Box-Jenkins modeling and spectral analysis. Project papers and presentations required. Seminar. Prerequisite: GCU 495 or equivalent.

GPH 599 Thesis. (6) N

Department of Geology

Simon Peacock

Chair

(PS F686) 480/965-5081

geology.asu.edu

REGENTS' PROFESSORS

BUSECK, GREELEY, MOORE

PROFESSORS

BURT, CHRISTENSEN, FARMER, FINK, HOLLOWAY,
KNAUTH, LARIMER, PEACOCK, REYNOLDS, STUMP,
TYBURCZY, WILLIAMS

ASSISTANT PROFESSORS

ARROWSMITH, GARNERO, LESHIN, O'DAY,
SHARP, TANG

GEOLOGY—B.S.

The B.S. degree in Geology requires 39 semester hours including the following core courses or their equivalents:

GLG 101 Introduction to Geology I (Physical) <i>SQ</i> , ¹ <i>G</i>	3
GLG 102 Introduction to Geology II (Historical) <i>SG</i> , ² <i>H</i>	3
GLG 103 Introduction to Geology I—Laboratory <i>SQ</i> ¹	1
GLG 104 Introduction to Geology II—Laboratory <i>SG</i> ²	1
GLG 310 Structural Geology.....	3
GLG 321 Mineralogy.....	3
GLG 400 Geology Colloquium.....	1
GLG 424 Petrology.....	3
GLG 435 Sedimentology.....	3
GLG 450 Geology Field Camp <i>L</i>	6
Total.....	27

¹ Both GLG 101 and 103 must be taken to secure SQ credit.

² Both GLG 102 and 104 must be taken to secure SG credit.

In addition, two of the following four branch courses must be taken:

GLG 335 Paleontology.....	3
GLG 418 Geophysics.....	3
GLG 470 Hydrogeology.....	3
GLG 481 Geochemistry.....	3

To complete the total required hours, other upper-division courses in geology (excluding GLG 300 and 304) or courses in related fields listed as approved by the department may be taken. See "College Degree Requirements," page 332.

Supporting courses required in related fields include:

CHM 113 General Chemistry <i>SQ</i>	4
CHM 116 General Chemistry <i>SQ</i>	4
MAT 270 Calculus with Analytic Geometry I <i>MA</i>	4
MAT 271 Calculus with Analytic Geometry II <i>MA</i>	4
MAT 272 Calculus with Analytic Geometry III <i>MA</i>	4
or MAT 274 Elementary Differential Equations <i>MA</i> (3)	
PHY 121 University Physics I: Mechanics <i>SQ</i> ¹	3
PHY 122 University Physics Laboratory I <i>SQ</i> ¹	1
PHY 131 University Physics II: Electricity and Magnetism <i>SQ</i> ²	3
PHY 132 University Physics Laboratory II <i>SQ</i> ²	1
Total.....	28

¹ Both PHY 121 and 122 must be taken to secure SQ credit.

² Both PHY 131 and 132 must be taken to secure SQ credit.

MAT 290 Calculus I and MAT 291 Calculus II may be substituted for MAT 270, 271, and 272.

MINOR IN GEOLOGY

A minor in Geology is awarded to students who complete a minimum of 21 hours of geology courses. Required courses are as follows:

GLG 101 Introduction to Geology I (Physical) <i>SQ</i> , ¹ <i>G</i>	3
GLG 102 Introduction to Geology II (Historical) <i>SG</i> , ² <i>H</i>	3
GLG 103 Introduction to Geology I—Laboratory <i>SQ</i> ¹	1
GLG 104 Introduction to Geology II—Laboratory <i>SG</i> ²	1
GLG 310 Structural Geology.....	3
GLG 321 Mineralogy.....	3
GLG 400 Geology Colloquium.....	1
Total.....	15

¹ Both GLG 101 and 103 must be taken to secure SQ credit.

² Both GLG 102 and 104 must be taken to secure SG credit.

The remaining six semester hours may be chosen among other upper-division geology courses, except GLG 300 and 400, after consultation with a departmental advisor.

GRADUATE PROGRAMS

The faculty in the Department of Geology offer programs leading to the degrees of Master of Natural Science, M.S., and Ph.D. See the *Graduate Catalog* for requirements.

GEOLOGY (GLG)

GLG 101 Introduction to Geology I (Physical). (3) F, S, SS
Basic principles of geology, geochemistry, and geophysics. Rocks, minerals, weathering, earthquakes, mountain building, volcanoes, water, and glaciers. Possible weekend field trips. *General Studies: SQ (if credit also earned in GLG 103), G.*

GLG 102 Introduction to Geology II (Historical). (3) S
Basic principles of applied geology and the use of these principles in the interpretation of geologic history. Possible weekend field trips. Prerequisite: GLG 101. *General Studies: SG (if credit also earned in GLG 104), H.*

GLG 103 Introduction to Geology I—Laboratory. (1) F, S, SS
Three hours lab, some field trips. Corequisite: GLG 101. *General Studies: SQ (if credit also earned in GLG 101).*

GLG 104 Introduction to Geology II—Laboratory. (1) S
Laboratory techniques involving map interpretation, cross sections, and fossils. 3 hours lab, possible field trips. Prerequisite: GLG 103 or equivalent. Corequisite: GLG 102. *General Studies: SG (if credit also earned in GLG 102).*

GLG 105 Introduction to Planetary Science. (4) S
Solar system objects and their geologic evolution, surfaces, interiors, and atmospheres; weekly laboratory for data analysis and experiments; weekend field trip. Lecture, lab. *General Studies: SG.*

GLG 110 Environmental Geology. (3) F
Geological studies as they apply to interactions between humans and earth. Includes geological processes and hazards, resources, and global change. *General Studies: SG (if credit also earned in GLG 111), G.*

GLG 111 Environmental Geology Laboratory. (1) F
Basic geological processes and concepts. Emphasis on geology-related environmental problems concerning Arizona. Case histories and field studies. Lab. Corequisite: GLG 110. *General Studies: SG (if credit also earned in GLG 110).*

GLG 294 Special Topics. (1–4) N
(a) Geology of the Planets

GLG 300 Geology of Arizona. (3) A
Basic and historical geology, fossils, mining, energy resources, environmental problems, landscape development, and meteorites, cast in examples from Arizona. Majors who have taken GLG 101 for credit may not enroll.

GLG 304 Geology of the Grand Canyon. (2) N
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 310 Structural Geology. (3) S
Geologic structures and the mechanical processes involved in their formation. 2 hours lecture, 3 hours lab. Possible field trips. Prerequisites: GLG 101; MAT 270 (or 290).

GLG 321 Mineralogy. (3) F
Crystal chemistry, crystallography, mineral identification, origin and occurrence of minerals, systematic mineralogy. 2 hours lecture, 3 hours lab, possible field trips. Prerequisites: CHM 113; MAT 270 (or 290). Pre- or corequisite: CHM 116.

GLG 335 Paleontology. (3) F
Introduction to concepts and analytical techniques in biogeology, paleobiology, paleoecology, and paleoenvironmental reconstruction from the fossil record. 2 hours lecture, 3 hours lab. Prerequisites: GLG 102 and MAT 270 (or 290) or instructor approval.

GLG 336 Invertebrate Paleontology. (3) N
Biology, skeletal morphology, and systematics of fossil invertebrates. One or two projects emphasizing population analysis and techniques in paleontology. Lecture, 6 hours lab, possible field trips. Prerequisite: GLG 102 or instructor approval. Pre- or corequisite for Geology majors: GLG 335.

GLG 362 Geomorphology. (3) N
Land forms and processes which create and modify them. Laboratory and field study of physiographic features. 2 hours lecture, 3 hours lab, possible weekend field trips. Prerequisite: GLG 101. Pre- or corequisite: GLG 310.

GLG 400 Geology Colloquium. (1) F, S
Presentation of recent research by faculty and guests. Written assignments required. 1 semester hour required for Geology majors; may be repeated for a total of 2 semester hours. Prerequisite: 2 courses in the department or instructor approval.

GLG 405 Geology of the Moon. (3) N
Current theories of the origin and evolution of the moon through photogeological analyses and consideration of geochemical and geophysical constraints. Possible weekend field trip. Prerequisite: GLG 105 or instructor approval.

GLG 406 Geology of Mars. (3) N
Geological evolution of Mars through analyses of spacecraft data, theoretical modeling, and study of terrestrial analogs; emphasis on current work. Possible weekend field trip to Northern Arizona. Prerequisite: GLG 105 or instructor approval.

GLG 410 Computers in Geology. (3) F
Geological computer skills including data processing, visualization, presentation, numerical analysis, software and hardware applications. 2 hours lecture, 3 hours lab. Prerequisites: GLG 101 and one upper-division geology course or instructor approval.

GLG 412 Geotectonics. (3) F
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) S
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) F
Solid earth geophysics; geomagnetism, gravity, seismology, heat flow. Emphasis on crust and upper mantle. Prerequisites: GLG 310 and MAT 272 and PHY 131 or instructor approval.

GLG 419 Thermal-Mechanical Processes in the Earth. (3) F
Emphasis on applied mathematical techniques, heat conduction problems in geology, thermal convection, stresses in the lithosphere, and viscoelastic processes in the Earth. Prerequisite: PHY 131.

GLG 420 Volcanology. (3) A
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. Prerequisite: GLG 424.

GLG 424 Petrology. (3) F
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. Prerequisite: GLG 321.

GLG 435 Sedimentology. (3) S
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. Prerequisites: GLG 102, 321.

GLG 441 Ore Deposits. (3) N
Origin, occurrence, structure, and mineralogy of ore deposits. Possible weekend field trips. Prerequisite: GLG 424 or instructor approval.

GLG 450 Geology Field Camp. (6) SS
Geological mapping techniques on aerial photos and topographic maps. Field based with excursions. Prerequisites: GLG 310, 321. *General Studies: L.*

GLG 455 Advanced Field Geology. (3–4) F, S
Geologic mapping in igneous, sedimentary, and metamorphic terrains of the Basin and Range province of Arizona. Weekend field trips. May be repeated for credit. Prerequisite: GLG 450 or instructor approval.

GLG 456 Cordilleran Regional Geology. (3) F
Systematic coverage through space and time of the geological development of western North America, emphasizing the western United States. Prerequisite: senior major or graduate student in Geology or instructor approval.

GLG 470 Hydrogeology. (3) S
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) F
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 484 Geology Internship. (3) F, S
Assist in teaching fifth-grade students a simplified version of GLG 103 using hands-on activities.

GLG 485 Meteorites and Cosmochemistry. (3) N

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) F, S, SS

Special topics in a range of fields in geology. May be repeated for credit. Prerequisite: instructor approval.

GLG 500 Geology Colloquium. (1) F, S

Presentation of recent research by faculty and invited guests. 1 semester required for all geology graduate students. May be repeated for total of 2 semesters. Research paper required. Prerequisite: instructor approval.

GLG 501 Geology of Arizona. (3) A

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) S

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) N

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. Prerequisites: GLG 310 and 424 or instructor approval.

GLG 520 Advanced Physical Volcanology. (2–3) A

Selected volcanologic topics, including explosive eruption processes, lava flow mechanics, and intrusive mechanisms. Field trips possible. Prerequisite: GLG 420 or instructor approval.

GLG 524 Advanced Igneous Petrology. (3) N

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. Prerequisite: GLG 424.

GLG 581 Isotope Geochemistry. (3) N

Geochemistry and cosmochemistry of stable and radioactive isotopes; geochronology; isotope equilibria. Prerequisite: instructor approval.

GLG 582 Physical Geochemistry. (3) N

Application of thermodynamic and kinetic principles to geochemical processes. Prerequisite: CHM 336 (or 341) or GLG 321.

GLG 583 Phase Equilibria and Geochemical Systems. (3) N

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. Prerequisites: GLG 582; instructor approval.

GLG 591 Seminar. (1–3) F, S, SS

Topics in a range of fields in geology. May be repeated for credit. Prerequisite: instructor approval.

GLG 592 Research. (1–12) N**GLG 598 Special Topics.** (1–3) F, S, SS

Special topics in geology. May be repeated for credit.

- (a) Advanced Field Geology
- (b) Clastic Sedimentology and Petrology
- (c) Cordilleran Regional Geology
- (d) Geology of Mars
- (e) Ore Deposits
- (f) Petrology-Petrography
- (g) Principles of Stratigraphy
- (h) Sedimentology
- (i) Volcanology

Prerequisite: instructor approval.

GLG 599 Thesis. (1–12) N**GLG 792 Research.** (1–12) N**GLG 799 Dissertation.** (1–15) N

Department of History

Noel J. Stowe

Chair

(SS 204) 480/965-5778

www.asu.edu/clas/history

CORE FACULTY

Regents' Professor: Iverson;

Professors: Adelson, Batalden, Burg, Davis, Dellheim, Fuchs, Giffin, Gratton, Kleinfeld, Lavrin, Luckingham, Mackinnon, Rosales, Rothschild, Ruiz, Simpson, Stowe, Tambs, Tillman, Trennert, Warrnicke;

Associate Professors: Barnes, Carroll, Gray, Gullett, Hendricks, Kahn, Longley, Rush, Samuelson, L. Smith, R. Smith, Soergel, Stoner, VanderMeer, Warren-Findley;

Assistant Professors: McKee, Ramey, Thompson, Thornton;

Senior Instructional Professional: Luey

AFFILIATED FACULTY**Chicana and Chicano Studies**

Associate Professor: Escobar

Biology

Professor: Pyne

HISTORY—B.A.

The B.A. degree in History consists of 30 semester hours in history and 15 hours in closely related fields, as approved by the undergraduate advisor in consultation with the student. HIS 300 Historical Inquiry and HIS 498 PS: History Pro-Seminar are required for all degree candidates. HIS 300 is a prerequisite for HIS 498. Honors students may substitute HIS 493 Honors Thesis for HIS 498. Courses in related fields may also be used to satisfy university General Studies and college distribution requirements. At least 18 hours in history courses and nine hours in the related fields must be in the upper division. Students are required to take at least six semester hours in each of two different subject areas and at least three hours in a third subject area all within the discipline of history. Subject areas include Asia, Europe, Great Britain, Latin America, and the United States. A minimum GPA of 2.25 in the 30 hours of history courses is required.

Asian Studies Certificate. Students majoring in History may elect to pursue an Asian Studies certificate combining courses from the major with selected outside courses of wholly Asian content. See "Asian Studies," page 340, for more information.

Jewish Studies Certificate. Students majoring in History may elect to pursue the Jewish Studies Certificate combining courses from the major with selected outside courses of

wholly Jewish content. See “Jewish Studies,” page 340, for more information.

Latin American Studies Certificate. Students majoring in History may elect to pursue a Latin American Studies certificate combining courses from the major with selected outside courses of wholly Latin American content. See “Latin American Studies,” page 340, for more information.

Medieval and Renaissance Studies Certificate. Students majoring in History may elect to pursue the Medieval and Renaissance Studies Certificate by successfully completing the requirements. See “Medieval and Renaissance Studies,” page 340, for more information.

Russian and East European Studies Certificate. Students majoring in History may elect to pursue the Russian and East European Studies Certificate combining courses from the major with selected outside courses of wholly Russian and East European content. See “Russian and East European Studies,” page 341, for more information.

Southeast Asian Studies Certificate. Students majoring in History may elect to pursue the Southeast Asian Studies Certificate combining courses from the major with selected outside courses of wholly Southeast Asian content. See “Southeast Asian Studies,” page 341, for more information.

Women’s Studies Certificate. Students majoring in History may elect to pursue a Women’s Studies certificate by successfully completing the requirements. See “Women’s Studies,” page 341, for more information.

MINOR IN HISTORY

The History minor consists of 18 semester hours of course work, at least 12 hours of which are in the upper division.

SECONDARY EDUCATION—B.A.E.

History. The major teaching field consists of 42 semester hours, of which at least 30 must be in history courses. At least 18 must be in upper-division courses. At least 15 must be in U.S. history. The remaining history and related-area courses must be selected in consultation with an advisor from the Department of History. All degree candidates must complete the following four-course methods block:

HIS 300 Historical Inquiry <i>L/SB, H</i>	3
HIS 495 Methods of Teaching History: Classroom Resources	3
HIS 496 Methods of Teaching History: Community Resources	3
HIS 498 PS: History Pro-Seminar <i>L</i>	3

Students should complete HIS 300 before enrolling in HIS 495, 496, and 498. A minimum GPA of 2.50 in history courses is required for admission to student teaching and for graduation. HIS 495 and 496 may not be counted as part of the 42-hour requirement for the academic specialization.

GRADUATE PROGRAMS

The faculty in the Department of History offer programs leading to the M.A. and Ph.D. degrees. A Certificate in Scholarly Publishing is also available. See the *Graduate Catalog* for requirements.

HISTORY (HIS)

- HIS 100 Western Civilization.** (3) F, S
Traces origin and development of Western societies and institutions from the ancient world through the Middle Ages. *General Studies: SB, H.*
- HIS 101 Western Civilization.** (3) F, S
Traces origin and development of Western societies and institutions from the Renaissance and Reformation through Age of Enlightenment. *General Studies: SB, H.*
- HIS 102 Western Civilization.** (3) F, S
Traces origin and development of Western societies and institutions from the French Revolution to the present. *General Studies: SB, G, H.*
- HIS 103 The United States.** (3) F, S
Growth of the Republic from colonial times through the Civil War period. *General Studies: SB, H.*
- HIS 104 The United States.** (3) F, S
Growth of the Republic from the Civil War period to the present day. *General Studies: SB, H.*
- HIS 107 Introduction to Japan.** (3) F
Historical survey of the people, culture, politics, and economy of Japan, supplemented by audiovisual presentations. Intended for non-majors. *General Studies: SB, G, H.*
- HIS 111 Global History Since 1500.** (3) F, S
Survey of Africa, the Americas, and Eurasia; changes in communication, communities, demography, economics, environment, politics, religion, technology, warfare, and women. Lecture, CD-ROM, electronic forum, discussion. *General Studies: G, H.*
- HIS 201 Introduction to Slavic Civilization.** (3) F, S, SS
Development of Slavic cultures and societies from medieval Byzantium to the present; introduction to modern Eurasia. Lecture, discussion, electronic forum. Pre- or corequisite: ENG 101. *General Studies: L/SB, H.*
- HIS 230 American Social History.** (3) N
American society from the colonial period to the present. Ethnicity, race, age, and sex as factors in historical experience. Lecture, discussion. *General Studies: L, H.*
- HIS 240 Introduction to Southeast Asia.** (3) F
An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as ASB 240/GCU 240/POS 240/REL 240. Credit is allowed for only ASB 240 or GCU 240 or HIS 240 or POS 240 or REL 240. *General Studies: G.*
- HIS 270 Judaism in American History.** (3) N
A chronological analysis of Jews and Judaism in American history and letters. *General Studies: SB, H.*
- HIS 273 American Military History.** (3) N
A study of the role of the military in American life during war and peace from colonial times to the present day. 3 hours lecture/conference. *General Studies: SB, H.*
- HIS 294 ST: Selected Topics in History.** (3) N
A full description of topics for any semester is available in the Department of History office. May be repeated for credit.
- HIS 300 Historical Inquiry.** (3) F, S
Historical methods and critical inquiry related to particular events and processes. Topics vary. Required course for majors. Prerequisite for HIS 498. Discussion, seminar, lecture. Prerequisites: ENG 102; History major. *General Studies: L/SB, H.*
- HIS 302 Film as History.** (3) A
Survey of moving image media as recorder, object, and writer of history. *General Studies: HU.*
- HIS 303 American Cultural History.** (3) F, S
Culture in a broad connotation, including ideas, ideals, the arts, and social and economic standards from the nation’s colonial background and early national period. *General Studies: SB, H.*
- HIS 304 American Cultural History.** (3) F, S
Culture in a broad connotation, including ideas, ideals, the arts, and social and economic standards from the age of industrialism and modern America. *General Studies: SB, H.*
- HIS 305 Asian Civilizations.** (3) A
The civilizations of China, Japan, and India to mid-17th century. *General Studies: SB, G, H.*
- HIS 306 Asian Civilizations.** (3) S
The civilizations of China, Japan, and India from the mid-17th century to present. May also include Southeast Asia. *General Studies: SB, G, H.*

HIS 308 Modern Southeast Asia. (3) S

Vietnam, Laos, Cambodia, Thailand, Burma, Malaysia, Singapore, Brunei, Indonesia, and Philippines since 1750: imperialism, revolution, and independence. Lecture, discussion. *General Studies: SB, G, H.*

HIS 309 History of Chinese Science. (3) N

Explores development of traditional Chinese science in the context of Chinese thought and society and in comparison with developments elsewhere. Lecture, discussion. Cross-listed as HPS 325. Credit is allowed for only HIS 309 or HPS 325.

HIS 312 Interpreting China's Classics. (3) N

Study of selected Confucian and/or Taoist classics and ways they have been read in both Asian and Western scholarship. Cross-listed as HUM 312. Credit is allowed for only HIS 312 or HUM 312. *General Studies: L/HU, H.*

HIS 315 Japan in the Age of the Samurai. (3) N

History of the warrior class of Japan, 700–1868.

HIS 320 Ancient Greece. (3) F

History and civilization of the Greek world from the Bronze Age to the Roman conquest of the Hellenistic kingdoms. *General Studies: SB, H.*

HIS 321 Rome. (3) S

History and civilization of Rome from the beginning of the Republic to the end of the Empire. *General Studies: SB, H.*

HIS 322 The Middle Ages. (3) F

Political, socioeconomic, and cultural developments of Western Europe during the Early Middle Ages. Prerequisite: HIS 100 or instructor approval. *General Studies: SB, H.*

HIS 323 The Middle Ages. (3) S

Political, socioeconomic, and cultural developments of Western Europe during the High Middle Ages. Prerequisite: HIS 100 or instructor approval. *General Studies: SB, H.*

HIS 324 Renaissance. (3) F

Antecedents and development of the Renaissance in Italy and its spread to the rest of Europe. *General Studies: L/SB, H.*

HIS 325 Reformation. (3) S

The Protestant and Catholic Reformation in the 16th century. *General Studies: L/SB, H.*

HIS 326 Early Modern Europe. (3) F

Social, economic, cultural, and political changes in 17th-century Europe. *General Studies: SB, H.*

HIS 327 Early Modern Europe. (3) S

Social, economic, cultural, and political changes in 18th-century Europe. *General Studies: SB, H.*

HIS 329 19th-Century Europe. (3) F

Political, social, economic, and intellectual currents in Europe from Napoleon to 1866. *General Studies: SB, H.*

HIS 330 19th-Century Europe. (3) S

Political, social, economic, and intellectual currents in Europe from 1866–1918. *General Studies: SB, H.*

HIS 331 20th-Century Europe. (3) F

Europe in its world setting since World War I, emphasizing major political and social issues. 1914–1945. *General Studies: SB, G, H.*

HIS 332 Europe Since 1945. (3) N

Europe in its world setting since World War II, emphasizing major political and social issues from 1945 to the present. *General Studies: SB, G, H.*

HIS 340 Witchcraft and Heresy in Europe. (3) N

Background, origins, and development at the Inquisition. Analysis of marginal groups and their suppression. Cross-listed as REL 374. Credit is allowed for only HIS 340 or REL 374. Prerequisite: upper-division standing or instructor approval. *General Studies: L, H.*

HIS 341 Sex and Society in Classical and Medieval Europe. (3) F

Family life, sex roles, and marriage, and their relationship to political, economic, and religious change in classical and medieval Europe. Lecture, discussion. Prerequisite: upper-division standing or instructor approval. *General Studies: SB, H.*

HIS 342 Sex and Society in Early Modern Europe. (3) S

Family life, sex roles, and marriage and their relationship to political, economic, and religious change in early modern Europe. Lecture, discussion. Prerequisite: upper-division standing or instructor approval. *General Studies: SB, H.*

HIS 343 Sex and Society in Modern Europe. (3) N

Family life, sex roles, and marriage, and their relationship to political, economic, and social changes in modern Europe. Prerequisite: upper-division standing or instructor approval. Lecture, discussion. *General Studies: L/SB, H.*

HIS 344 Women and Society in Europe. (3) N

Women's role, status, and achievements in Europe, 1750–1950. Changes in everyday life, sex roles, family patterns, work, and culture. *General Studies: L/HU/SB, H.*

HIS 351 England. (3) F

Political, economic, and social development of the English people to the 17th century. *General Studies: SB, H.*

HIS 352 England. (3) S

Political, economic, and social development of the English people from 17th century to the present. *General Studies: SB, H.*

HIS 356 Immigration and Ethnicity in the United States. (3) F, S

Origins, historical development, and future of a multiethnic society, 1492 to 2050. Prerequisite: HIS 103 or 104. *General Studies: SB, C, H.*

HIS 357 19th-Century West. (3) F, S

Social, political, and economic development of trans-Mississippi West beginning with Louisiana Purchase and ending in 1900. *General Studies: SB, H.*

HIS 358 The West in the 20th Century. (3) F, S

Role of the western states in American history since 1890 with emphasis on politics, the environment, industry and labor, and the changing position of ethnic minorities. *General Studies: SB, H.*

HIS 360 American Indian History to 1900. (3) F, S

Cultural, economic, political, and social continuity and change of American Indian communities to 1900. Lecture, discussion. *General Studies: SB, C, H.*

HIS 361 American Indian History Since 1900. (3) F, S

Cultural, economic, political, and social continuity and change of American Indian communities from 1900 to the present. Lecture, discussion. *General Studies: SB, C, H.*

HIS 363 African American History I. (3) F

The African American in American history, thought, and culture from slavery to 1865. Cross-listed as AFS 363. Credit is allowed for only AFS 363 or HIS 363. *General Studies: SB, C, H.*

HIS 364 African American History II. (3) S

The African American in American history, thought, and culture from 1865 to the present. Cross-listed as AFS 364. Credit is allowed for only AFS 364 or HIS 364. *General Studies: SB, C, H.*

HIS 366 The Modern Middle East. (3) N

Impact of the Western world upon Middle Eastern governments, religion, and society in the 19th and 20th centuries; problems of modernization and the role of the Middle East in world affairs. *General Studies: SB, G, H.*

HIS 369 Exploration and Empire. (3) N

An interdisciplinary survey of exploration by Western Civilization over the past 500 years. Lecture, discussion. *General Studies: L, H.*

HIS 370 Women in U.S. History, 1600–1880. (3) F

Examination of American women of diverse racial, religious, ethnic groups, and classes; focus is on changing definitions of women's roles. *General Studies: SB, C, H.*

HIS 371 Women in U.S. History, 1880–1980. (3) F, S

Examination of American women of diverse racial, religious, ethnic groups, and classes; focus is on changing definitions of women's roles. *General Studies: SB, C, H.*

HIS 373 Women in 20th-Century West. (3) A

Examines how women of various cultures have contended for and shaped the American West, including the West of the imagination. Lecture, discussion. *General Studies: C, H.*

HIS 380 History of the Mexican American. (3) N

Role of the Mexican American in U. S. history. *General Studies: SB, C, H.*

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

HIS 381 Quantification in History. (3) N

Quantitative techniques, including political analysis, new economic theory, demography, and social history. Research methods in social science, including design, data collection, and computer skills. Prerequisite: MAT 117 or a course for which MAT 117 is a prerequisite.

HIS 383 Latin America. (3) F, S

Ancient civilization, explorers and conquerors, and colonial institutions. *General Studies: SB, H.*

HIS 384 Latin America. (3) F, S

Nationalistic development of the independent republics since 1825. *General Studies: SB, H.*

HIS 385 Women in Colonial Latin America. (3) F

History of women in colonial Latin America, cross-examining class, race, and gender relations in depth. Lecture, discussion. *General Studies: H.*

HIS 386 Latin American Women: The National Period. (3) S

Surveys the history of women, gender relations, and state policies in a broad continental setting, from independence to the present. Lecture, media, discussion. *General Studies: SB, G, H.*

HIS 394 ST: Selected Topics in History. (3) F, S

A full description of topics for any semester is available in the Department of History office. May be repeated for credit.

HIS 401 American Colonial History. (3) F

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.*

HIS 403 Revolution and Constitution. (3) N

The causes, course, and consequences of the American Revolution culminating in the ratification of the Constitution. Prerequisite: HIS 103 or instructor approval.

HIS 404 The Early Republic, 1789–1850. (3) A

Political, social, economic, and cultural development of the United States from the Revolution to 1850. Prerequisite: HIS 103 or instructor approval. *General Studies: L/SB, H.*

HIS 406 Civil War and Reconstruction. (3) A

Explores the causes, conduct, and consequences of the American Civil War, concentrating on the years 1848 to 1877. Prerequisite: HIS 103 or instructor approval. *General Studies: L/SB, H.*

HIS 407 The Emergence of the Modern United States, 1877 to 1918. (3) A

The triumph of modern political, social, and economic structures and values, 1877–1918; role of region, religion, race, and ethnicity. *General Studies: SB, H.*

HIS 408 The Modern United States, 1918 to 1945. (3) A

1920's boom and the crash, the Depression and the New Deal response. The Second World War at home and abroad. Prerequisite: HIS 104 or equivalent. *General Studies: SB, H.*

HIS 409 The Postwar United States. (3) A

The United States from 1945 to 1973. *General Studies: SB, H.*

HIS 410 The Contemporary United States. (3) A

The United States from 1973 to the present. *General Studies: SB, H.*

HIS 414 The Modern American Economy. (3) N

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 HIS 103 (or 104). *General Studies: SB, H.*

HIS 416 American Diplomatic History. (3) S

American relations with foreign powers from 1898 to the present. Prerequisite: HIS 104 or instructor approval. *General Studies: SB, G, H.*

HIS 417 Constitutional History of the United States. (3) F

Origin and development of the American constitutional system from Colonial origins through Reconstruction. Prerequisite: HIS 103 or instructor approval. *General Studies: SB, H.*

HIS 418 Constitutional History of the United States. (3) S

Origin and development of the American constitutional system, from Reconstruction to the present. Prerequisite: HIS 104 or instructor approval. *General Studies: SB, H.*

HIS 419 American Urban History. (3) F

The history of the city in American life from colonial times to the late 19th century. *General Studies: SB, H.*

HIS 420 American Urban History. (3) S

The history of the city in American life from the 19th century to the present. *General Studies: SB, H.*

HIS 421 History of American Labor. (3) N

American workers, from the colonial period to the present, including farmers, slaves, housewives, the skilled and unskilled, unionized and nonunionized. Prerequisite: HIS 103 (or 104) or MGT 301. *General Studies: SB, H.*

HIS 422 Rebellious Women. (3) F, S

Examination of the roles of rebellious women in history through the study of autobiography, biography, and theory. *General Studies: L/SB, C, H.*

HIS 424 The Hispanic Southwest. (3) N

Development of the Southwest in the Spanish and Mexican periods to 1848. *General Studies: SB, H.*

HIS 425 The American Southwest. (3) F

Development of the Southwest from 1848 to the present. *General Studies: L/SB, H.*

HIS 426 Indian History of the Southwest. (3) F, S

Comprehensive review of historical events from prehistoric peoples, the Spanish and Mexican periods, and the American period after 1846 to the present. Prerequisite: upper-division standing or instructor approval. *General Studies: SB, C, H.*

HIS 428 Arizona. (3) F, S

Emergence of the state from early times to the present. Prerequisite: upper-division standing or instructor approval. *General Studies: SB, H.*

HIS 430 20th-Century Chicano History. (3) S

Historical development of the Chicano community in the 20th century. *General Studies: SB, C, H.*

HIS 431 The French Revolution and the Napoleonic Era. (3) N

Conditions in France before 1789, the Revolutionary decade from 1789 to 1799, the organization of France under Napoleon, and the impact of changes in France on European society. Prerequisite: upper-division standing or instructor approval. *General Studies: SB, H.*

HIS 433 Modern France. (3) N

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.*

HIS 434 Hitler: Man and Legend. (3) F

A biographical approach to the German Third Reich emphasizing nature of Nazi regime, World War II, and historiography. *General Studies: SB, H.*

HIS 435 Modern Germany. (3) S

Germany since 1840. *General Studies: SB, G, H.*

HIS 437 Eastern Europe and the Balkans. (3) N

Peoples and countries of eastern and southeastern Europe in the 19th and 20th centuries from 1800 to 1914, emphasizing the Hapsburg and Ottoman Empires. *General Studies: SB, H.*

HIS 438 Eastern Europe and the Balkans. (3) N

Peoples and countries of eastern and southeastern Europe in the 19th and 20th centuries, emphasizing the successor states from 1914 to the present. *General Studies: SB, G, H.*

HIS 441 The Russian Empire. (3) F

Development of modern Eurasia from the late seventeenth century to 1917, including analysis of Russian society, institutions and cultural traditions. Lecture, discussion. *General Studies: SB, H.*

HIS 442 The Soviet Union. (3) S

An examination of Soviet and post-Soviet politics, economic development, and foreign relations from the 1917 Revolution to the present. *General Studies: SB, G, H.*

HIS 443 Russia and the United States. (3) S

Official and unofficial relations between Russia and the United States, from the late 18th century to the present, emphasizing period following the Bolshevik Revolution. *General Studies: SB, G, H.*

HIS 445 Tudor England. (3) A

Political, social, economic, and cultural developments in 16th-century England. *General Studies: SB, H.*

HIS 446 Stuart England. (3) A

Political, social, economic, and cultural developments in 17th-century England. *General Studies: SB, H.*

HIS 449 Modern Britain. (3) N

Factors contributing to Britain's position as the world's leading power in the 19th century and its decline from that position in the 20th century. *General Studies: SB, G, H.*

- HIS 450 British Constitutional History.** (3) N
Historical development of the constitutional system of Great Britain from the Middle Ages to the present, emphasizing the growth of democracy. *General Studies: SB, H.*
- HIS 451 The British Empire.** (3) A
British imperialism and colonialism in Africa, the Americas, Asia, and the South Pacific. Prerequisite: upper-division standing or instructor approval. *General Studies: SB, H.*
- HIS 455 Intellectual History of Modern Europe.** (3) A
Major developments in European thought from Karl Marx to the present. Prerequisite: upper-division standing or instructor approval. *General Studies: HU, H.*
- HIS 456 History of Spain.** (3) F
Cultural, economic, political, and social development of Spain from earliest days to 1700. *General Studies: HU/SB, H.*
- HIS 457 History of Spain.** (3) S
Cultural, economic, political, and social development of Spain from 1700 to the present. *General Studies: HU/SB, G, H.*
- HIS 460 Spanish South America.** (3) N
Political, economic, and social development of the Spanish-speaking nations of South America since independence. 19th-century developments. *General Studies: SB, H.*
- HIS 461 Spanish South America.** (3) A
Political, economic, and social development of the Spanish-speaking nations of South America. 20th-century developments. *General Studies: SB, H.*
- HIS 463 Intellectual and Cultural History of Latin America.** (3) A
Main currents of thought, the outstanding thinkers, and their impact on 19th- and 20th-century Latin America. Cultural and institutional basis of Latin American life. *General Studies: SB, H.*
- HIS 464 The United States and Latin America.** (3) A
The 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.*
- HIS 466 Mexico.** (3) F
Political, economic, social, and cultural developments from earliest times to 1810. *General Studies: SB, H.*
- HIS 467 Mexico.** (3) S
Political, economic, social, and cultural developments from 1810 to the present. *General Studies: SB, H.*
- HIS 468 Brazil.** (3) N
Discovery, conquest, and settlement by the Portuguese; achievement of independence; rise and fall of the empire; problems and growth of the republic to the present. *General Studies: SB, H.*
- HIS 469 Chinese Thought and Way.** (3) F
China's classics in translation studied both for their intrinsic ideas and for the origins of Chinese thought. *General Studies: SB, H.*
- HIS 470 Chinese Thought and Way.** (3) S
Evolution of Confucian Tao (Way), its synthesis of Taoism and Buddhism, and 20th-century reactions to that Tao. *General Studies: SB, G, H.*
- HIS 471 The United States and Japan.** (3) F
Cultural, political, and economic relations in the 19th and 20th centuries. Emphasis on post-World War II period. *General Studies: SB, G, H.*
- HIS 473 China.** (3) F
Political, economic, social, and cultural history of the Chinese people from early times to the late 17th century. *General Studies: SB, H.*
- HIS 474 China.** (3) S
Political, economic, social, and cultural history of the Chinese people from mid-17th century to the present. *General Studies: SB, G, H.*
- HIS 475 The American Experience in Vietnam, 1945–1975.** (3) F
Intersection of American and Asian histories in Vietnam, viewed from as many sides as possible. *General Studies: SB, G, H.*
- HIS 477 Japan.** (3) F
Political, economic, social, and cultural history of the Japanese people from early times to the 19th century. *General Studies: L/SB, H.*
- HIS 478 Japan.** (3) S
Political, economic, social, and cultural history of the Japanese people from 19th century to the present. *General Studies: SB, G, H.*
- HIS 481 The People's Republic of China.** (3) N
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.*
- HIS 488 History of Fire.** (3) F
A global survey of the natural and cultural history of fire. Lecture, discussion. *General Studies: L, H.*
- HIS 493 Honors Thesis.** (3) N
General Studies: L.
- HIS 495 Methods of Teaching History: Classroom Resources.** (3) F
Methods in instruction, organization, and presentation of the subject matter of history and closely allied fields. Prerequisites: HIS 300; admission to PTPP.
- HIS 496 Methods of Teaching History: Community Resources.** (3) S
Identify community-based resources for teaching history, work with resources, and learn how to integrate them into the secondary classroom. Lecture, lab. Prerequisites: HIS 300; admission to PTPP.
- HIS 498 PS: History Pro-Seminar.** (3) F, S
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: HIS 300; History major. *General Studies: L.*
- HIS 502 Public History Methodology.** (3) F
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.
- HIS 512 Historians of Early Europe.** (3) N
A study of the history of European historical writing from the Greeks to the 18th century.
- HIS 513 Historians of Modern Europe.** (3) N
A study of 19th- and 20th-century European historical writing.
- HIS 514 Historians of the United States.** (3) N
A study of the history of American historical writing from the early colonial days to the 20th century.
- HIS 515 Studies in Historiography.** (3) F, S
Methods and theories of writers of history. May be repeated for credit.
- HIS 525 Historical Resource Management.** (3) F
Identification, documentation, and interpretation of historic period buildings, sites, and districts. Emphasis on interdisciplinary efforts among historians, architects, and anthropologists.
- HIS 526 Historians and Preservation.** (3) S
Preparation of historians for public and private historic preservation programs. Prerequisite: HIS 525 or instructor approval.
- HIS 527 Historical Administration.** (3) F
Preparation of historians in administration of archives, historical sites, historical museums, historical societies, and historical offices in government agencies.
- HIS 532 Community History.** (3) N
Techniques and methods of community history emphasizing local resources. Required for community history option. Seminar.
- HIS 551 Comparative Histories of War and Revolution.** (3) A
A comparative field course of the themes of war and revolution.
- HIS 552 Comparative History of Family and Community.** (3) N
A comparative course with a focus on family, including minority and ethnic groups, in society.
- HIS 553 Comparative History of State and Institutions.** (3) N
A comparative course that explores the changing nature of central institutions and government.
- HIS 554 Comparative Historical Population Studies: Ethnicity, Economy, and Migration.** (3) N
A comparative course that explores the impact of social, cultural, or economic changes in the population.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

HIS 555 Comparative Historical Topics. (3) N

This course analyzes a variety of specific social, political, cultural, and intellectual topics.

HIS 591 Seminar. (3) N

May be repeated for credit.

HIS 592 Research. (1–12) N**HIS 598 Special Topics.** (3) N

Reading courses designed to increase students' familiarity with a particular topic and the important writing concerning it. The following areas may be included:

- (a) Asian History
- (b) English and British History
- (c) European History
- (d) Latin American History
- (e) U.S. History

May be repeated for credit.

HIS 599 Thesis. (1–12) N**SCHOLARLY PUBLISHING (PUB)**

See the *Graduate Catalog* for the PUB courses.

Interdisciplinary Humanities Program

Charles J. Dellheim

Director

(LL 641) 480/965-6747

www.asu.edu/clas/humanities

Humanities

Professors: Dellheim, Kugelmass, Lehman;

Associate Professor: Privateer;

Assistant Professors: Baker, Ballew, Lund, Morales, Romeyn, Taylor, Wright;

Academic Professional: Lynch

Languages And Literatures

Regents' Professor: Foster

The humanities are those learned bodies of knowledge that are used to express ideas, to understand the meaning of words, and to explore the values and beliefs that underlie our culture and the cultures of others. As defined by the U.S. Congress, the humanities include archaeology, comparative religion, ethics, history, jurisprudence, literature, linguistics, philosophy, the history and criticism of the arts, and those aspects of the social sciences that employ a philosophical or historical rather than quantitative approach to knowledge.

HUMANITIES—B.A.

The major in Humanities is interdisciplinary and may be intercollegiate. In consultation with an advisor, the student takes a minimum of 44 semester hours of interdisciplinary humanities courses from two components: (1) an interdisciplinary core of 23 hours and (2) an area of concentration of 21 hours.

Interdisciplinary Core

Issues, Methods, and Theory

HUM 200 Encountering the Humanities *HU*3

HUM 498 Pro-Seminar in the Humanities *L/HU*3

Cultures in Context

HUM 301 Humanities in the Western World *L/HU, H*4

HUM 302 Humanities in the Western World *L/HU, H*4

One approved upper-division HUM course on the cultures and traditions of Latin America, Asia, or Africa3

Ethnicity, Race, and Gender

One approved course3

Art, Science, and Technology

One approved course3

Total23

Area of Concentration

Required courses from list obtained from advisor21

Courses must be selected from an approved list or be approved in advance by the undergraduate advisor. Areas of study include architecture, culture, and society; classical studies; film studies; humanities; humanities and sciences; and liberal arts.

MINOR IN HUMANITIES

The following courses are required for the minor:

HUM 110 Contemporary Issues in the Humanities *HU*3

HUM 301 Humanities in the Western World *L/HU, H*4

HUM 302 Humanities in the Western World *L/HU, H*4

Three approved upper-division HUM courses9

Total20

GRADUATE PROGRAM

The faculty in the program also offer the M.A. degree in Humanities through the Graduate Committee on Humanities. See the *Graduate Catalog* for requirements.

HUMANITIES (HUM)**HUM 110 Contemporary Issues in Humanities.** (3) F, S

Responses of literature, art history, history, philosophy, religion, and other disciplines to common problems affecting modern American life. *General Studies: HU.*

HUM 194 ST: Special Topics in the Humanities. (3) N

Open to all students. Topics include:

- (a) American Fine Arts
- (b) Comparative Fine and Performing Arts
- (c) Cultures of Ethnic Minorities
- (d) Non-Western Cultures
- (e) Western Historical or Contemporary Cultures

HUM 200 Encountering the Humanities. (3) F, S

Introduction to the languages, methods, and objectives of the study of the interdisciplinary humanities. Intersections of ideas, values, and cultural institutions. Lecture, studio, workshop. Prerequisite: Humanities major. *General Studies: HU.*

HUM 260 Introduction to Islam. (3) S

Examination of Islamic beliefs, ceremonies, festivals, and institutions. Course assumes no prior knowledge about Islam. Lecture, discussion. Cross-listed as REL 260. Credit is allowed for only HUM 260 or REL 260.

HUM 294 ST: Special Topics in the Humanities. (3) N

Open to all students. Topics include:

- (a) American Fine Arts
- (b) Comparative Fine and Performing Arts
- (c) Cultures of Ethnic Minorities
- (d) Film and Media Studies
- (e) Non-Western Cultures

HUM 301 Humanities in the Western World. (4) F

Interrelation of arts and ideas in Western Civilization, Hellenic through medieval. 3 hours lecture, 1 discussion meeting per week. *General Studies: L/HU, H.*

HUM 302 Humanities in the Western World. (4) S

Interrelation of arts and ideas in Western Civilization, Renaissance to the present. 3 hours lecture, 1 discussion meeting per week. *General Studies: L/HU, H.*

- HUM 310 Japanese Cities and Cultures to 1800.** (3) S
Relations among ideas and literary, visual, and performing arts of the ancient aristocracy, medieval samurai, and early modern townspeople. Cross-listed as REL 355. Credit is allowed for only HUM 310 or REL 355. *General Studies: L/HU, H.*
- HUM 312 Interpreting China's Classics.** (3) N
Study of select Confucian and/or Taoist classics and ways they have been read in both Asian and Western scholarship. Cross-listed as HIS 312. Credit is allowed for only HIS 312 or HUM 312. *General Studies: L/HU, H.*
- HUM 340 Contemporary American Film and Popular Culture.** (3) F
Study of American film, television, and popular music of past three decades as cultural documents. *General Studies: HU.*
- HUM 371 Origins, Evolution, and Creation.** (3) F
Examines scientific, mythic, and religious ideas relating to origins (particularly human). Place of antievolutionism and "scientific creationism" in American culture. Lecture, discussion. Cross-listed as BIO 344/HPS 311/REL 383. Credit is allowed for only BIO 344 or HPS 311 or HUM 371 or REL 383.
- HUM 372 The Darwinian Revolution.** (3) S
Intellectual and cultural history of Darwinism and modern evolutionary theory and their impact on 19th- and 20th-century thought. Lecture, discussion. Cross-listed as BIO 346/HPS 332. Credit is allowed for only BIO 346 or HPS 332 or HUM 372.
- HUM 394 ST: Special Topics in the Humanities.** (3) N
Open to all students. Topics include:
(a) Art and Politics
(b) Culture and Society of Contemporary China
(c) Immigration and Ethnicity in American Culture
(d) The Holocaust and Social Theory
- HUM 401 The Culture and Legacy of the European Enlightenment.** (3) S
Historical survey of 18th-century European enlightenment and its status within contemporary intellectual culture. Lecture, discussion. *General Studies: HU, H.*
- HUM 420 Interpreting Latin America.** (3) S
Introduction to 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) S
Analysis of 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) S
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 451 Virtual Reality: The Culture of Cyberspace.** (3) A
Socioeconomic, cultural, aesthetic, postmodern, theoretical, and human implications of virtual reality technologies. Themes: cultural ideological productions of cyberspace. Collaborative and research based.
- HUM 460 Postmodern Culture and Interpretation.** (3) N
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) F
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) F
Theories of narrative and narrativity in the humanities, concentrating on the problems of specific disciplines and interdisciplinary solutions. *General Studies: L/HU.*
- HUM 494 ST: Special Topics in the Humanities.** (3) N
Open to all students. Topics include:
(a) American Jewry Through Film and TV
(b) Comedy and Culture
(c) Global Media Studies
(d) Post-Colonial Studies
(e) Uses and Abuses of Classical Antiquity
- HUM 498 Pro-Seminar in the Humanities.** (3) F, S
Methodologies and comparative theories for the study of relationships between various aspects of culture, the history of ideas, and the arts. For students with a major in humanities with upper-division standing. May be repeated for a total of 6 semester hours, when topics vary.
(a) Theory and Culture
General Studies: L/HU.
- HUM 501 Introduction to Cultural Theory.** (3) F
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) F
Systematic training in humanistic research and writing with particular attention to the interdisciplinary study of culture. Seminar.
- HUM 511 Structures of Knowledge.** (3) F
Theories and examples of structures of knowledge, including such topics as metaphor, semiotics, and knowledge of the "other."
- HUM 512 Writing Cultures.** (3) S
Theories and methods of representing Western and non-Western cultures in literature, history, ethnography, and pictorial media.
- HUM 513 Interpretation of Cultures.** (3) A
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) A
An 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.** (3) A
Topics include:
(a) Cultural Productions
(b) Theory and Culture
(c) Tragedy: Meaning and Form
- HUM 598 ST: Special Topics in the Humanities.** (3) N
Open to all students. Topics include:
(a) Comparative Fine and Performing Arts
(b) Cultures of Ethnic Minorities
(c) Film and Media Studies
(d) Non-Western Cultures
(e) Western Historical or Contemporary Cultures

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

Department of Languages and Literatures

David William Foster
Chair
(LL 440) 480/965-6281
www.asu.edu/clas/dll

REGENTS' PROFESSORS

FOSTER, KELLER

PROFESSORS

ALEXANDER, BALDINI, BALLON-AGUIRRE, CHAMBERS,
COUCH, CROFT, CURRAN, EKMANIS, FLYS,
GUNTERMANN, HORWATH, LOSSE, VALDIVIESO, VOLEK,
WETSEL, WIXTED, T. WONG

ASSOCIATE PROFESSORS

COTA-CARDENAS, GARCIA-FERNANDEZ,
W. HENDRICKSON, HERNANDEZ-G., B. LAFFORD,
OSSIPOV, REIMAN, SANCHEZ, SENNER, TOMPKINS,
VITULLO, WILLIAMS

ASSISTANT PROFESSORS

ACEREDA, BURTON, CANDELA, CANOVAS, CHOI,
COLINA, GEORGE, GRUZINSKA, HABERMAN,
REES, REINSHAGEN-JOHO, SCOTT, SUWARNO,
TIPTON, URIOSTE-AZCORRA

LECTURERS

BERNIER, CRISTO, FOARD, S. HENDRICKSON, LAGE,
LIONTAS, McMILLAN, PETERSEN, SONANDRES,
STIFTEL, WALTON-RAMIREZ, E. WONG

INSTRUCTORS

DEAL, KORET, LE, OH, PANG

ASSOCIATE RESEARCH PROFESSIONAL

P. LAFFORD

ASSISTANT RESEARCH PROFESSIONAL

ORLICH

ACADEMIC ASSOCIATE

GLESSNER

BACHELOR OF ARTS DEGREE

The faculty in the Department of Languages and Literatures offer majors in Asian Languages (Chinese/Japanese), French, German, Italian, Russian, and Spanish. Each major consists of 45 semester hours, of which 30 must be in one language and 15 in a second language or in closely related fields to be approved by the advisor in consultation with the student. Of the 30 hours required for the major, a minimum of 24 hours must be taken at the 300 or 400 level and must include at least nine hours at the 400 level. Specific required courses for each major area are shown in this section and in a brochure available in the department. See "College Degree Requirements," page 332.

MAJORS

Asian Languages (Chinese/Japanese)—B.A.

Students majoring in Asian Languages (Chinese/Japanese) may select a course of study that focuses on either language.

Chinese. The major requires 45 semester hours. At least nine semester hours must be at the 400 level. In addition to the courses shown below, the student must meet with an advisor and choose at least 15 semester hours of courses, including six semester hours of JPN courses such as Japanese language and calligraphy, Japanese literature in translation (FLA 421) or KOR prefix courses such as Korean language and/or Korean culture, and nine semester hours from appropriate courses in art, humanities, social and behavioral sciences, and business.

Required

CHI 313	Advanced Chinese <i>G</i>	3
CHI 314	Advanced Chinese <i>G</i>	3
CHI 321	Chinese Literature <i>L/HU</i>	3
CHI 322	Chinese Literature <i>L/HU, G</i>	3
	or FLA 420 Foreign Literature in Translation <i>HU, G</i> (3)	
CHI 413	Introduction to Classical Chinese <i>HU</i>	3
CHI 414	Introduction to Classical Chinese <i>HU</i>	3
Total		18

Electives

Choose six semester hours from the courses below.....		6
CHI 309	Chinese Conversation (2)	
CHI 310	Chinese Conversation (2)	
CHI 311	Chinese Conversation (2)	
CHI 312	Chinese Conversation (2)	
CHI 494	Special Topics (1-4)	
CHI 499	Individualized Instruction (1-3)	
Total		6

Recommended

Two 200-level CHI courses (excluding 205)	6
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Japanese. The major requires 45 semester hours. At least nine semester hours must be taken from FLA 421, and JPN 321 and 414. No more than eight semester hours may be selected from JPN 309, 310, 311, and 312.

Required

FLA 421	Japanese Literature in Translation <i>L/HU, G</i>	3
JPN 313	Advanced Japanese <i>G</i>	3
JPN 314	Advanced Japanese <i>G</i>	3
JPN 321	Japanese Literature <i>L/HU, G</i>	3
JPN 414	Introduction to Classical Japanese	3
Total		15

Electives

Choose nine semester hours from the courses below		9
JPN 309	Intermediate Japanese Conversation (2)	
JPN 310	Intermediate Japanese Conversation (2)	
JPN 311	Japanese Conversation and Composition <i>G</i> (3)	
JPN 312	Japanese Conversation and Composition <i>G</i> (3)	
JPN 321	Japanese Literature (3) <i>L/HU, G</i>	
JPN 394	Special Topics (1-4)	
JPN 435	Advanced Readings (3)	
JPN 485	Problems of Translation (3)	
JPN 494	Special Topics (1-4)	
JPN 499	Individualized Instruction (1-3)	
Total		9



Chicana/Chicano Studies students (from left) Laura Muñoz, Eduardo Corral, Raquel Viguera, and Perlita Dicochea have recently earned prestigious fellowships to various universities.

Tim Trumble photo

Recommended

Two 200-level JPN courses (excluding 206).....6

In addition to the courses, the student must meet with an advisor and choose at least 15 semester hours of courses, including six semester hours of CHI prefix courses such as Chinese language and calligraphy, Chinese literature in translation (CHI 321 and 322 and FLA 420) or KOR prefix courses such as Korean language and/or Korean culture, and appropriate courses in art, humanities, social and behavioral sciences, and business.

French—B.A.

Required

FRE 311 French Conversation *G*3
 FRE 312 French Composition *G*3
 FRE 321 French Literature *L/HU, H*.....3

FRE 322 French Literature *L/HU*.....3
 Two 200-level FRE courses6
 Total18

Select 12 semester hours from the following list, including at least nine semester hours from the 400 level:

FRE 315 French Phonetics3
 FRE 319 Business Correspondence and Communication *G*.....3
 FRE 411 Advanced Spoken French *G*3
 FRE 412 Advanced Written French *G*3
 FRE 415 French Civilization I *HU*3
 FRE 416 French Civilization II *HU, G*3
 FRE 422 Applied French Linguistics.....3
 FRE 423 French Syntax3
 FRE 441 French Literature of the 17th Century *HU*.....3
 FRE 442 French Literature of the 17th Century *HU, H*.....3
 FRE 445 French Literature of the 18th Century *L/HU*3

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

FRE 451	French Poetry of the 19th Century.....	3
FRE 452	French Novel of the 19th Century <i>HU</i>	3
FRE 453	Theater of the 19th Century <i>L/HU</i>	3
FRE 461	Preatomic Literature <i>HU</i>	3
FRE 462	Postatomic Literature <i>HU</i>	3
FRE 471	The Literature of Francophone Africa and the Caribbean <i>L/HU</i>	3
FRE 472	Franco-Canadian Civilization.....	3
FRE 494	Special Topics.....	1-4
FRE 499	Individualized Instruction.....	1-3

In addition to the courses, the student must meet with an advisor and choose at least 15 semester hours of courses from appropriate social and behavioral science, humanities, business courses, and other language courses.

German—B.A.

Required

GER 311	German Conversation <i>G</i>	3
	or GER 312 German Conversation <i>G</i> (3)	
GER 313	German Composition <i>G</i>	3
GER 411	Advanced Grammar and Conversation <i>G</i>	3
GER 412	Advanced Grammar and Composition <i>G</i>	3
GER 421	German Literature <i>HU</i>	3
GER 422	German Literature <i>L/HU</i>	3
Choose six semester hours from the courses below.....		6
GER 303	Scientific German (3)	
GER 304	Scientific German (3)	
GER 314	Introduction to German Literature (3)	
GER 319	Business Correspondence and Communication <i>G</i> (3)	
GER 394	Special Topics (1-4)	
GER 415	German Civilization <i>HU, H</i> (3)	
GER 416	German Civilization <i>HU, H</i> (3)	
GER 445	German Literature: Enlightenment to Classicism (3)	
GER 451	German Literature: Biedermeier to Naturalism (3)	
GER 494	Special Topics (1-4)	
Two 200-level GER courses.....		6
Total.....		30

In addition to the courses, the student must meet with an advisor and choose at least 15 semester hours of courses from appropriate social and behavioral science, humanities, business courses, and other language courses.

Italian—B.A.

Required

ITA 311	Italian Composition and Conversation <i>G</i>	3
ITA 312	Italian Composition and Conversation <i>G</i>	3
ITA 325	Introduction to Italian Literature <i>HU</i>	3
Two 200-level ITA courses.....		6
Total.....		15

Fifteen semester hours are required from the following list, including at least nine semester hours from the 400 level:

ITA 314	Advanced Italian <i>G</i>	3
ITA 394	Special Topics.....	1-4
ITA 415	Italian Civilization <i>L/HU, G</i>	3
ITA 420	Italian Cinema.....	3
ITA 430	Italian Literature of the Middle Ages <i>HU</i>	3
ITA 441	Dante: <i>Divina Commedia L/HU</i>	3
ITA 443	Italian Literature of the Renaissance <i>HU, H</i>	3
ITA 446	Italian Literature of the 18th and 19th Centuries <i>HU</i>	3
ITA 449	20th-Century Italian Literature <i>HU, G</i>	3

ITA 494	Special Topics.....	1-4
ITA 499	Individualized Instruction.....	1-3

In addition to the courses shown above, the student must meet with an advisor and choose at least 15 semester hours of courses from appropriate social and behavioral science, humanities, business courses, and other language courses.

Russian—B.A.

Required

RUS 211	Basic Russian Conversation <i>G</i>	3
RUS 212	Basic Russian Conversation <i>G</i>	3
RUS 311	Russian Composition and Conversation <i>G</i>	3
RUS 312	Russian Composition and Conversation <i>G</i>	3
RUS 411	Advanced Composition and Conversation I <i>G</i>	3
	or RUS 412 Advanced Composition and Conversation II <i>G</i> (3)	
Total.....		15

Fifteen semester hours are required from the following list, including at least six semester hours from the 400 level:

RUS 303	Scientific Russian.....	3
RUS 304	Scientific Russian.....	3
RUS 321	Survey of Russian Literature <i>L/HU, H</i>	3
RUS 322	Survey of Russian Literature <i>L/HU</i>	3
RUS 323	Survey of Literature of the Soviet Era <i>L/HU, G</i>	3
RUS 411	Advanced Composition and Conversation I <i>G</i>	3
RUS 412	Advanced Composition and Conversation II <i>G</i>	3
RUS 417	Applied Russian Phonetics.....	2
RUS 420	Russian Poetry <i>L/HU</i>	3
RUS 421	Pushkin <i>L/HU</i>	3
RUS 423	Dostoyevsky <i>L/HU</i>	3
RUS 424	Tolstoy <i>L/HU</i>	3
RUS 425	Chekhov <i>L/HU</i>	3
RUS 426	Literatures of the Nationalities of the Former Soviet Union <i>L/HU, G</i>	3
RUS 430	Russian Short Story <i>L/HU</i>	3
RUS 440	History of the Russian Language.....	3
RUS 441	Survey of Russian Culture <i>L/HU, G, H</i>	3
RUS 494	Special Topics.....	1-4
RUS 499	Individualized Instruction.....	1-3

In addition to the courses shown above, the student must meet with an advisor and choose at least 15 semester hours of courses from appropriate social and behavioral science, humanities, business courses, and other language courses.

Spanish—B.A.

Required

SPA 313	Spanish Conversation and Composition <i>G</i>	3
	or SPA 315 Spanish Conversation and Composition for Bilinguals (3)	
SPA 314	Spanish Conversation and Composition <i>G</i>	3
	or SPA 316 Spanish Conversation and Composition for Bilinguals (3)	
SPA 325	Introduction to Hispanic Literature <i>HU</i>	3
SPA 412	Advanced Conversation and Composition <i>G</i>	3
SPA 425	Spanish Literature <i>HU</i>	3
Choose two courses below.....		6
SPA 426	Spanish Literature <i>HU</i> (3)	
SPA 427	Spanish American Literature <i>L</i> (3)	
SPA 428	Spanish American Literature <i>L, G</i> (3)	
Choose one course below.....		3
SPA 471	Civilization of the Spanish Southwest <i>HU</i> (3)	
SPA 472	Spanish American Civilization <i>HU, G, H</i> (3)	

SPA 473 Spanish Civilization <i>HU/SB, G</i> (3)	—
Total	24
Electives	
Two upper-division (300–400 level) SPA courses	6
Total	30
Related Fields	
POR 101 Elementary Portuguese	5
POR 201 Intermediate Portuguese <i>G</i>	5
Total	10

In addition to these courses, the student must meet with an advisor and choose at least six semester hours of courses from appropriate social and behavioral science, humanities, business courses, and other romance language courses.

SPA 311 and 312 are not counted toward the major or minor in Spanish.

MINORS

Each minor in Asian Languages (Chinese/Japanese), French, German, Italian, and Russian consists of 18 hours, of which 12 hours must be in the upper division. In addition, specific required courses for each area follow and are in a brochure in the department.

Chinese

CHI 313 Advanced Chinese <i>G</i>	3
CHI 314 Advanced Chinese <i>G</i>	3

Consult with the departmental advisor for other courses.

French

FRE 311 French Conversation <i>G</i>	3
FRE 312 French Composition <i>G</i>	3
FRE 321 French Literature <i>L/HU, H</i>	3
or FRE 322 French Literature <i>L/HU</i> (3)	

Consult with the departmental advisor for other courses. Twelve hours must be at the 300 level or above.

German

GER 311 German Conversation <i>G</i>	3
or GER 312 German Conversation <i>G</i> (3)	
GER 313 German Composition <i>G</i>	3
One 400-level GER course	3
Upper-division GER course	3

Consult with the departmental advisor for other courses.

Italian

ITA 311 Italian Composition and Conversation <i>G</i>	3
or ITA 312 Italian Composition and Conversation <i>G</i> (3)	
ITA 325 Introduction to Italian Literature <i>HU</i>	3
One 400-level ITA course	3

Consult with the departmental advisor for other courses.

Japanese

JPN 313 Advanced Japanese <i>G</i>	3
JPN 314 Advanced Japanese <i>G</i>	3

Consult with the departmental advisor for other courses.

Russian

RUS 303 Scientific Russian	3
RUS 304 Scientific Russian	3
RUS 311 Russian Composition and Conversation <i>G</i>	3
RUS 312 Russian Composition and Conversation <i>G</i>	3

RUS 211 and 212 are the only lower-division courses that may count toward the Russian minor.

Consult with the departmental advisor for other courses.

Spanish

The minor in Spanish requires a minimum of 18 upper-division semester hours. The required courses are as follows:

SPA 313 Spanish Conversation and Composition <i>G</i>	3
or SPA 315 Spanish Conversation and Composition for Bilinguals (3)	
SPA 314 Spanish Conversation and Composition <i>G</i>	3
or SPA 316 Spanish Conversation and Composition for Bilinguals (3)	
SPA 325 Introduction to Hispanic Literature <i>HU</i>	3
SPA 413 Advanced Spanish Grammar <i>G</i>	3
SPA 471 Civilization of Spanish Southwest <i>HU</i>	3
or SPA 472 Spanish-American Civilization <i>HU, G, H</i> (3)	
or SPA 473 Spanish Civilization <i>HU/SB, G</i> (3)	

SPA 311 and 312 are not counted toward the major or minor in Spanish.

CERTIFICATES AND EMPHASES

The following are certificate programs or emphases offered in the Department of Languages and Literatures. For more information, see "Certificate Programs and Areas of Emphasis," page 339.

Asian Studies Certificate. Foreign language students majoring in Asian Languages (Chinese/Japanese) may elect to pursue an Asian Studies certificate combining courses from the major with selected outside courses of wholly Asian content.

Latin American Studies Certificate. Foreign language students majoring in Spanish may elect to pursue a Latin American Studies certificate combining courses from the major with selected outside courses of wholly Latin American content.

Russian and East European Studies. Any undergraduate major can earn a Certificate in Russian and East European Studies by successfully completing one of the options mentioned in the section on "Russian and East European Studies," page 341.

Scandinavian Studies. Any undergraduate major can earn a certificate in Scandinavian Studies.

Southeast Asian Studies Certificate. To earn a certificate in Southeast Asian Studies, a student must complete a minimum of 40 semester hours of course work related to South-

east Asia, including two years (20 semester hours) of a Southeast Asian language.

B.I.S. CONCENTRATION AREAS

Students seeking to focus on a language as one of their concentration areas for the Bachelor of Interdisciplinary Studies degree may choose from Chinese, French, German, Italian, Japanese, Russian, and Spanish. They may also choose from any of the approved certificate programs. The requirements for the Bachelor of Arts in Interdisciplinary Studies (B.I.S.) concentrations are the same for the minor in that language. See “Minors,” page 391, for specific course requirements. For more information, see “Division of Undergraduate Academic Services,” page 114.

SECONDARY EDUCATION—B.A.E.

French, German, Japanese, and Spanish. Each of the major teaching fields in French, German, Japanese, and Spanish consists of 45 semester hours, of which 30 must be in one language and 15 in a second language or in closely related fields to be approved by the advisor in consultation with the student. Of the 30 hours required for the academic specialization, a minimum of 24 hours must be taken at the 300 or 400 level and must include at least nine hours at the 400 level. Specific required courses for each major area are listed in curriculum check sheets of the individual language areas available in the department.

Applications are not being accepted at this time for Chinese and Russian.

GRADUATE PROGRAMS

The faculty in the Department of Languages and Literatures offer programs leading to the M.A. degree in French, German, and Spanish and the Ph.D. degree in Spanish. See the *Graduate Catalog* for requirements.

FOREIGN LANGUAGES FOR INTERNATIONAL PROFESSIONS

The sequence of two semesters, listed under numbers 107 and 207 in two languages (French and Spanish), integrates an accelerated study, a functional approach to course design, and preparation for international professions (e.g., business, diplomacy, international political economy). It is parallel to the traditional sequence of 101 through 202 and also satisfies the college’s foreign language requirement. The sequence differs from traditional basic language programs in that all aspects of the language—vocabulary, grammar, and skill development—are practiced within the context of authentic communication for social and professional purposes in the target culture. Classes meet eight hours weekly, for eight semester hours in each of two semesters.

Students who have had success in learning one foreign language are encouraged to join this program in a second language. Students should contact the Department of Languages and Literatures before registration.

CERTIFICATE PROGRAM IN TRANSLATION

The Certificate Program in Translation is designed to provide the advanced training required for professional translation in both 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 hours of in-service practicum primarily into the receptor language of English from the source language of Spanish. It 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 brochure is available at the Department of Languages and Literatures, 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.

Admission Requirements. Since entrance to professional translation is through work, cultural experience, and examination, the two entrance requirements to this certificate program are (1) written proficiency examination in the source and the receptor languages at the level of completion of the fourth year or most advanced composition course in Spanish, which at ASU is SPA 412, and (2) either an academic year at a university in a Spanish-speaking country, an extensive work experience using Spanish, or demonstrated bilingual facility, both written and oral, in English and Spanish.

Certificate Requirements. The certificate program consists of the following requirements:

Prerequisites

FLA 400 Linguistics <i>SB</i>	3
or SPA 494 ST: Introduction to Hispanic Linguistics (3) or equivalent	
SPA 413 Advanced Spanish Grammar <i>G</i>	3
SPA 494 ST: Lexicography	3

Required

FLA 401 Translation Theory and Practice	3
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In-Service Practicum

FLA 484 Internship	2
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Also required are nine hours of applied translation electives in specialized areas chosen from the following courses:

FLA 481 Technical and Scientific Translation	3
FLA 482 Business and Financial Translation.....	3
FLA 483 Medical and Legal Translation.....	3
FLA 485 Problems of Literary Translation	3

FOREIGN LANGUAGE REQUIREMENT

The College of Liberal Arts and Sciences requires knowledge of one foreign language equivalent to the completion of two years’ study at the college level. This normally includes a sequence of courses numbered 101 and 102 and 201 and 202 *or* 107 and 207. For important exceptions in Greek, Latin, and Portuguese, see the statement at the head of respective course descriptions.

FOREIGN LANGUAGE PLACEMENT

Students who transfer from other postsecondary institutions with foreign language credits below the 202 level are

placed in a course at the level directly above the work completed.

Students who have completed their secondary education at a school in which the language of instruction was not English are considered to have satisfied the foreign language requirement. Certification of this status is made at the time of admission to ASU. Questions should be addressed to the foreign credentials evaluator at Undergraduate Admissions.

The foreign language requirement can be met in languages not taught at ASU either by transferring credit from another institution or by passing a proficiency examination. When possible, the Department of Languages and Literatures recommends to the college an appropriate source for such examinations and proctors them. Grading is done by the institution that provides the examination, and the student pays any costs incurred. The examination can be used only to demonstrate proficiency; it does not produce semester hours of credit.

Students desiring placement above the 101-level course in French, German, or Spanish should take the placement exam for that language in the Computer Language Laboratory, LL 65.

Ordinarily, no placement or proficiency examination is administered to students who wish to continue studying languages for which high school credits have been earned. Students should be guided by the following principles of equivalency: (1) one unit (one academic year) of high school-level study is considered, for placement purposes only, to equal one semester of study of the same language at the university level. Thus, students with one year of high school study would enroll in the second semester course (102); students with two years of high school study, in the third semester course (201), and so on. (2) Students who feel that their high school language preparation was inadequate may choose to place themselves in a lower level, but not lower than 111 with two or three years of high school study and 201 with four years of high school study.

Students with prior knowledge of a language may meet the college foreign language requirement in any one of the following ways:

1. by satisfactory results in a nonrepeatable college-approved proficiency examination;
2. by achieving a grade of at least "C" in the last course of the required sequence; or
3. by achieving a grade of at least "C" in a course at the next higher level.

Students are expected to follow the progressive sequence of 100, 200, and 300. Once a grade of "C" or higher is earned in a 300-level class in a language, students may not earn lower-division credit in that language.

First-year foreign language courses taught by the Department of Languages and Literatures are not open to students who have spent one or more years in a country where that language is the predominant language. Individual language areas may have different policies. Students with questions about this policy should check with the appropriate language coordinator in the department.

If transfer students are uncertain about course equivalencies, they should contact the Department of Languages and Literatures.

LANGUAGE LABORATORY REQUIREMENT

All students enrolled in 101, 102, 201, and 202 language courses are expected to spend a minimum of one hour per week in the language laboratory or in other assigned audio-lingual tape exercises in addition to the regular class periods.

FOREIGN LANGUAGES (FLA)

FLA 150 Introduction to East Asian Culture. (3) S

An introduction to the cultures of China, Japan, and Korea. *General Studies: HU, G.*

FLA 323 Survey of Literature of the Soviet Era in Translation. (3) F, S

Survey main literary movements, prominent authors, most significant works of prose, poetry, and drama of the Soviet period, 1917–1991. *General Studies: L/HU, G.*

FLA 400 Linguistics. (3) S

Introduction to the analysis of language and its use in social contexts. Topics: morphology, phonology, pragmatics, semantics, syntax, and variation. Open to juniors with instructor approval. *General Studies: SB.*

FLA 401 Translation Theory and Practice. (3) N

Translation theories and professional practices and ethics; bibliography, computer technology, and sample texts for natural and social sciences and humanities. Prerequisite: 4th-year composition or instructor approval in respective language area.

FLA 415 Bilingualism and Languages in Contact. (3) F

Analysis of linguistic aspects of bilingualism, e.g., pidgins and creoles, code-switching, and other contact phenomena; simultaneous/sequential bilingual language acquisition. Prerequisite: FLA 400 (or equivalent) or instructor approval.

FLA 420 Foreign Literature in Translation. (3) F, S

Topics may be chosen from the following:

- (a) Brazilian
- (b) Chinese
- (c) French
- (d) German
- (e) Greek
- (f) Italian
- (g) Latin
- (h) Portuguese
- (i) Russian
- (j) Soviet
- (k) Spanish
- (l) Spanish American

Not for language majors (except in Asian languages and Russian); open to language majors as a related-area course. Graduate students by permission. *General Studies: HU, G.*

FLA 421 Japanese Literature in Translation. (3) F, S

Readings selected by theme or genre or period from various works of Japanese literature in English translation. May be repeated as topic changes. Graduate students by permission. Prerequisite: a course that satisfies the L General Studies requirement. *General Studies: L/HU, G.*

FLA 480 Methods of Teaching Foreign Languages. (3) F

Teaching foreign languages and literatures at secondary and college levels. This course does not meet the Liberal Arts and Sciences general studies requirement for humanities and fine arts. Required for admission to SED 478. Prerequisite: 12 hours of upper-division courses in 1 foreign language.

FLA 481 Technical and Scientific Translation. (3) N

Resources, practices, strategies, and lexicon for translation of professional texts in subjects such as engineering, architecture, agriculture, computer technology, electronics, and physical and biological sciences. Prerequisite: FLA 401.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

FLA 482 Business and Financial Translation. (3) N

Resources, practices, strategies, and lexicon for translation of professional texts in subjects such as economics, finance, insurance, management, marketing, accounting, advertising, and real estate. Prerequisite: FLA 401.

FLA 483 Medical and Legal Translation. (3) N

Resources and strategies for translation of professional texts in subjects such as medicine, nursing, public health, criminal justice, and international law. May be repeated for a total of 6 semester hours. Prerequisite: FLA 401.

FLA 484 Internship. (1–12) N**FLA 485 Problems of Literary Translation.** (3) N

Theory and practice with emphasis on application through individual translation projects. May be repeated for a total of 6 semester hours. Prerequisite: FLA 401 or instructor approval in the respective language area.

FLA 494 Special Topics. (3) F

Major trends of Italian cinema from the post-war period to the present.

FLA 515 Second Language Acquisition. (3) S

Discussion and application of theories of second language acquisition. Prerequisite: FLA 400 or equivalent.

FLA 525 Trends and Issues in Foreign Language Teaching. (3) N

Advanced methods seminar, designed for experienced teachers.

ARABIC (ARB)**ARB 101 Elementary Arabic.** (4) F

Reading, writing, speaking, and understanding basic Arabic. 4 hours lecture, 1 hour lab.

ARB 102 Elementary Arabic. (4) S

Reading, writing, speaking, and understanding basic Arabic. 4 hours lecture, 1 hour lab. Prerequisite: ARB 101 or equivalent.

ARB 201 Intermediate Arabic. (4) F

Review of Arabic grammar with emphasis on the development of the skills of listening comprehension, reading, speaking, and writing. 4 hours lecture, 1 hour lab. Prerequisite: ARB 102 or equivalent. *General Studies: G.*

ARB 202 Intermediate Arabic. (4) S

Review of Arabic grammar with emphasis on the development of the skills of listening comprehension, reading, speaking, and writing. 4 hours lecture, 1 hour lab. Prerequisite: ARB 201 or equivalent. *General Studies: G.*

CHINESE (CHI)**CHI 101 Elementary Chinese.** (5) F

Pronunciation, grammar, elementary conversation, and development of basic reading and writing skills. Standard dialect. 5 class hours.

CHI 102 Elementary Chinese. (5) S

See CHI 101. Prerequisite: CHI 101 or equivalent.

CHI 107 Chinese for International Professions I. (10) F

Accelerated program alternative to CHI 101, 102 sequence. Functional approach to needs of international professions. 10 class hours.

CHI 201 Intermediate Chinese. (5) F

Systematic review of grammar. Development of vocabulary through reading and writing. Drill in aural/oral skills. 5 class hours. Prerequisite: CHI 102 or equivalent. *General Studies: G.*

CHI 202 Intermediate Chinese. (5) S

See CHI 201. Prerequisite: CHI 201 or equivalent. *General Studies: G.*

CHI 205 Chinese Calligraphy. (1) F, S

An introduction to styles and techniques of Chinese writing. Knowledge of Chinese or Japanese is not required.

CHI 207 Chinese for International Professions II. (10) S

Continuation of CHI 107, alternative to CHI 201, 202 sequence. Expansion of communicative proficiency in specific areas of international professions. 10 class hours. Prerequisite: CHI 107 or instructor approval. *General Studies: G.*

CHI 309 Chinese Conversation. (2) F

Aural/oral drills using contemporary stories, articles, and essays. For students with lower-level proficiency. Prerequisite: CHI 202.

CHI 310 Chinese Conversation. (2) S

See CHI 309. Prerequisite: CHI 202.

CHI 311 Chinese Conversation. (2) F

Intensive aural/oral practice in Modern Chinese. For students who have lived in China or a Chinese-speaking environment. Discussion, drill. Prerequisite: CHI 202.

CHI 312 Chinese Conversation. (2) S

See CHI 311. Discussion, drill. Prerequisite: CHI 202.

CHI 313 Advanced Chinese. (3) F

The modern language in general or specific areas depending on the student's needs or interests. 3 hours lecture, arranged lab. Prerequisite: CHI 202 or equivalent. *General Studies: G.*

CHI 314 Advanced Chinese. (3) S

Continuation of CHI 313. Prerequisite: CHI 313. *General Studies: G.*

CHI 321 Chinese Literature. (3) F

Masterworks of the tradition from the 6th century B.C.E. through the 13th century. Readings, lectures, and examinations are in English. *General Studies: L/HU.*

CHI 322 Chinese Literature. (3) S

Masterpieces from the later tradition and its transition to modern times. Readings, lectures, and examinations are in English. *General Studies: L/HU, G.*

CHI 413 Introduction to Classical Chinese. (3) F

Reading in various genres of pre-20th century literature (wen-yen), with analysis of the structure of the classical writings. Prerequisite: CHI 314 or instructor approval. *General Studies: HU.*

CHI 414 Introduction to Classical Chinese. (3) S

Continuation of CHI 413. Prerequisite: CHI 413. *General Studies: HU.*

CHI 494 Special Topics. (1–4) N**CHI 499 Individualized Instruction.** (1–3) N**CHI 500 Bibliography and Research Methods.** (3) N

Introduction to research materials on China in Chinese, Japanese, and Western languages. Overview of research methods. Lecture, discussion.

CHI 514 Advanced Classical Chinese. (3) N

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) N

Theory and practice of teaching Chinese, including presentation, interaction, and evaluation, with consideration given to cultural factors. Lecture, discussion.

CHI 535 Advanced Readings. (3) N

Readings in primary and secondary sources in history, art, religious studies, economics, or other fields. Lecture, discussion.

CHI 543 Chinese Language and Linguistics. (3) F

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) N

Theories and practice of translation: strategies for handling a variety of Chinese texts. Lecture, discussion.

CHI 591 Seminar. (3) N

Topics in literary, linguistic, or cultural studies.

FRENCH (FRE)**FRE 101 Elementary French.** (4) F, S, SS

Intensive aural/oral drill in class and laboratory; basic grammar supplemented by simple prose readings. 4 hours lecture, 1 hour lab. Not open to students with credit in FRE 111.

FRE 102 Elementary French. (4) F, S, SS

See FRE 101. Prerequisite: FRE 101 or equivalent.

FRE 107 French for International Professions I. (8) F

Accelerated alternative to FRE 101, 102. Functional approach. Emphasis on speaking, understanding, writing, and reading for communicative competence for international professions.

FRE 111 Fundamentals of French. (4) F, S

Primarily for students with two years of high school French who need review to enter second year study. Not open to students with credit in FRE 101 or 102. 4 hours lecture, 1 hour lab.

FRE 201 Intermediate French I. (4) F, S, SS

Grammar review, with emphasis on development of skills of speaking, reading, writing, and listening comprehension. 4 hours lecture; 1 hour lab. Prerequisite: FRE 102 or 111 or equivalent. *General Studies: G.*

- FRE 202 Intermediate French II.** (4) F, S, SS
Continuation of grammar review with emphasis on development of skills in speaking, reading, writing, and listening comprehension. 4 hours lecture, 1 hour lab. Prerequisite: FRE 201 or equivalent. *General Studies: G.*
- FRE 205 Readings in French Literature.** (3) F, S, SS
Designed to teach reading with facility and comprehension. Vocabulary building and textual analysis of literary genres are major elements. Prerequisite: FRE 202 or equivalent. *General Studies: G.*
- FRE 207 French for International Professions II.** (8) S
Continuation of FRE 107, alternative to FRE 201, 202 sequence. Expansion of communicative proficiency in specific areas of international professions. Prerequisite: FRE 107 or instructor approval. *General Studies: G.*
- FRE 311 French Conversation.** (3) F, S
Further practice in speaking French, emphasizing current usage and promoting facility in the expression of ideas. Prerequisite: 8 hours of 200-level French or equivalent. *General Studies: G.*
- FRE 312 French Composition.** (3) F, S
Further practice in writing French, emphasizing current usage and promoting facility in the expression of ideas. Prerequisite: 8 hours of 200-level French or equivalent. *General Studies: G.*
- FRE 315 French Phonetics.** (3) F
Practice and theory of French pronunciation. Emphasis is on standard French, although an overview of regional varieties is offered. Lecture and lab. Prerequisite: FRE 311 or equivalent.
- FRE 319 Business Correspondence and Communication.** (3) S
Organization and presentation of clear, effective business communications; vocabulary applicable to modern business usage. Prerequisite: FRE 312 or instructor approval. *General Studies: G.*
- FRE 321 French Literature.** (3) F, S
Representative masterpieces and significant movements of French literature of the middle ages through the 18th century. Prerequisite: FRE 205 or equivalent. *General Studies: L/HU, H.*
- FRE 322 French Literature.** (3) F, S
Literature of the 19th and 20th centuries. Prerequisite: FRE 205 or equivalent. *General Studies: L/HU.*
- FRE 411 Advanced Spoken French.** (3) F, S
Improvement of spoken French. Prerequisites: 9 hours of 300-level French, including FRE 311 or equivalents. *General Studies: G.*
- FRE 412 Advanced Written French.** (3) F, S
Improvement of composition skills. Prerequisites: 9 hours of 300-level French, including FRE 312 or equivalents. *General Studies: G.*
- FRE 415 French Civilization I.** (3) F
Political, intellectual, social, economic, and artistic development of France from its origins to the end of the 17th century. Prerequisite: 6 hours of upper-division French. *General Studies: HU.*
- FRE 416 French Civilization II.** (3) S
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) F
Phonology, morphology, syntax, semantics, and varieties of French. Prerequisites: FRE 311 and 312 or instructor approval.
- FRE 422 Applied French Linguistics.** (3) S
Application of 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) F
The analysis of French syntactic structure by contemporary theoretical models. Prerequisite: ASB 480 or ENG 213 or FLA 400.
- FRE 424 French Phonology.** (3) S
Introduction to phonological theory and its application to French. Prerequisites: FRE 311 and 312 or instructor approval.
- FRE 441 French Literature of the 17th Century.** (3) N
From 1600 to 1660. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General Studies: HU.*
- FRE 442 French Literature of the 17th Century.** (3) N
From 1660 to 1700. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General Studies: HU, H.*
- FRE 445 French Literature of the 18th Century.** (3) N
Contributions of the philosophers and the development of the novel and drama. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General Studies: L/HU.*
- FRE 451 French Poetry of the 19th Century.** (3) N
From Romanticism to Parnassian poetry to Symbolism. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval.
- FRE 452 French Novel of the 19th Century.** (3) N
From Constant, Hugo, Balzac, Stendhal, and Sand to Flaubert and Zola, with emphasis on major literary movements. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General Studies: HU.*
- FRE 453 Theater of the 19th Century.** (3) N
From Romantic drama to the Symbolist Theater. Representative plays of Hugo, Musset, Vigny, Dumas, Becque, Rostand, Feydeau, and Mirbeau. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General Studies: L/HU.*
- FRE 461 Preatomic Literature.** (3) F
Representative authors from Proust and Malraux to Sartre from 1900 to 1945. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General Studies: HU.*
- FRE 462 Postatomic Literature.** (3) S
Representative authors including Camus, Duras, and Robbe-Grillet from 1945 to present. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General Studies: HU.*
- FRE 471 The Literature of Francophone Africa and the Caribbean.** (3) N
Selected prose, poetry, and drama of black authors from Africa and the Caribbean. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General Studies: L/HU.*
- FRE 472 Franco-Canadian Civilization.** (3) S
A 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 494 Special Topics.** (1–4) N
- FRE 499 Individualized Instruction.** (1–3) N
- FRE 500 Bibliography and Research Methods.** (3) F
Required of all graduate students.
- FRE 510 Explication de Textes.** (3) N
Detailed analysis of literary texts.
- FRE 515 Intellectual Currents in France, from the Middle Ages to the 18th Century.** (3) N
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) N
See FRE 515.
- FRE 521 History of the French Language.** (3) N
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) F
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) S
Readings in French Renaissance literature with special attention to the humanist movement and to Rabelais, Montaigne, and the Pleiade.
- FRE 591 Seminar.** (3) N
Topics may be selected from the following:
(a) Advanced Problems in French Literature
(b) Balzac
(c) Corneille, Molière, and Racine
(d) Diderot, Voltaire, and Rousseau
(e) Flaubert
(f) French Existentialist Literature
(g) French Literary Criticism
(h) Proust
(i) Realism and Naturalism
(j) Romanticism
(k) Stendhal and Zola

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

GERMAN (GER)

- GER 101 Elementary German.** (4) F, S, SS
Reading, writing, speaking, and understanding of basic German, with emphasis on pronunciation and grammar. 4 hours lecture, 1 hour lab. Not open to students with credit in GER 111.
- GER 102 Elementary German.** (4) F, S, SS
See GER 101. Prerequisite: GER 101 or equivalent.
- GER 111 Fundamentals of German.** (4) F, S
Primarily for students with two years of high school German who need review to enter second-year study. 4 hours lecture, 1 hour lab. Not open to students with credit in GER 101 or 102.
- GER 201 Intermediate German.** (4) F, S, SS
Intensive review of grammar, with emphasis on the development of the skills of speaking, listening comprehension, reading, and writing. 4 hours lecture, 1 hour lab. Prerequisite: GER 102 or 111 or equivalent. *General Studies: G.*
- GER 202 Intermediate German.** (4) F, S, SS
See GER 201. Prerequisite: GER 201 or equivalent. *General Studies: G.*
- GER 303 Scientific German.** (3) N
Acquisition of a specialized vocabulary through the reading of German scientific publications. Prerequisite: GER 202 or equivalent.
- GER 304 Scientific German.** (3) N
See GER 303. Prerequisite: GER 202 or equivalent.
- GER 311 German Conversation.** (3) F
Expansion of idiom through oral practice dealing with contemporary articles, essays, and stories. 3 semester hours limit for majors. Prerequisite: GER 202 or equivalent. *General Studies: G.*
- GER 312 German Conversation.** (3) S
See GER 311. Prerequisite: GER 202 or equivalent. *General Studies: G.*
- GER 313 German Composition.** (3) S
Intensive practice in writing, emphasizing style, and grammar. Prerequisite: GER 202 or equivalent. *General Studies: G.*
- GER 314 Introduction to German Literature.** (3) F
Beginning study of German poetry, drama, the novel, and the *Novelle*. Prerequisite: GER 202 or equivalent.
- GER 319 Business Correspondence and Communication.** (3) N
Organization and presentation of clear, effective business communications; vocabulary applicable to modern business usage. Prerequisite: GER 313 or instructor approval. *General Studies: G.*
- GER 394 Special Topics.** (1–4) N
- GER 411 Advanced Grammar and Conversation.** (3) F
Improvement of diction and idiom through intensive oral review. Prerequisite: GER 311 or 312 or equivalent. *General Studies: G.*
- GER 412 Advanced Grammar and Composition.** (3) S
Improvement of writing ability. Prerequisite: GER 313 or equivalent. *General Studies: G.*
- GER 415 German Civilization.** (3) S
Aspects of political, social, and cultural life of the German-speaking world from the beginning through 1600. Prerequisite: any 300-level course in German or instructor approval. *General Studies: HU, H.*
- GER 416 German Civilization.** (3) F
From 1600 through 1945. Prerequisite: any 300-level course in German or instructor approval. *General Studies: HU, H.*
- GER 421 German Literature.** (3) F
From the beginning to classicism. Prerequisite: 6 hours of 300-level German. *General Studies: HU.*
- GER 422 German Literature.** (3) S
From Romanticism to the present. Prerequisite: 6 hours of 300-level German. *General Studies: L/HU.*
- GER 445 German Literature: Enlightenment to Classicism.** (3) N
Major works of the literary epochs in the century. Prerequisite: GER 421 or instructor approval.
- GER 451 German Literature: Biedermeier to Naturalism.** (3) N
Representative works of prose and poetry from 1820 to 1890. Prerequisite: GER 422 or instructor approval.
- GER 453 German Literary Masterpieces on Film.** (3) F, S, SS
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 461 Contemporary German Literature.** (3) S, SS
German writers since 1945. Prerequisite: GER 422 or instructor approval.
- GER 494 Special Topics.** (1–4) N
- GER 500 Bibliography and Research Methods.** (3) N
Required of all graduate students.
- GER 511 German Stylistics.** (3) N
Art of writing literary German, comparative stylistics.
- GER 521 History of German Language.** (3) N
Linguistic development of German from the earliest records to the present.
- GER 523 German Drama.** (3) N
Drama of the 19th and 20th centuries.
- GER 525 German Novel.** (3) N
Special studies in the German novel.
- GER 527 The *Novelle*.** (3) N
Special studies in the German short story.
- GER 531 Middle High German Language and Literature.** (3) N
Reading and discussion of specimens of the Middle High German epics, romances, and other literary genres.
- GER 551 Romanticism.** (3) N
Treatment of early and late Romanticism.
- GER 555 Modern German Literature.** (3) N
Major works from the period of Expressionism to 1945.
- GER 591 Seminar.** (3) N
Special topics are concerned with a figure, theme, or work in German literature or Germanic studies. Topics may be selected from the following:
- Faust
 - Germanic Studies
 - Goethe
 - Grass and Böll
 - Hesse
 - Kafka
 - Kleist
 - Schiller

ANCIENT GREEK (GRK)

- To satisfy the foreign language requirement, students must take GRK 301 and 302.*
- GRK 101 Elementary Ancient Greek.** (4) F
Ancient Greek grammar and vocabulary with an emphasis on developing reading skills. For beginning students only.
- GRK 201 Intermediate Ancient Greek.** (4) S
Continuation of GRK 101. Increased emphasis on reading texts adapted from Aristophanes, Demosthenes, and Plato. Prerequisite: GRK 101 or instructor approval.
- GRK 301 Ancient Greek Literature.** (3) F
Readings in the masterpieces of ancient Greek literature; advanced grammar. Authors read are changed each year in accordance with needs of the class. May be repeated for credit. Prerequisite: GRK 201 or instructor approval. *General Studies: HU.*
- GRK 302 Ancient Greek Literature.** (3) S
Continuation of GRK 301. Prerequisite: GRK 201 or instructor approval. *General Studies: HU.*

HEBREW (HEB)

- HEB 101 Elementary Modern Hebrew.** (4) F
Reading, writing, speaking, and understanding of basic modern Hebrew, with emphasis on pronunciation and grammar. 4 hours lecture, 1 hour lab.
- HEB 102 Elementary Modern Hebrew.** (4) S
Reading, writing, speaking, and understanding of basic modern Hebrew, with emphasis on pronunciation and grammar. 4 hours lecture, 1 hour lab. Prerequisite: HEB 101 or equivalent.
- HEB 201 Intermediate Modern Hebrew.** (4) F
Intensive review of grammar, with emphasis on the development of the skills of speaking, listening comprehension, reading, and writing. 4 hours lecture, 1 hour lab. Prerequisite: HEB 102 or equivalent. *General Studies: G.*

HEB 202 Intermediate Modern Hebrew. (4) S

Intensive review of grammar, with emphasis on the development of the skills of speaking, listening comprehension, reading, and writing. 4 hours lecture, 1 hour lab. Prerequisite: HEB 201 or equivalent. *General Studies: G.*

HEB 313 Advanced Modern Hebrew. (4) F

Continued development of ability to communicate orally and in writing. Reading of selected literary works. Prerequisite: HEB 202 or equivalent.

HEB 314 Advanced Modern Hebrew. (4) S

Continued development of ability to communicate orally and in writing. Reading of selected literary works. Prerequisite: HEB 313 or equivalent.

HEB 375 Contemporary Culture of Israel. (3) F, S

Intense study of aspects of historical, social, political, and cultural modern life in Israel. Beginning of Zionism to present day. Lecture, discussion. *General Studies: HU, G.*

INDONESIAN (IDN)**IDN 101 Elementary Indonesian I.** (5) F

Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose reading. 4 hours lecture, 1 hour lab.

IDN 102 Elementary Indonesian II. (5) S

Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose reading. 4 hours lecture, 1 hour lab. Prerequisite: IDN 101 or equivalent.

IDN 201 Intermediate Indonesian I. (5) F

Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: IDN 102 or equivalent. *General Studies: G.*

IDN 202 Intermediate Indonesian II. (5) S

Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: IDN 201 or equivalent. *General Studies: G.*

ITALIAN (ITA)**ITA 101 Elementary Italian.** (4) F, S

Aural/oral drill in class and laboratory, and basic grammar supplemented by simple prose readings. 4 hours lecture, 1 hour lab.

ITA 102 Elementary Italian. (4) F, S

See ITA 101. Prerequisite: ITA 101 or equivalent.

ITA 201 Intermediate Italian. (4) F, S

Intensive review of the fundamentals of Italian grammatical structure to increase the student's ability in composition, translation, and idiomatic expression. 4 hours lecture, 1 hour lab. Prerequisite: ITA 102 or equivalent. *General Studies: G.*

ITA 202 Intermediate Italian. (4) F, S

See ITA 201. Prerequisite: ITA 201 or equivalent. *General Studies: G.*

ITA 311 Italian Composition and Conversation. (3) F, S

Development of writing ability and oral expression. Prerequisite: ITA 202 or equivalent. *General Studies: G.*

ITA 312 Italian Composition and Conversation. (3) F, S

See ITA 311. Prerequisite: ITA 202 or equivalent. *General Studies: G.*

ITA 314 Advanced Italian. (3) N

An advanced grammar and composition course with readings of selected literary works. Prerequisite: ITA 202 or instructor approval. *General Studies: G.*

ITA 325 Introduction to Italian Literature. (3) F

Italian literature through the interpretation of representative works in drama, poetry, and novel. Prerequisite: ITA 202 or instructor approval. *General Studies: HU.*

ITA 394 Special Topics. (1–4) N

ITA 415 Italian Civilization. (3) N
A general survey of history, literature, art, and music, emphasizing Italy's cultural contribution to Western civilization. Prerequisites: ITA 311, 312 (or 314). *General Studies: L/HU, G.*

ITA 420 Italian Cinema. (3) F

Major trends of Italian cinema from the post-war period to the present.

ITA 430 Italian Literature of the Middle Ages. (3) N

Emphasis on "Stil Novo," Dante's minor works, Petrarch, and Boccaccio. Prerequisite: ITA 325 or instructor approval. *General Studies: HU.*

ITA 441 Dante: Divina Commedia. (3) N

Critical reading of the three Cantiche (Inferno, Purgatorio, and Paradiso). Prerequisite: ITA 325. *General Studies: L/HU.*

ITA 443 Italian Literature of the Renaissance. (3) N

Emphasis on Lorenzo de' Medici, Poliziano Castiglione, Machiavelli, Ariosto, and Tasso. Prerequisite: ITA 325 or instructor approval. *General Studies: HU, H.*

ITA 446 Italian Literature of the 18th and 19th Centuries. (3) N

Goldoni, Parini, Alfieri, the poetry of Foscolo and Leopardi, and the sociohistorical novels of Foscolo, Manzoni, and Verga. Prerequisite: ITA 325 or instructor approval. *General Studies: HU.*

ITA 449 20th-Century Italian Literature. (3) N

Major works, figures, and movements of contemporary Italian literature. Prerequisite: ITA 325. *General Studies: HU, G.*

ITA 494 Special Topics. (1–4) N

(a) Italian/American Culture. (3)

ITA 499 Individualized Instruction. (1–3) N**JAPANESE (JPN)****JPN 101 Elementary Japanese.** (5) F

Communication skills and basic skills in grammar, reading, and writing, including hiragana, katakana, and about 75 kanji. 5 hours/week.

JPN 102 Elementary Japanese. (5) S

Continuation of JPN 101. Additional 99 kanji. Continued development of communication skills in speaking, listening, reading, writing, and culture. Prerequisite: JPN 101 or equivalent.

JPN 107 Japanese for International Professions I. (10) F

Accelerated program alternative to JPN 101, 102 sequence. Functional approach to needs of international professions. 10 class hours a week.

JPN 201 Intermediate Japanese. (5) F

Continued development of communication skills. Increased emphasis on reading and writing. Review of fundamentals of structure to increase student's abilities in composition and translation. 5 class hours a week. Prerequisite: JPN 102 or equivalent. *General Studies: G.*

JPN 202 Intermediate Japanese. (5) S

Continuation of JPN 201. Prerequisite: JPN 201 or equivalent. *General Studies: G.*

JPN 206 Calligraphy. (1) N

Introduction to the practice of calligraphy in Japan, with emphasis on the derivation of Japanese kana syllabaries from Chinese characters. Prerequisite: CHI 205 or JPN 101.

JPN 207 Japanese for International Professions II. (10) S

Continuation of JPN 107, alternative to JPN 201, 202 sequence. Expansion of communicative proficiency in specific areas of international professions. 10 class hours a week. Prerequisite: JPN 107 or instructor approval. *General Studies: G.*

JPN 309 Intermediate Japanese Conversation. (2) F

Practice in current usage in expression of ideas. Recommended especially for those who have not had the opportunity to practice Japanese in Japan. Prerequisite: JPN 202.

JPN 310 Intermediate Japanese Conversation. (2) S

Continuation of JPN 309. Prerequisite: JPN 309.

JPN 311 Japanese Conversation and Composition. (3) F

Intensive aural/oral practice leading toward conversational fluency. Practice in writing Japanese, emphasizing current usage. Prerequisite: JPN 202. *General Studies: G.*

JPN 312 Japanese Conversation and Composition. (3) S

See JPN 311. Prerequisite: JPN 202. *General Studies: G.*

JPN 313 Advanced Japanese. (3) F

Continued development of ability to communicate orally and in writing. Exposure to the variety of Japanese written styles. Prerequisite: JPN 202 or equivalent. *General Studies: G.*

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

JPN 314 Advanced Japanese. (3) S

See JPN 313. Prerequisite: JPN 313 or instructor approval. *General Studies: G.*

JPN 321 Japanese Literature. (3) N

Readings in representative masterpieces of modern Japanese literature. Authors read change each year in accordance with the needs of the class. May be repeated for credit. Prerequisite: JPN 313 or instructor approval. *General Studies: L/HU, G.*

JPN 394 Special Topics. (1–4) N**JPN 414 Introduction to Classical Japanese.** (3) S

Readings from various genres of pre-20th-century literature, with analysis of the structure of the classical language. Prerequisite: JPN 313 or instructor approval.

JPN 435 Advanced Readings. (3) N

Readings in history, art, religious studies, economics, or other fields. Lecture, discussion. Prerequisite: JPN 314 or equivalent.

JPN 485 Problems of Translation. (3) N

Theories and practice of translation: strategies for handling a variety of Japanese texts. Lecture, discussion. Prerequisite: JPN 314 or equivalent.

JPN 494 Special Topics. (1–4) N**JPN 499 Individualized Instruction.** (1–3) N**JPN 500 Bibliography and Research Methods.** (3) N

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) N

Close readings of selected premodern texts, with focus on grammatical and stylistic features. Lecture, discussion. Prerequisite: JPN 414 or equivalent.

JPN 520 Teaching of Japanese as a Second Language. (3) N

Theory and practice of teaching Japanese, including presentation, interaction, and evaluation, with consideration given to cultural factors. Lecture, discussion.

JPN 535 Advanced Readings. (3) N

Readings in primary and secondary sources in history, art, religious studies, literature, or other fields. Lecture, discussion. Prerequisite: JPN 414 or equivalent.

JPN 543 Japanese Language and Linguistics. (3) N

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) N

Theories and practice of translation; strategies for handling a variety of Japanese texts. Lecture, discussion. Prerequisite: JPN 435 or equivalent.

JPN 591 Seminar. (3) N

Topics in literary, linguistic, or cultural studies.

KOREAN (KOR)**KOR 101 Elementary Korean I.** (5) F

Pronunciation, grammar, elementary conversation, and development of basic reading and writing skills including Han'gul. Lecture, recitation.

KOR 102 Elementary Korean II. (5) S

Continuation of KOR 101. Lecture, recitation. Prerequisite: KOR 101 or equivalent.

KOR 201 Intermediate Korean I. (5) F

Continual development of communication skills. Increased emphasis on reading and writing, vocabulary building, and review of fundamentals. Lecture, recitation. Prerequisite: KOR 102 or equivalent. *General Studies: G.*

KOR 202 Intermediate Korean II. (5) S

Continuation of KOR 201. Lecture, recitation. Prerequisite: KOR 201 or equivalent. *General Studies: G.*

LATIN (LAT)

Students entering LAT 202 directly from LAT 102 must complete LAT 201 to satisfy the College of Liberal Arts and Sciences second language requirement.

LAT 101 Elementary Latin. (4) F, S

Basic Latin grammar with an emphasis on developing reading skills. For beginning students only.

LAT 102 Elementary Latin. (4) F, S

Continuation of LAT 101. Prerequisite: LAT 101 or equivalent.

LAT 201 Intermediate Latin. (4) F

Selected Latin literature, both classical and postclassical; Virgil's *Aeneid*: advanced grammar. Prerequisite: LAT 102 or instructor approval. *General Studies: HU.*

LAT 202 Intermediate Latin. (4) S

See LAT 201. Prerequisite: LAT 102 or instructor approval. *General Studies: HU.*

LAT 421 Roman Literature. (3) F

Readings in the Latin masterpieces. Authors read change each year in accordance with needs of the class. May be repeated for credit. Prerequisite: LAT 202 or instructor approval. *General Studies: HU.*

LAT 422 Roman Literature. (3) S

See LAT 421. Prerequisite: LAT 202 or instructor approval. *General Studies: HU.*

NORWEGIAN (NOR)**NOR 101 Elementary Norwegian.** (4) F

Reading, writing, speaking and understanding of basic Norwegian. 4 hours lecture, 1 hour lab.

NOR 102 Elementary Norwegian. (4) S

Reading, writing, speaking and understanding of basic Norwegian. 4 hours lecture, 1 hour lab. Prerequisite: NOR 101 or equivalent.

NOR 201 Intermediate Norwegian. (4) F

Review of Norwegian grammar with emphasis on the development of the skills of speaking, listening comprehension, reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: NOR 102 or equivalent.

NOR 202 Intermediate Norwegian. (4) S

Review of Norwegian grammar with emphasis on the development of the skills of speaking, listening comprehension, reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: NOR 201 or equivalent.

PORTUGUESE (POR)

To satisfy the foreign language requirement, students must take POR 314 or a higher-numbered POR course.

POR 101 Elementary Portuguese. (5) F

Basic grammar with intensive drills in class and laboratory directed toward conversational fluency. 5 hours lecture, 1 hour lab. Prerequisite: 1 year of Spanish or French or Italian or instructor approval.

POR 201 Intermediate Portuguese. (5) S

Continuation of POR 101. Intensive drill of fundamentals in class and laboratory directed toward conversational fluency. 5 hours lecture, 1 hour lab. Prerequisite: POR 101 or instructor approval. *General Studies: G.*

POR 313 Portuguese Composition and Conversation. (3) F

Designed to develop skill in written Portuguese and corrected oral expression. Must be taken in sequence. Prerequisite: POR 201 or instructor approval. *General Studies: G.*

POR 314 Portuguese Composition and Conversation. (3) S

Continuation of POR 313. Prerequisite: POR 313 or instructor approval. *General Studies: G.*

POR 321 Luso-Brazilian Literature. (3) N

Representative masterpieces of Portuguese and Brazilian literature from the beginning to the present. Prerequisite: POR 313 or instructor approval. *General Studies: HU.*

POR 472 Luso-Brazilian Civilization. (3) N

Lectures, readings, and discussion of important aspects of Luso-Brazilian civilization. Topics from music, art, folklore, literature, history, and politics. Prerequisite: POR 313 or instructor approval. *General Studies: HU, G.*

RUSSIAN (RUS)**RUS 101 Elementary Russian.** (4) F, S, SS

Structural grammar and basic vocabulary. Introduction and reinforcement of aural/oral reading and writing skills. 4 hours lecture, 1 hour lab.

RUS 102 Elementary Russian. (4) S, SS

See RUS 101. Prerequisite: RUS 101 or equivalent.

RUS 201 Intermediate Russian. (4) F, SS

Systematic review of grammar. Development of vocabulary through reading and writing. Drill in aural/oral skills. 4 hours lecture, 1 hour lab. Prerequisite: RUS 102 or equivalent. *General Studies: G.*

RUS 202 Intermediate Russian. (4) S, SS

See RUS 201. Prerequisite: RUS 201 or equivalent. *General Studies:* G.

RUS 211 Basic Russian Conversation. (3) F

Intensive aural/oral drill to supplement reading and grammatical skills acquired in RUS 101, 102, 201, and 202. Required of Russian majors. Prerequisite: RUS 102. *General Studies:* G.

RUS 212 Basic Russian Conversation. (3) S

See RUS 211. Prerequisite: RUS 102. *General Studies:* G.

RUS 303 Scientific Russian. (3) F

Acquisition of scientific vocabulary through reading from current Russian scientific publications. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. Prerequisite: RUS 102.

RUS 304 Scientific Russian. (3) S

See RUS 303. Prerequisite: RUS 102.

RUS 311 Russian Composition and Conversation. (3) F

Development of writing ability and oral expression. Prerequisite: RUS 202. *General Studies:* G.

RUS 312 Russian Composition and Conversation. (3) S

See RUS 311. Prerequisite: RUS 202. *General Studies:* G.

RUS 321 Survey of Russian Literature. (3) A

Main literary movements, authors, and significant works of prose, poetry, and drama from the beginning to the mid-19th century in translation. Prerequisite: RUS 202 or equivalent. *General Studies:* L/HU, H.

RUS 322 Survey of Russian Literature. (3) A

An insight into the 19th- and early 20th-century Russian thought, life, and culture by reading translations of works of major writers. Prerequisite: RUS 202 or equivalent. *General Studies:* L/HU.

RUS 323 Survey of Literature of the Soviet Era. (3) A

Main literary movements, prominent authors, and the most significant works of prose, poetry, and drama of the Soviet period from 1917–1991. Prerequisite: RUS 202 or equivalent. *General Studies:* L/HU, G.

RUS 411 Advanced Composition and Conversation I. (3) F

Designed to improve aural discrimination and self-expression in oral and written skills, emphasizing vocabulary building. Subject materials drawn from current post-Soviet-Russian publications. Prerequisite: RUS 312. *General Studies:* G.

RUS 412 Advanced Composition and Conversation II. (3) S

See RUS 411. Prerequisite: RUS 312. *General Studies:* G.

RUS 417 Applied Russian Phonetics. (2) N

General improvement in the student's language skills through aural/oral training in Russian phonology and an analysis of Russian orthography. Prerequisite: RUS 102.

RUS 420 Russian Poetry. (3) N

Development of Russian poetry from its beginnings to the present, including both native and émigré poets. Topics in criticism and the study of poetics. Prerequisite: RUS 312 or instructor approval. *General Studies:* L/HU.

RUS 421 Pushkin. (3) N

Pushkin's poetry, plays, and prose fiction, including *Eugene Onegin*, *The Little Tragedies*, *Tales of Belkin*, *Queen of Spades*, and *The Captain's Daughter*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General Studies:* L/HU.

RUS 423 Dostoyevsky. (3) N

Dostoyevsky's major works of fiction, including *Crime and Punishment* and *Brothers Karamazov*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General Studies:* L/HU.

RUS 424 Tolstoy. (3) N

Tolstoy's major works, including *War and Peace* and *Anna Karenina*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General Studies:* L/HU.

RUS 425 Chekhov. (3) N

Chekhov's major works, representative short stories and major plays, including *The Cherry Orchard* and *Three Sisters*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General Studies:* L/HU.

RUS 426 Literatures of the Nationalities of the Former Soviet Union. (3) N

Including such authors as Belsevica, Kross, Venclova, Kupala, Khvylovy, Sevak, Nasri, Aitmatov, Charents, Cholpan. Prerequisite: RUS 312 or instructor approval. *General Studies:* L/HU, G.

RUS 430 Russian Short Story. (3) N

Detailed study of representative works of the Russian short story genre. Authors included are from both Imperial and Soviet Russia. Prerequisite: RUS 312 or instructor approval. *General Studies:* L/HU.

RUS 440 History of the Russian Language. (3) N

Principles of historical linguistics presented through the evolution of the Russian language from Proto-Indo-European to the present. Readings of historical documents in Old Russian and Old Church Slavonic. Prerequisite: RUS 312 or instructor approval.

RUS 441 Survey of Russian Culture. (3) N

Interplay of artistic, social, and political forces in the development of Russian culture from the Kievan period to the present. Exclusive use of Russian language source materials. Prerequisite: RUS 312 or instructor approval. *General Studies:* L/HU, G, H.

RUS 494 Special Topics. (1–4) N**RUS 499 Individualized Instruction.** (1–3) N**RUS 591 Seminar.** (3) N

Topics may be selected from the following:

- (a) Baltic Literatures
- (b) Literature from 1956 to August 1991
- (c) Literary Zhdanovism
- (d) 19th-Century Russian
- (e) Post-Soviet Literature
- (f) Pre-19th Century Russian Literature
- (g) Russian Literary Criticism
- (h) Russian Poetry to 1890
- (i) Russian Poetry, 1890 to Present

SCANDINAVIAN (SCA)**SCA 250 Introduction to Scandinavian Culture.** (3) S

Scandinavian identity from an interdisciplinary perspective with an historic overview. Lecture, discussion.

SCA 314 Medieval Scandinavia. (3) F, S

Study in English translation of the Sagas, Edda and Skaldic poetry, history and mythology of the Vikings.

SCA 315 Old Norse. (3) F, S

Readings and study of grammatical structures of Medieval Scandinavian with emphasis on the Sagas and Edda poetry and historical writings.

SCA 316 Scandinavian Cinema. (3) F, S

Presentation of Danish, Norwegian, Icelandic, and Swedish film, with English subtitles, as representatives of contemporary historical culture.

SCA 450 Masterpieces of Scandinavian Literature. (3) S

Scandinavian literature in translation in its cultural and historical contexts.

SPANISH (SPA)

Students who have completed their secondary education in a school where Spanish was the official language of instruction should begin their studies at the 325 level or above. For the courses SPA 313 and 314, certain restrictions apply: no student who has completed more than two years of high school in a Spanish-speaking country, where Spanish is the medium of instruction in the school, is allowed to register in a Spanish class below the 400 level.

SPA 101 Elementary Spanish. (4) F, S, SS

Fundamentals of the language. Emphasis on listening, speaking, reading, and writing. 4 hours lecture, 1 hour lab. Not open to students with credit in SPA 111.

SPA 102 Elementary Spanish. (4) F, S, SS

See SPA 101. Not open to students with credit in SPA 111. Prerequisite: SPA 101 or equivalent.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

SPA 107 Spanish for International Professions I. (8) F

Accelerated program alternative to SPA 101, 102 sequence. Functional approach to needs of international professions.

SPA 111 Fundamentals of Spanish. (4) F, S

Primarily for students with two years of high school Spanish who need review to enter second-year study. 4 hours lecture, 1 hour lab. Not open to students with credit in SPA 101 or 102.

SPA 201 Intermediate Spanish. (4) F, S, SS

Continuation of fundamentals. Emphasis on the development of the skills of reading, listening comprehension, speaking, writing, and culture. 4 hours lecture, 1 hour lab. Prerequisite: SPA 102 or 111. *General Studies: G.*

SPA 202 Intermediate Spanish. (4) F, S, SS

See SPA 201. Prerequisite: SPA 201 or equivalent. *General Studies: G.*

SPA 203 Intermediate Spanish for Bilinguals. (4) F

For Spanish-speaking students, in lieu of SPA 201. Composition, literature, conversation, grammar fundamentals. 4 hours lecture, 1 hour lab. Prerequisite: SPA 102 or 111 or placement. *General Studies: G.*

SPA 204 Intermediate Spanish for Bilinguals. (4) S

For Spanish-speaking students, in lieu of SPA 202. Composition, literature, conversation, grammar fundamentals. 4 hours lecture, 1 hour lab. Prerequisite: SPA 203 or equivalent. *General Studies: G.*

SPA 207 Spanish for International Professions II. (8) S

Continuation of SPA 107, alternative to SPA 201, 202 sequence. Expansion of communicative proficiency in specific areas of international professions. Prerequisite: SPA 107 or instructor approval. *General Studies: G.*

SPA 311 Spanish Conversation. (3) F, S

Designed primarily for nonmajors to promote vocabulary building and communicative expression in Spanish through discussions based on cultural readings. Prerequisite: SPA 202 or equivalent.

SPA 312 Spanish Conversation. (3) F, S

See SPA 311. Prerequisite: SPA 311 or equivalent.

SPA 313 Spanish Conversation and Composition. (3) F, S, SS

Designed to develop skill and accuracy in spoken and written Spanish. Required of majors; SPA 313 and 314 must be taken in sequence. Prerequisite: SPA 202 or equivalent. *General Studies: G.*

SPA 314 Spanish Conversation and Composition. (3) F, S, SS

See SPA 313. Prerequisite: SPA 313 or equivalent. *General Studies: G.*

SPA 315 Spanish Conversation and Composition for Bilinguals. (3) F

Emphasis on comparing standard Spanish with regional Southwest Spanish. May be taken in lieu of SPA 313 and 314. Prerequisite: SPA 202 or 204 or instructor approval.

SPA 316 Spanish Conversation and Composition for Bilinguals. (3) S

See SPA 315. Prerequisite: SPA 315 or equivalent.

SPA 319 Business Correspondence and Communication. (3) N

Organization and presentation of clear, effective business communications; vocabulary applicable to modern business usage. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: G.*

SPA 325 Introduction to Hispanic Literature. (3) F, S

A critical approach to and analysis of literary types, including poetry, drama, short story, and novel. Required of all majors. Prerequisite: SPA 313. *General Studies: HU.*

SPA 412 Advanced Conversation and Composition. (3) F, S

Oral and written Spanish communication skills, with particular attention given to developing fluency and facility. Required of majors. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: G.*

SPA 413 Advanced Spanish Grammar. (3) F

Intensive analysis of the Spanish language. Required of teaching majors. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: G.*

SPA 417 Spanish Phonetics and Phonology. (3) F

Introduction to the theory and practice of Spanish phonetics and phonology. Prerequisite: SPA 412.

SPA 420 Applied Spanish Linguistics. (3) S

Application of linguistic principles to the teaching of Spanish. Prerequisites: FLA 400 (or equivalent); SPA 412. *General Studies: L.*

SPA 421 Spanish in the Southwest. (3) F

Discussion and linguistic analysis of Southwest Spanish. Prerequisite: SPA 412. *General Studies: L/SB, C.*

SPA 425 Spanish Literature. (3) F, S

Survey of Spanish literature from its beginning to 1700. Prerequisite: SPA 325. *General Studies: HU.*

SPA 426 Spanish Literature. (3) F, S

Survey of Spanish literature from 1700 to the present. Prerequisite: SPA 325. *General Studies: HU.*

SPA 427 Spanish American Literature. (3) F, S

Survey of major works, figures, and movements from Colonial period to 1880. Prerequisite: SPA 325. *General Studies: L.*

SPA 428 Spanish American Literature. (3) F, S

Survey of major works, figures, and movements from 1880 to the present. Prerequisite: SPA 325. *General Studies: L, G.*

SPA 429 Mexican Literature. (3) N

Selected readings from pre-Columbian writers/poets (e.g., Macuilóchitl) through the novel of the Revolution to the present. Prerequisite: SPA 325.

SPA 434 Drama of the Golden Age. (3) S

Dramatic works of Lope de Vega, Calderón de la Barca, and their contemporaries. Prerequisite: SPA 325.

SPA 435 Cervantes—Don Quijote. (3) F

Don Quijote and the development of the novel. Prerequisite: SPA 325.

SPA 454 19th-Century Spanish American Narrative. (3) F

Principal works in the novel, short story, narrative fiction, and narrative (Gauchesque) poetry. Prerequisite: SPA 325.

SPA 456 20th-Century Spanish American Fiction. (3) S

Major works and movements. Prerequisite: SPA 325.

SPA 464 Mexican American Literature. (3) F

Representative literature in Spanish and English by Mexican Americans, emphasizing sociocultural as well as literary values. Prerequisite: SPA 325. *General Studies: HU.*

SPA 471 Civilization of the Spanish Southwest. (3) S

The political, intellectual, social, economic, and artistic development of the Spanish-speaking people of the Southwest. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: HU.*

SPA 472 Spanish American Civilization. (3) F

Growth of the institutions and cultures of Spanish American people. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: HU, G, H.*

SPA 473 Spanish Civilization. (3) S

Political, intellectual, social, economic, and artistic development of the Spanish nation from its origin to the present. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: HU/SB, G.*

SPA 485 Mexican American Short Story. (3) N

Critical study of contemporary short stories by Mexican American authors, with emphasis on their Spanish-language writings. Prerequisite: SPA 325 or instructor approval.

SPA 486 Mexican American Novel. (3) N

Social and literary contexts of representative novelists, emphasizing their Spanish-language writings. Prerequisite: SPA 325 or instructor approval.

SPA 487 Mexican American Drama. (3) N

Representative dramatic works, with emphasis on the history and development of this genre from its regional origins to the present. Prerequisite: SPA 325 or instructor approval.

SPA 494 Special Topics. (3) N

- (a) Introduction to Hispanic Linguistics
- (b) Lexicography

SPA 500 Bibliography and Research Methods. (3) F

Required of all graduate students.

SPA 536 Generation of 1898. (3) N

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) S

Analysis and discussion of the development of Spanish from Vulgar Latin to the present day. Prerequisite: FLA 400 or equivalent.

SPA 541 Spanish Language in America. (3) F

Discussion and analysis of various regional and social varieties of Spanish in the Americas. Prerequisite: FLA 400 or equivalent.

SPA 542 Studies in the Spanish of the Southwest. (3) S

Examination of bilingualism and the social and regional dialects of Spanish in the Southwest. Prerequisite: FLA 400 or equivalent.

SPA 543 Structure of Spanish. (3) S

Analysis and discussion of data on selected topics in Spanish morphology, semantics, and syntax. Prerequisite: FLA 400 or equivalent.

SPA 545 Concepts of Literary Criticism. (3) S

Aims and methods of modern literary scholarship. Discussion of major theories of literary analysis.

SPA 555 Spanish American Modernism. (3) N

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) N

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) N

Major figures and works of the Middle Ages in Spain.

SPA 561 Golden Age Spanish Prose Fiction. (3) N

Major figures and works of the 16th and 17th centuries, with emphasis on the picaresque novel.

SPA 562 Golden Age Spanish Poetry. (3) N

Major figures and works of the 16th and 17th centuries, with emphasis on lyric poetry.

SPA 563 Spanish Romanticism. (3) N

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) N

Principal figures and works of Realism in the 19th-century novel, with emphasis on Galdós.

SPA 565 20th-Century Spanish Drama. (3) N

Principal figures and works of Spanish dramatic literature from the Generation of 1898 to the present.

SPA 566 Generation of 1927. (3) N

Major poets of the Generation of 1927, with emphasis on works of Lorca, Guillén, Salinas, and Aleixandre.

SPA 567 Contemporary Spanish Novel. (3) N

Major works of post-Civil War Spanish fiction.

SPA 568 Cervantes. (3) N

An 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) N

The indigenous literary traditions, with emphasis on Nahuatl, Mayan, and Quechua literatures through readings in Spanish translations.

SPA 571 Colonial Spanish American Literature. (3) N

The major figures and works from Conquest to Independence.

SPA 572 Spanish American Drama. (3) N

Major contributions of Spanish American drama, with emphasis on contemporary dramatists.

SPA 573 Spanish American Essay. (3) N

Major works of the essay, within the framework of intellectual history and literary movements.

SPA 574 Spanish American Vanguard Poetry. (3) N

Examination of poetic developments, 1920–1940, with emphasis on Huidobro, Vallejo, Neruda, and the international context of their works.

SPA 575 Contemporary Spanish American Novel. (3) N

Principal novels of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative.

SPA 576 Contemporary Spanish American Short Story. (3) N

Principal short stories of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative.

SPA 577 Regional Spanish American Literature. (3) N

The figures and works of major national (Peru, Argentina, Chile, and Mexico) and regional (Caribbean) literatures. Topics offered on a rotating basis. May be repeated for different topics.

SPA 578 Novel of the Mexican Revolution. (3) N

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) N

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) N

Examination of the role of film in contemporary Latin American culture; films viewed and analyzed as casebook examples. Seminar.

SPA 591 Seminar. (3) N

Spanish and Spanish American literary, cultural, and linguistic topics.

SPA 691 Figures and Works Seminar. (3) N

Topics may be selected from Spanish and Spanish American literatures.

SWEDISH (SWE)**SWE 101 Elementary Swedish.** (4) F

Reading, writing, speaking and understanding of basic Swedish. 4 hours lecture, 1 hour lab.

SWE 102 Elementary Swedish. (4) S

Reading, writing, speaking and understanding of basic Swedish. 4 hours lecture, 1 hour lab. Prerequisite: SWE 101 or equivalent.

SWE 201 Intermediate Swedish. (4) F

Review of Swedish grammar with emphasis on the development of the skills of speaking, listening comprehension, reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: SWE 102 or equivalent.

SWE 202 Intermediate Swedish. (4) S

Review of Swedish grammar with emphasis on the development of the skills of speaking, listening comprehension, reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: SWE 201 or equivalent.

THAI (THA)**THA 101 Elementary Thai I.** (5) F

Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose readings in Thai script. 4 hours lecture, 1 hour lab.

THA 102 Elementary Thai II. (5) S

Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose reading. 4 hours lecture, 1 hour lab. Prerequisite: THA 101 or equivalent.

THA 201 Intermediate Thai I. (5) F

Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: THA 102 or equivalent. *General Studies: G.*

THA 202 Intermediate Thai II. (5) S

Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: THA 201 or equivalent. *General Studies: G.*

VIETNAMESE (VTN)**VTN 101 Elementary Vietnamese I.** (5) F

Basic skills in modern conversational Vietnamese and development of basic reading and writing skills, with special emphasis on tones. 4 hours lecture, 1 hour lab.

VTN 102 Elementary Vietnamese II. (5) S

Basic skills in modern conversational Vietnamese and development of basic reading and writing skills, with special emphasis on tones. 4 hours lecture, 1 hour lab. Prerequisite: VTN 101 or equivalent.

VTN 201 Intermediate Vietnamese I. (5) F

Improve students' speaking, listening, reading, and writing competence through dialogues, reading passages, pattern drill, and grammar and communicative exercises. 4 hours lecture, 1 hour lab. Prerequisite: VTN 102 or equivalent. *General Studies: G.*

VTN 202 Intermediate Vietnamese II. (5) S

Improve students' speaking, listening, reading, and writing competence through dialogues, reading passages, pattern drill, and grammar and communicative exercises. 4 hours lecture, 1 hour lab. Prerequisite: VTN 201 or equivalent. *General Studies: G.*

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

Department of Mathematics

Rosemary A. Renaut
Chair
(PS A216) 480/965-3951
math.la.asu.edu

REGENTS' PROFESSOR TROTTER

PROFESSORS

ARMBRUSTER, BREMNER, BUSTOZ, FELDSTEIN,
GARDNER, HELTON, HOPPENSTEADT, IHRIG,
JACKIEWICZ, KADELL, KAWSKI, KIERSTEAD,
KOSTELICH, KUANG, KUIPER, LEONARD, McDONALD,
MITTELMANN, NICOLAENKO, QUIGG, RENAUT,
RINGHOFER, H.A. SMITH, H.L. SMITH, THIEME,
WEISS, YOUNG

ASSOCIATE PROFESSORS

BAER, BARCELO, BLOUNT, CHILDRESS, DRISCOLL, FAN,
FARMER, HURLBERT, J. JONES, KURTZ, LAI, LOHR,
LOPEZ, MAHALOV, McCARTER, MOORE, SPIELBERG,
SWIMMER, TAYLOR, TURNER, WELFERT

ASSISTANT PROFESSORS

CARLSON, CZYGRINOW, GELB, D. JONES,
KALISZEWSKI, NIKITIN, PREWITT, G. SMITH, SUSLOV,
ZANDIEH, ZUO

The Department of Mathematics offers the B.A. and B.S. degrees in Mathematics. Students who plan to attend graduate school in mathematics or statistics should choose the B.S. degree. The B.S. degree in Mathematics is available with a concentration in computational mathematical sciences; however, the requirements for the degree with the concentration are distinct from the requirements for the degree without the concentration.

The department also offers a minor in Mathematics and an academic specialization in mathematics for students pursuing the B.A.E. degree in Secondary Education.

Related Field Course List. All students majoring in Mathematics need to refer to the related field course list. It is available from an advisor, in PS A211, or from the department Web site at math.la.asu.edu/~undergrd/underprog/degree/related-fields.html.

MATHEMATICS—B.A.

The B.A. degree in Mathematics requires a minimum of 36 semester hours of course work in mathematics and statistics, and additional course work in closely related fields, for a total of 51 semester hours. A grade of "C" or higher is required in all courses taken for the major. MAT 370 and 371 may not be used to satisfy these degree requirements. The required course work has the following components:

Core Courses

MAT 270 Calculus with Analytic Geometry I *MA*4
MAT 271 Calculus with Analytic Geometry II *MA*4
MAT 272 Calculus with Analytic Geometry III *MA*4

MAT 300 Mathematical Structures *L*3
MAT 342 Linear Algebra3
MAT 370 Intermediate Calculus3
or MAT 371 Advanced Calculus I (3)
Total21

Computer Science Requirement

CSE 100 Principles of Programming with C++ *CS*3
or CSE 200 Concepts of Computer Science *CS* (3)
Total3

Advanced Courses in Mathematics and Statistics

Two courses from the following list, both preferably taken from the same grouping.....6

Algebra, Topology, and Number Theory

MAT 410 Introduction to General Topology (3)
MAT 442 Advanced Linear Algebra (3)
MAT 443 Introduction to Abstract Algebra (3)
MAT 444 Intermediate Abstract Algebra (3)
MAT 445 Theory of Numbers (3)

Analysis and Applications

MAT 372 Advanced Calculus II (3)
MAT 461 Applied Complex Analysis (3)
MAT 472 Intermediate Real Analysis (3)

Applied Mathematics and Dynamics

MAT 451 Mathematical Modeling *CS* (3)
MAT 452 Introduction to Chaos and Nonlinear Dynamics (3)
MAT 455 Introduction to Fractals and Applications (3)

Computational Mathematics

MAT 420 Scientific Computing (3)
MAT 421 Applied Computational Methods (3)
MAT 423 Numerical Analysis I *CS* (3)
MAT 425 Numerical Analysis II *CS* (3)
MAT 427 Computer Arithmetic *CS* (3)

Differential Equations

MAT 462 Applied Partial Differential Equations (3)
MAT 475 Differential Equations (3)
MAT 476 Partial Differential Equations (3)

Discrete Mathematics

MAT 415 Introduction to Combinatorics (3)
MAT 416 Introduction to Graph Theory (3)
MAT 419 Introduction to Linear Programming *CS* (3)

Statistics and Probability

STP 420 Introductory Applied Statistics *CS* (3)
STP 421 Probability (3)
STP 425 Stochastic Processes (3)
STP 427 Mathematical Statistics (3)
STP 429 Experimental Statistics *CS* (3)

Additional Course Work in Mathematics and Statistics

Three courses in mathematics and statistics¹9

Related Field Course Work

Twelve hours of course work in mathematics, statistics, or related fields²12

¹ Acceptable mathematics courses are MAT 274 and upper-division MAT courses, with the exception of MAT 362, 485, and ASU West MAT 411. Acceptable statistics courses are upper-division STP courses.

² See "Related Field Course List," page 402.

MATHEMATICS—B.S.

The Department of Mathematics has two avenues for earning a B.S. degree. The B.S. requirements are similar to the B.A. requirements, but they require more extensive courses in advanced mathematics. The program is flexible

enough to allow students to focus their studies on mathematics, applied mathematics, or statistics. The computational mathematical sciences concentration is an interdisciplinary program with significant components of computer science, physical and biological sciences, and mathematics and statistics. The requirements for the B.S. degree and for the B.S. degree with the computational mathematical sciences concentration are distinct; neither is a subset of the other.

B.S. Requirements. The B.S. degree in Mathematics requires a minimum of 42 semester hours of course work in mathematics and statistics, and additional course work in closely related fields, for a total of 55 semester hours. A grade of “C” or higher is required in all courses taken for the major. MAT 370 and 371 may not both be used to satisfy these degree requirements. The required course work has the following components:

Core Courses

MAT 270 Calculus with Analytic Geometry I <i>MA</i>	4
MAT 271 Calculus with Analytic Geometry II <i>MA</i>	4
MAT 272 Calculus with Analytic Geometry III <i>MA</i>	4
MAT 300 Mathematical Structures <i>L</i>	3
MAT 342 Linear Algebra	3
MAT 371 Advanced Calculus I	3
<hr/>	
Total	21

Computer Science Requirement

CSE 200 Concepts of Computer Science <i>CS</i>	3
<hr/>	
Total	3

Depth Requirement

Two courses chosen from the following list of advanced courses

MAT 423 Numerical Analysis I <i>CS</i> (3)	3
MAT 425 Numerical Analysis II <i>CS</i> (3)	3
MAT 442 Advanced Linear Algebra (3)	3
MAT 444 Intermediate Abstract Algebra (3)	3
MAT 462 Applied Partial Differential Equations (3)	3
MAT 472 Intermediate Real Analysis (3)	3
MAT 475 Differential Equations (3)	3
MAT 476 Partial Differential Equations (3)	3
STP 421 Probability (3)	3
STP 427 Mathematical Statistics (3)	3

Advanced Courses in Mathematics and Statistics¹

Two courses from the following list, both preferably taken from the same grouping.....6

Algebra, Topology, and Number Theory

MAT 410 Introduction to General Topology (3)	3
MAT 442 Advanced Linear Algebra (3)	3
MAT 443 Introduction to Abstract Algebra (3)	3
MAT 444 Intermediate Abstract Algebra (3)	3
MAT 445 Theory of Numbers (3)	3

Analysis and Applications

MAT 372 Advanced Calculus II (3)	3
MAT 461 Applied Complex Analysis (3)	3
MAT 472 Intermediate Real Analysis (3)	3

Applied Mathematics and Dynamics

MAT 451 Mathematical Modeling <i>CS</i> (3)	3
MAT 452 Introduction to Chaos and Nonlinear Dynamics (3)	3
MAT 455 Introduction to Fractals and Applications (3)	3

Computational Mathematics

MAT 420 Scientific Computing (3)	3
MAT 421 Applied Computational Methods <i>CS</i> (3)	3
MAT 423 Numerical Analysis I <i>CS</i> (3)	3
MAT 425 Numerical Analysis II <i>CS</i> (3)	3
MAT 427 Computer Arithmetic <i>CS</i> (3)	3

Differential Equations

MAT 462 Applied Partial Differential Equations (3)	3
MAT 475 Differential Equations (3)	3
MAT 476 Partial Differential Equations (3)	3

Discrete Mathematics

MAT 415 Introduction to Combinatorics (3)	3
MAT 416 Introduction to Graph Theory (3)	3
MAT 419 Introduction to Linear Programming <i>CS</i> (3)	3

Statistics and Probability

STP 420 Introductory Applied Statistics <i>CS</i> (3)	3
STP 421 Probability (3)	3
STP 425 Stochastic Processes (3)	3
STP 427 Mathematical Statistics (3)	3
STP 429 Experimental Statistics <i>CS</i> (3)	3

Additional Course Work in Mathematics and Statistics²

Three courses in mathematics and statistics9

Related Fields Course Work³

Ten hours of course work in mathematics, statistics, or related fields is required10

- ¹ Students who contemplate graduate work in mathematics should choose additional courses listed under the depth requirement to satisfy the advanced courses requirement.
- ² Acceptable mathematics courses are MAT 274 and upper division MAT courses, with the exception of MAT 310, 362, 485, and ASU West MAT 411. Acceptable statistics courses are 400-level STP courses.
- ³ See “Related Field Course List,” page 402.

Computational Mathematical Sciences Concentration Requirements.

The B.S. degree in Mathematics with the computational mathematical sciences concentration requires a minimum of 36 semester hours of course work in mathematics and statistics, plus a minimum of 21 semester hours in physics, computer science, and other sciences for a minimum of 57 semester hours of course work related to the major. A grade of “C” or higher is required in all courses taken for the major. MAT 370 and 371 may not be used to satisfy these degree requirements. The required course work has the following components:

Core Courses

MAT 270 Calculus with Analytic Geometry I <i>MA</i>	4
MAT 271 Calculus with Analytic Geometry II <i>MA</i>	4
MAT 272 Calculus with Analytic Geometry III <i>MA</i>	4
MAT 274 Elementary Differential Equations <i>MA</i>	3
MAT 300 Mathematical Structures <i>L</i>	3
MAT 342 Linear Algebra	3
<hr/>	
Total	21

Computer Science Requirement

CSE 200 Concepts of Computer Science <i>CS</i>	3
CSE 210 Object-Oriented Design and Data Structures <i>CS</i>	3
CSE 310 Data Structures and Algorithms	3
MAT 420 Scientific Computing	3
<hr/>	
Total	12

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see “General Studies,” page 87. For graduation requirements, see “University Graduation Requirements,” page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see “Classification of Courses,” page 60.

Physics Requirement

Two semesters of introductory physics as shown 6 or 8

PHY 121 University Physics I: Mechanics *SQ* (3)*
or PHY 151 Physics II *SQ* (4)

PHY 131 University Physics II: Electricity and
Magnetism *SQ* (3)*
or PHY 150 Physics I *SQ* (4)

* It is highly recommended that students taking PHY 121 and 131 also take the associated laboratory courses PHY 122 and 132.

Advanced Courses in Mathematics and Statistics

Choose one course from each of the following four groups12

Group One

MAT 371 Advanced Calculus I (3)
MAT 460 Applied Real Analysis (3)

Group Two

MAE 471 Computational Fluid Dynamics (3)
or other course as approved by an advisor
MAT 419 Introduction to Linear Programming *CS* (3)
MAT 421 Applied Computational Methods *CS* (3)
MAT 423 Numerical Analysis I *CS* (3)
MAT 425 Numerical Analysis II *CS* (3)
STP 429 Experimental Statistics *CS* (3)

Group Three

MAT 372 Advanced Calculus II (3)
MAT 427 Computer Arithmetic *CS* (3)
MAT 451 Mathematical Modeling *CS* (3)
MAT 452 Introduction to Chaos and Nonlinear Dynamics (3)
MAT 461 Applied Complex Analysis (3)
MAT 462 Applied Partial Differential Equations (3)
MAT 475 Differential Equations (3)
STP 420 Introductory Applied Statistics *CS* (3)
STP 421 Probability (3)

One course not already chosen from *Group One* or *Two* (3)

Group Four

One course from either *Group One*, *Two*, or *Three*, or any other 400-level MAT or STP course except for MAT 485, and ASU West MAT 411 (3)

Second Science

Choose among the course combinations below for a one-year sequence in some other science, chosen from astronomy, biology, geology, or chemistry¹6-9

AST 321 Introduction to Planetary and Stellar
Astrophysics *SQ* (3)

AST 322 Introduction to Galactic and Extragalactic
Astrophysics *SQ* (3)

or

BIO 181 General Biology *SQ* (4)

BIO 182 General Biology *SG* (4)

or

GLG 101 Introduction to Geology I (Physical) *SQ* (3)

GLG 102 Introduction to Geology II (Historical) *SQ* (3)

or

Any two of CHM 113, 114, 115, 116, 117, and 118 as permitted by the Department of Chemistry and Biochemistry.²

¹ Other course combinations may be used upon approval of a departmental advisor.

² See the individual course listings for restrictions.

Advanced Science Course or Internship

One advanced course in a science for which a one-year course sequence in the same science is required, or an internship, subject to advisor approval¹3
MAT 484 Internship (3)
any upper-division course in plant biology (PLB), chemistry (CHM), or microbiology (MIC) (3)
any upper-division science or engineering course from the related field course list² (3)

¹ Other courses may be used to satisfy this requirement on approval of a Department of Mathematics advisor.

² Note that courses with prefixes ECN, FIN, MAT, PHI, and STP do not count toward this requirement. See "Related Field Course List," page 402.

Statistics. Students interested in concentrating their mathematical studies on statistics should satisfy the requirements for a B.S. degree in Mathematics with the following courses. A grade of "C" or higher is required in all courses taken for the major. MAT 370 and 371 may not be used to satisfy these degree requirements.

Core Courses

MAT 270 Calculus with Analytic Geometry I <i>MA</i>	4
MAT 271 Calculus with Analytic Geometry II <i>MA</i>	4
MAT 272 Calculus with Analytic Geometry III <i>MA</i>	4
MAT 300 Mathematical Structures <i>L</i>	3
MAT 342 Linear Algebra	3
MAT 371 Advanced Calculus I	3
STP 420 Introductory Applied Statistics <i>CS</i>	3
STP 421 Probability	3
STP 427 Mathematical Statistics	3
STP 429 Experimental Statistics <i>CS</i>	3
Total	33

Computer Science Requirement

CSE 200 Concepts of Computer Science <i>CS</i>	3
Total	3

Additional Advanced Courses in Mathematics and Statistics

Three courses from the following list	9
MAT 274 Elementary Differential Equations <i>MA</i> (3)	
MAT 372 Advanced Calculus II (3)	
MAT 423 Numerical Analysis I <i>CS</i> (3)	
MAT 442 Advanced Linear Algebra (3)	
STP 425 Stochastic Processes (3)	

Required Related Field Course Work

Statistics/probability, mathematics, or related fields*10

* See "Related Field Course List," page 402.

Actuarial Science. The faculty in the Department of Mathematics offer courses that cover the content of the mathematical examinations of the Society of Actuaries. The option in statistics and probability is particularly suited to students who wish to pursue actuarial careers. See the department's actuarial advisor for more information.

MINOR IN MATHEMATICS

The minor in Mathematics consists of a minimum of 24 semester hours. Required courses are as follows:

MAT 270 Calculus with Analytic Geometry I MA	4
MAT 271 Calculus with Analytic Geometry II MA	4
MAT 272 Calculus with Analytic Geometry III MA	4
MAT 342 Linear Algebra	3
Total	15

Electives are chosen in consultation with a mathematics advisor and must include three upper-division MAT or STP courses. In addition, CSE 200 Concepts of Computer Science and CSE 210 Object-Oriented Design and Data Structures are recommended. An approved Minor Verification Form must be submitted to the Office for Academic Programs, SS 111.

SECONDARY EDUCATION—B.A.E.

Mathematics. Students pursuing the major teaching field may choose from two options.

Option One. With this option, the academic specialization consists of the following required courses:

CSE 100 Principles of Programming with C++ CS	3
or CSE 183 Applied Problem Solving with FORTRAN CS (3)	
or CSE 200 Concepts of Computer Science CS (3)	
MAT 270 Calculus with Analytic Geometry I MA	4
MAT 271 Calculus with Analytic Geometry II MA	4
MAT 272 Calculus with Analytic Geometry III MA	4
MAT 300 Mathematical Structures L	3
MAT 310 Introduction to Geometry	3
MAT 342 Linear Algebra	3
MAT 370 Intermediate Calculus	3
or MAT 371 Advanced Calculus I (3)	
MAT 443 Introduction to Abstract Algebra.....	3
or MAT 445 Theory of Numbers (3)	
MTE 483 Mathematics in the Secondary School.....	3
STP 420 Introductory Applied Statistics CS.....	3
Total	36

The methods in academic specialization courses for mathematics are MTE 482 Methods of Teaching Mathematics in Secondary School and MTE 494 Special Topics: Advanced Methods of Teaching Secondary Mathematics. They are required as part of the Professional Teacher Preparation Program (PTPP) but cannot be counted as part of the 36-hour major requirement.

Option Two. This option may be exercised only in combination with option two under “Chemistry,” page 357, or “Physics,” page 419. The program consists of 30 semester hours in mathematics. Required courses are as follows:

MAT 270 Calculus with Analytic Geometry I MA	4
MAT 271 Calculus with Analytic Geometry II MA	4
MAT 272 Calculus with Analytic Geometry III MA	4
MAT 300 Mathematical Structures L	3
MAT 310 Introduction to Geometry	3
MAT 342 Linear Algebra	3

MAT 370 Intermediate Calculus MA.....	3
or MAT 371 Advanced Calculus I (3)	
or MAT 460 Applied Real Analysis (3)	
MAT 443 Introduction to Abstract Algebra.....	3
Total	27

Recommended

CSE 100 Principles of Programming with C++ CS	3
or CSE 200 Concepts of Computer Science CS (3)	

Minor Teaching Field. The minor teaching field consists of the following required courses:

MAT 270 Calculus with Analytic Geometry I MA.....	4
MAT 271 Calculus with Analytic Geometry II MA	4
MAT 272 Calculus with Analytic Geometry III MA	4
MAT 274 Elementary Differential Equations MA.....	3
or MAT 371 Advanced Calculus I (3)	
or MAT 460 Applied Real Analysis (3)	
MAT 300 Mathematical Structures L	3
MAT 310 Introduction to Geometry.....	3
MAT 342 Linear Algebra	3
Total	24



Resources for students with special needs are provided by Disability Resources for Students.

Tim Trumble photo

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see “General Studies,” page 87. For graduation requirements, see “University Graduation Requirements,” page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see “Classification of Courses,” page 60.

GRADUATE PROGRAMS

The faculty in the Department of Mathematics offer programs leading to the degrees of Master of Natural Science, M.S., and Ph.D. See the *Graduate Catalog* for requirements.

MATHEMATICS (MAT)

MAT 106 Intermediate Algebra. (3) F, S, SS

Topics from basic algebra such as linear equations, polynomials, factoring, exponents, roots, and radicals. Prerequisite: 1 year of high school algebra.

MAT 114 College Mathematics. (3) F, S, SS

Applications of basic college-level mathematics to real-life problems. Appropriate for students whose major does not require MAT 117 or 170. Prerequisite: MAT 106 or 2 years of high school algebra. *General Studies: MA.*

MAT 117 College Algebra. (3) F, S, SS

Linear and quadratic functions, systems of linear equations, logarithmic and exponential functions, sequences, series, and combinatorics. Prerequisite: MAT 106 or 2 years of high school algebra. *General Studies: MA.*

MAT 119 Finite Mathematics. (3) F, S, SS

Topics from linear algebra, linear programming, combinatorics, probability, and mathematics of finance. Prerequisite: MAT 117 or equivalent. *General Studies: MA.*

MAT 122 University Mathematics. (3) F, S, SS

Overview of contemporary and applicable mathematics. Graphical analysis, scale and proportions, exponential models and introductory probability applications. Prerequisite: four years of high school mathematics including a course in analytic geometry or precalculus (or MAT 117 or equivalent). *General Studies: MA.*

MAT 170 Precalculus. (3) F, S, SS

Intensive preparation for calculus (MAT 260, 270 and 290). Topics include functions (including trigonometric), matrices, polar coordinates, vectors, complex numbers, and mathematical induction. Prerequisite with a grade of "B" or higher: MAT 106. Prerequisite with a grade of "C" or higher: MAT 117 or two years of high school algebra. *General Studies: MA.*

MAT 210 Brief Calculus. (3) F, S, SS

Differential and integral calculus of elementary functions with applications. Not open to students with credit in MAT 260, 270, or 290. Prerequisite: MAT 117 or equivalent. *General Studies: MA.*

MAT 242 Elementary Linear Algebra. (2) F, S, SS

Introduction to matrices, systems of linear equations, determinants, vector spaces, linear transformations, and eigenvalues. Emphasizes development of computational skills. Prerequisite: 1 semester of calculus or instructor approval.

MAT 243 Discrete Mathematical Structures. (3) F, S, SS

Introduction to lattices, graphs, Boolean algebra, and groups, with emphasis on topics relevant to computer science. Prerequisite: 1 semester of calculus.

MAT 251 Calculus for Life Sciences. (3) F, S

Differential and integral calculus of elementary functions. Introduction to differential and difference equations. Emphasis on applications to the life sciences. Not open to students with credit in MAT 210, 260, or 270. Prerequisite: MAT 170 or equivalent. *General Studies: MA.*

MAT 260 Technical Calculus I. (3) F, S, SS

Analytic geometry, differential, and integral calculus of elementary functions, emphasizing physical interpretation and problem solving. Not open to students with credit in MAT 210, 270, or 290. Prerequisite: MAT 170 or equivalent. *General Studies: MA.*

MAT 261 Technical Calculus II. (3) F, S, SS

Continuation of MAT 260. Prerequisite: MAT 260 or instructor approval. *General Studies: MA.*

MAT 262 Technical Calculus III. (3) F, S

Infinite series, an introduction to differential equations and elementary linear algebra. Prerequisite: MAT 261 or equivalent. *General Studies: MA.*

MAT 270 Calculus with Analytic Geometry I. (4) F, S, SS

Real numbers, limits and continuity, and differential and integral calculus of functions of 1 variable. Not open to students with credit in MAT 290. The sequence MAT 270 and 271 may be substituted for MAT 290 to satisfy requirements of any curriculum. Prerequisite with a grade of "C" or higher: MAT 170 or satisfactory score on placement examination. *General Studies: MA.*

MAT 271 Calculus with Analytic Geometry II. (4) F, S, SS

Methods of integration, applications of calculus, elements of analytic geometry, improper integrals, sequences, and series. Not open to students with credit in MAT 291. The sequence MAT 270, 271, 272 may be substituted to satisfy requirements for MAT 290 and 291. Prerequisite with a grade of "C" or higher: MAT 270 or equivalent. *General Studies: MA.*

MAT 272 Calculus with Analytic Geometry III. (4) F, S, SS

Vector-valued functions of several variables, multiple integration, and introduction to vector analysis. The sequence MAT 270, 271, 272 may be substituted to satisfy requirements for MAT 290 and 291. Prerequisite with a grade of "C" or higher: MAT 271 or equivalent. *General Studies: MA.*

MAT 274 Elementary Differential Equations. (3) F, S, SS

Introduction to ordinary differential equations, adapted to the needs of students in engineering and the sciences. MAT 272 or equivalent is recommended. Prerequisite: MAT 271 or equivalent. *General Studies: MA.*

MAT 290 Calculus I. (5) N

Differential and integral calculus of elementary functions; topics from analytic geometry essential to the study of calculus. Prerequisite: MAT 170 or equivalent. *General Studies: MA.*

MAT 291 Calculus II. (5) N

Further applications of calculus, partial differentiation, multiple integrals, and infinite series. Prerequisite: MAT 290 or equivalent.

MAT 294 Special Topics. (1–4) N

(a) Calculus for the Life Sciences. (3)

MAT 300 Mathematical Structures. (3) F, S

Logic and set theory, induction, functions, order and equivalence relations, cardinality. Emphasis on writing proofs. Prerequisite: 1 semester of calculus or instructor approval. *General Studies: L.*

MAT 310 Introduction to Geometry. (3) S

Congruence, area, parallelism, similarity and volume, and Euclidean and non-Euclidean geometry. Prerequisite: MAT 272 or equivalent.

MAT 342 Linear Algebra. (3) F, S, SS

Linear equations, matrices, determinants, vector spaces, bases, linear transformations and similarity, inner product spaces, eigenvectors, orthonormal bases, diagonalization, and principal axes. Pre- or corequisite: MAT 272 or equivalent.

MAT 351 Mathematical Methods for Genetic Analysis. (3) F, S

Discrete mathematics, probability, statistics, and associated computer packages. Applications to genomics, bioinformatics, forensics, and DNA/protein sequence patterns. Prerequisites: MAT 251 and 270 or instructor approval.

MAT 362 Advanced Mathematics for Engineers and Scientists I.

(3) F, S, SS

Vector analysis, Fourier analysis, and partial differential equations. Prerequisites: MAT 272 and 274 or equivalents.

MAT 370 Intermediate Calculus. (3) F, S

Theory behind basic 1-variable calculus: continuity, derivative, Riemann integral, sequences, and series. Not open to students who have received a "C" or higher in MAT 371. Students may not count both MAT 370 and 371 toward mathematics degree. Prerequisites: MAT 272, 300.

MAT 371 Advanced Calculus I. (3) F, S

Real numbers, completeness, sequences/series, continuity, uniform theorems, derivative, Riemann integral, pointwise/uniform convergence, Taylor's theorem. Students may not count both MAT 370 and 371 toward mathematics degree. Prerequisite: MAT 272 or 300 or instructor approval.

MAT 372 Advanced Calculus II. (3) F, S

Open, closed, compact sets in R^n continuity, differentiation, partial differentiation, integration in R^n . Inverse/implicit function theorems. Not open to students with credit in MAT 460. Prerequisite: MAT 371. Pre- or corequisite: MAT 342.

MAT 410 Introduction to General Topology. (3) A

Topological spaces, metric spaces, compactness, connectedness, and product spaces. Prerequisite: MAT 300 or 371 or instructor approval.

MAT 415 Introduction to Combinatorics. (3) S

Topics include proof techniques, permutations, combinations; counting techniques including recurrence relaxations, generating functions, inclusion-exclusion; Ramsey theory and combinatorial designs. Prerequisites: MAT 300 (or 243) and 342 (or 242) or instructor approval.

MAT 416 Introduction to Graph Theory. (3) S

Topics include trees, cycles, matchings, planarity, connectivity, hamiltonicity, colorings, graph algorithms, and other advanced topics. Prerequisites: MAT 300 (or 243) and 342 (or 242) or instructor approval.

MAT 419 Introduction to Linear Programming. (3) S

Simplex method, duality, and network flows. Applications to game theory, geometry, combinatorics, graph theory, and posets. Prerequisites: CSE 100 (or 200 or 210); MAT 300 (or 243), 342 (or 242) or instructor approval. *General Studies: CS.*

MAT 420 Scientific Computing. (3) F

Survey and application of programming languages, libraries, and scientific visualization tools. Programming assignments emphasize software development skills. Lecture, lab. Prerequisites: CSE 200 and MAT 274 and 342 or equivalents or instructor approval.

MAT 421 Applied Computational Methods. (3) F, S

Numerical methods for quadrature, differential equations, roots of nonlinear equations, interpolation, approximation, linear equations, floating-point arithmetic, and roundoff error. Prerequisites: MAT 271 (or equivalent) and fluency in computer programming (preferably FORTRAN) or instructor approval. *General Studies: CS.*

MAT 423 Numerical Analysis I. (3) F, S

Analysis and algorithms for numerical solutions linear/nonlinear equations, direct solvers, iterative procedures, optimization. Determination of eigenvalues. Elementary computer arithmetic. Prerequisites: MAT 342 and 371 and fluency in computer programming or instructor approval. *General Studies: CS.*

MAT 425 Numerical Analysis II. (3) F, S

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: MAT 342 and 371 and fluency in computer programming or instructor approval. *General Studies: CS.*

MAT 427 Computer Arithmetic. (3) S

Number systems, hardware/software arithmetic, overflow, significance, rounding, multiple precision, and automatic error control; impact on languages, architectures, robust programming, and software development. Prerequisite: CSE 100 (or 200) or MAT 421 and 423 (or MAT 425) or instructor approval. *General Studies: CS.*

MAT 442 Advanced Linear Algebra. (3) F

Fundamentals of linear algebra, dual spaces, invariant subspaces, canonical forms, bilinear and quadratic forms, and multilinear algebra. Prerequisites: MAT 300 and 342 or instructor approval.

MAT 443 Introduction to Abstract Algebra. (3) F

Introduction to concepts of abstract algebra. Not open to students with credit in MAT 444. Prerequisites: MAT 300 and 342 or instructor approval.

MAT 444 Intermediate Abstract Algebra. (3) S

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) S

Prime numbers, unique factorization theorem, congruences, Diophantine equations, primitive roots, and quadratic reciprocity theorem. Prerequisites: MAT 300 and 342 or instructor approval.

MAT 451 Mathematical Modeling. (3) S

A 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: MAT 242 (or 342) and 274 or instructor approval. *General Studies: CS.*

MAT 452 Introduction to Chaos and Nonlinear Dynamics. (3) F

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) S

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 Applied Real Analysis. (3) S

Vectors, curvilinear coordinates, Jacobians, implicit function theorem, line and surface integrals, Green's, Stokes', and divergence theorems. Not open to students with credit in MAT 372. Prerequisites: MAT 242 (or 342), 272, 274.

MAT 461 Applied Complex Analysis. (3) F, SS

Analytic functions, complex integration, Taylor and Laurent series, residue theorem, conformal mapping, and harmonic functions. Prerequisite: MAT 272 or equivalent.

MAT 462 Applied Partial Differential Equations. (3) S

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. (3) F

Introduction to analysis in metric spaces with emphasis on the real line. Appropriate as preparation for MAT 570. Prerequisites: MAT 300, 342.

MAT 475 Differential Equations. (3) F

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) S

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) N**MAT 485 History of Mathematics.** (3) N

Topics from the history of the origin and development of mathematical ideas. Prerequisite: MAT 272 or equivalent.

MAT 505 Perturbation Methods. (3) N

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) F

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) S

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) F

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) S

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) F

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.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

MAT 519 Combinatorial Optimization II. (3) S

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) F

Direct solution of linear systems, iterative methods, eigenvalues and eigenvectors, singular value decomposition, the QR algorithm, error propagation, arithmetic, and stability. Prerequisites: MAT 342 and 423 (or 421) or instructor approval.

MAT 521 Iterative Methods. (3) S

Numerical methods for solving linear/nonlinear systems of equations (symmetric, nonsymmetric). Iterative methods for linear systems, conjugate gradients, multigrid methods, preconditioning, Krylov methods. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 523 Numerical Optimization. (3) N

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 equivalent) or instructor approval.

MAT 524 Parallel Numerical Algorithms. (3) N

Algorithms for massively parallel, hypercube architectures; "parallel" FORTRAN; solution of linear, nonlinear systems; partial differential equations; iterative methods; multigrid; domain decomposition. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 530 Numerical Solution of Ordinary Differential Equations.

(3) F

One step, linear multistep methods; consistency, order, stability, convergence; discretization, roundoff errors, error estimation, adaptive strategy; implementation, software for nonstiff equations. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 531 Numerical Solution of Stiff Differential Systems. (3) S

Runge-Kutta methods, order conditions, construction of highly stable methods, order stars, error estimation, stepsize selection, contractivity properties, linear multistep methods. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 533 Computational Elliptic and Parabolic Partial Differential Equations. (3) F

Parabolic and elliptic equations, finite difference, finite element methods, stability, consistency, convergence, practical aspects, applications, software. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 534 Computational Hyperbolic Partial Differential Equations.

(3) S

Numerical solutions of hyperbolic PDEs, finite difference methods, well-posedness, stability, consistency, convergence, adaptive grids; Maxwell's equations, elastic wave propagation; Navier-Stokes. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 535 Spectral Methods for Partial Differential Equations. (3) N

Spectral, pseudo-spectral theory; Galerkin, collocation methods; Tau-methods, global approximation properties, stability; convergence; solutions for linear, nonlinear systems. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 543 Abstract Algebra. (3) F

Groups, modules, rings and fields, Galois theory, homological algebra, and the representation theory. Prerequisite: MAT 444 or instructor approval.

MAT 544 Abstract Algebra. (3) S

Continuation of MAT 543. Prerequisite: MAT 543 or instructor approval.

MAT 551 Linear Operators and Integral Equations. (3) S

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 equivalents.

MAT 555 Fractal Geometry. (3) N

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 570 Real Analysis. (3) S

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) F

Continuation of MAT 570. Prerequisite: MAT 570 or instructor approval.

MAT 572 Complex Analysis. (3) F

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) S

Continuation of MAT 572. Prerequisite: MAT 572 or instructor approval.

MAT 574 Theory of Ordinary Differential Equations. (3) N

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) N

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: MAT 452 and 475 or MAT 574 or instructor approval.

MAT 576 Theory of Partial Differential Equations. (3) N

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) N

Continuation of MAT 576. Prerequisite: MAT 576 or instructor approval.

MAT 578 Functional Analysis. (3) N

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) N

Continuation of MAT 578. Prerequisite: MAT 578 or instructor approval.

MAT 591 Seminar. (1–3) N

Topics may be selected from the following:

- (a) Algebra
- (b) Analysis
- (c) Applied Mathematics
- (d) Combinatorial Mathematics
- (e) Mathematical Logic
- (f) Numerical Analysis
- (g) Topology

MATHEMATICS EDUCATION (MTE)**MTE 180 Theory of Elementary Mathematics.** (3) F, S, SS

Number systems, intuitive geometry, elementary algebra, and measurement. Intended for prospective elementary school teachers. Prerequisite: MAT 117 or equivalent.

MTE 181 Theory of Elementary Mathematics. (3) A

Continuation of MTE 180. Prerequisite: MTE 180 or instructor approval.

MTE 380 Arithmetic in the Elementary School. (3) A

Historical numeration systems, overview of elementary number theory, including primes, factorization, divisibility, bases, modular systems, linear congruence, and continued fractions. Prerequisite: MTE 181 or instructor approval.

MTE 381 Geometry in the Elementary School. (3) N

Informal geometry, including concepts of length, area, volume, similarity, and congruence. Classification of figures, straightedge and compass constructions, and motion geometry. Prerequisite: MTE 380 or instructor approval.

MTE 482 Methods of Teaching Mathematics in Secondary School.

(3) F, SS

Examination of secondary school curricular material and analysis of instructional devices. Teaching strategies, evaluative techniques, diagnosis, and remediation and problem solving. Prerequisite: instructor approval.

MTE 483 Mathematics in the Secondary School. (3) S, SS

Topics in geometry, number theory, algebra, and analysis. Emphasis on unifying principles. Prerequisite: MAT 310 or instructor approval.

MTE 484 Theory of Elementary Mathematics Internship. (3) F, S
Employ hands-on activities and manipulatives to advance mathematical understanding in second- to fourth-grade students.

MTE 494 Special Topics. (3) F, S

(a) Advanced Methods of Teaching Secondary Mathematics
Continuation of MTE 482. Prerequisite: MTE 482.

MTE 585 Modern Geometry for Teachers. (3) A

Euclidean, projective, and non-Euclidean geometries. Prerequisite: instructor approval.

MTE 587 Analysis for Teachers. (3) N

Subject matter in mathematics appropriate for accelerated programs in secondary schools, including analytic geometry and calculus. Prerequisite: instructor approval.

STATISTICS AND PROBABILITY (STP)

STP 220 Conceptual Statistics. (3) F, S

Treats the concepts and vocabulary needed to evaluate statistical reports on health, technology, and society. Aggressively emphasizes understanding over computation. Lecture, teamwork. Prerequisite: MAT 114 or 117 or 122 or equivalent. *General Studies: CS.*

STP 226 Elements of Statistics. (3) F, S, SS

Basic concepts and methods of statistics, including descriptive statistics, significance tests, estimation, sampling, and correlation. Not open to majors in mathematics or the physical sciences. Prerequisite: MAT 114 or 117 or equivalent. *General Studies: CS.*

STP 326 Intermediate Probability. (3) F, S

Probability models and computations, joint and conditional distributions, moments, and families of distributions. Topics in stochastic processes, simulation, and statistics. Prerequisite: MAT 210 or equivalent. *General Studies: CS.*

STP 420 Introductory Applied Statistics. (3) F, S, SS

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 equivalent. *General Studies: CS.*

STP 421 Probability. (3) F

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 equivalents.

STP 425 Stochastic Processes. (3) S

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) S

Limiting distributions, interval estimation, point estimation, sufficient statistics, and tests of hypotheses. Prerequisites: STP 420, 421.

STP 429 Experimental Statistics. (3) S

Statistical inference for controlled experimentation. Multiple regression, correlation, analysis of variance, multiple comparisons, and nonparametric procedures. Prerequisite: STP 420 or equivalent. *General Studies: CS.*

STP 525 Advanced Probability. (3) N

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: MAT 571 and STP 421 or instructor approval.

STP 526 Theory of Statistical Linear Models. (3) F

Multinomial 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) F

Method of least squares, simple and multiple linear regression, polynomial regression, analysis of residuals, dummy variables, and model building. Prerequisite: STP 420 or equivalent.

STP 531 Applied Analysis of Variance. (3) S

Factorial designs, balanced and unbalanced data, fixed and random effects, randomized blocks, Latin squares, analysis of covariance, and multiple comparisons. Prerequisite: STP 420 or equivalent.

STP 532 Applied Nonparametric Statistics. (3) F

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 equivalent.

STP 533 Applied Multivariate Analysis. (3) S

Discriminant analysis, principal components, factor analysis, cluster analysis, and canonical correlation. Prerequisite: STP 420 or equivalent.

STP 534 Applied Discrete Data Analysis. (3) N

Models for discrete and count data, measures of association, and log-linear and regression models for contingency tables. Prerequisite: STP 420 or equivalent.

STP 535 Applied Sampling Methodology. (3) S

Simple random, stratified, cluster sampling; variance estimation in complex surveys; nonparametric superpopulation approaches; nonresponse models; computational methods. Prerequisite: STP 420 or equivalent.

STP 591 Seminar. (1–3) N

Topics may be selected from the following:

- (a) Probability
- (b) Statistics

STP 593 Applied Project. (1–12) N

STP 599 Thesis. (1–12) N

Department of Microbiology

Edward A. Birge

Chair

(LSE 210) 480/965-1457

lsvl.la.asu.edu/microbiology

PROFESSORS

BURKE, HARRINGTON, JACOBS, MOSSMAN, SCHMIDT

ASSOCIATE PROFESSORS

BIRGE, HOFFMAN, MISRA, STOUT

ASSISTANT PROFESSORS

CHANG, GARCIA-PICHEL

CLINICAL FACULTY

DOWNES, LEFEVRE, MASS, ROBERTS

MICROBIOLOGY—B.S.

The B.S. degree in Microbiology consists of a minimum of 41 semester hours in microbiology and approved related fields. Students majoring in Microbiology are required to take the following courses:

BIO 181	General Biology <i>SQ</i>	4
BIO 182	General Biology <i>SG</i>	4
BIO 340	General Genetics	4
	Choose between the course combinations below	8
BCH 361	Principles of Biochemistry (3)	
BCH 367	Elementary Biochemistry Laboratory (1)	
CHM 231	Elementary Organic Chemistry <i>SQ</i> ¹ (3)	
CHM 235	Elementary Organic Chemistry Laboratory <i>SQ</i> ¹ (1)	

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

—— or ——	
CHM 331 General Organic Chemistry (3)	
CHM 332 General Organic Chemistry (3)	
CHM 335 General Organic Chemistry Laboratory (1)	
CHM 336 General Organic Chemistry Laboratory (1)	
MIC 206 Microbiology Laboratory <i>SG</i> ²	1
MIC 220 Biology of Microorganisms	3
MIC 302 Advanced Bacteriology Laboratory <i>L</i> ³	2
MIC 360 Bacterial Physiology	3
MIC 401 Research Paper <i>L</i> ³	1
Total	30

¹ Both CHM 231 and 235 must be taken to secure SQ credit.

² Both MIC 205 and 206 must be taken to secure SG credit.

³ Both MIC 302 and 401 must be taken to secure L credit.

A minimum of 11 semester hours of upper-division electives in microbiology or approved related fields must be taken.

These elective hours must include two courses chosen from the following:

MIC 421 Experimental Immunology	2
MIC 446 Techniques in Molecular Biology/Genetics Laboratory	2
MIC 470 Bacterial Diversity and Systematics	4
MIC 494 ST: Clinical Bacteriology Laboratory	3
MIC 495 Undergraduate Research	2

In addition, students are required to fulfill the university numeracy requirements with MAT 210 (or 270, 290, or 294) as their MA course and BIO 420 (or any CSE course that meets the CS requirement). The required supplemental courses are as follows:

CHM 113 General Chemistry <i>SQ</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i>	5
PHY 111 General Physics <i>SQ</i> *	3
PHY 112 General Physics <i>SQ</i> *	3
PHY 113 General Physics Laboratory <i>SQ</i> *	1
PHY 114 General Physics Laboratory <i>SQ</i> *	1
Total	17

* Both PHY 111 and 113 or PHY 112 and 114 must be taken to secure SQ credit.

CLINICAL LABORATORY SCIENCES—B.S.

The goal of the Clinical Laboratory Sciences degree program is to prepare individuals to practice in the field of clinical laboratory sciences, which includes the major disciplines of clinical chemistry, hematology, immuno-hematology, immunology, and microbiology. Employment opportunities exist in hospital, private, physician, and research laboratories and in government, sales, management, and education. After obtaining a B.S. degree in Clinical Laboratory Sciences, the graduate is eligible for national certification by examination.

A student majoring in Clinical Laboratory Sciences is required to take 40 hours of clinical laboratory sciences courses. Also required are the following courses:

BCH 361 Principles of Biochemistry	3
BIO 360 Basic Physiology	4
CHM 113 General Chemistry <i>SQ</i>	4
CHM 231 Elementary Organic Chemistry <i>SQ</i> ¹	3

MIC 205 Microbiology <i>SG</i> ²	3
or MIC 220 Biology of Microorganisms (3)	
MIC 206 Microbiology Laboratory <i>SG</i> ²	1
Total	18

¹ Both CHM 231 and 235 must be taken to secure SQ credit.

² Both MIC 205 and 206 must be taken to secure SG credit.

Equivalent courses may be substituted upon approval of an advisor. Students must consult with the clinical laboratory sciences advisor to select general electives courses. Completion of the degree is dependent upon acceptance of the student into the accredited professional study program, which consists of 40 hours of clinical laboratory sciences courses. The university does not guarantee all students to be accepted into the professional study program due to space limitations at the clinical affiliates and restrictions of program accreditation. For more information on acceptance procedures and program standards, contact the department for a program brochure. For proper course planning, students must meet with a clinical laboratory sciences advisor.

MINOR IN MICROBIOLOGY

The minor in Microbiology consists of a minimum of 24 semester hours. Required courses are as follows:

BIO 181 General Biology <i>SQ</i>	4
BIO 182 General Biology <i>SG</i>	4
BIO 340 General Genetics	4
MIC 206 Microbiology Laboratory <i>SG</i> ¹	1
MIC 220 Biology of Microorganisms	3
MIC 302 Advanced Bacteriology Laboratory <i>L</i> ²	2
MIC 360 Bacterial Physiology	3
Total	21

¹ Both MIC 205 and 206 must be taken to secure SG credit.

² Both MIC 302 and 401 must be taken to secure L credit.

The remaining upper-division microbiology courses are chosen in consultation with an advisor. Students majoring in Biology may not minor in Microbiology.

GRADUATE PROGRAMS

The faculty in the Department of Microbiology offer programs leading to the degrees of Master of Natural Science, M.S., and Ph.D. See the *Graduate Catalog* for requirements.

The department participates in the interdisciplinary program for the M.S. and Ph.D. degrees in Molecular and Cellular Biology. See the *Graduate Catalog* for courses, faculty, and program information, or call 480/965-0743 for more information.

CLINICAL LABORATORY SCIENCES/ MEDICAL TECHNOLOGY (CLS)

CLS 100 Introduction to Clinical Laboratory Sciences. (1) F
Introduction to the field of clinical laboratory sciences. Required for Clinical Laboratory Sciences majors.

Enrollment for the following CLS classes is restricted to students admitted to the Clinical Laboratory Sciences Professional Study Program.

CLS 310 Principles of Clinical Chemistry I. (6) S
Theory and application of principles of clinical chemistry, with emphasis on laboratory techniques, pathophysiology, methods of analysis, and assessment of procedure. 3 hours lecture, 9 hours lab.

- CLS 320 Principles of Clinical Microbiology I.** (6) S
Theory and application of principles of clinical microbiology with emphasis on isolation and identification of medically significant fungi and bacteria. 3 hours lecture, 9 hours lab.
- CLS 330 Principles of Clinical Hematology I/Body Fluids.** (3) F
Theory and application of principles in hematology, with emphasis on techniques to evaluate blood dyscrasias and analyze body fluids. 2 hours lecture, 3 hours lab.
- CLS 410 Principles of Clinical Chemistry II.** (2) SS
Continuation of CLS 310 with emphasis on principles of advanced clinical chemistry. 1 hour lecture, 3 hours lab.
- CLS 411 Advanced Applications of Clinical Chemistry.** (4) F
Clinical application of theory/techniques from CLS 310 and 410. Emphasis on operation of common laboratory instrumentation and clinical correlation. Minimum 180 hours practicum.
- CLS 420 Principles of Microbiology II.** (2) SS
Disease mechanisms and identification of medically significant parasites, Mycobacteria, Actinomycetes, Chlamydia, Rickettsia, Mycoplasma, and viruses. 1 hour lecture, 3 hours lab.
- CLS 421 Advanced Applications of Clinical Microbiology.** (4) S
Practical laboratory application of the principles of specimen collection, processing, detection, identification, and antimicrobial testing of medically significant bacteria, fungi, and parasites. Minimum 180 hours practicum.
- CLS 430 Principles of Clinical Hematology II/Hemostasis.** (3) F
Theory and applications of principles in hematology with emphasis on etiology, pathophysiology, clinical manifestations, and treatment of blood dyscrasias/hemostatic defects. 2 hours lecture, 3 hours lab.
- CLS 431 Advanced Applications of Clinical Hematology.** (4) S
Practical laboratory application of methods/techniques used to evaluate and diagnose blood dyscrasias/hemostatic defects. Applied techniques in body fluid analysis. Minimum 180 hours practicum.
- CLS 440 Principles of Clinical Immunology/Immunohematology.** (4) F
Theoretical and practical application of clinical immunology and immunohematology. Emphasizes serological techniques that aid disease diagnosis and blood donor selection. 3 hours lecture, 3 hours lab.
- CLS 441 Advanced Applications of Clinical Immunology/Immunohematology.** (3) S
Practical laboratory application of the principles of serological methods used in diagnosing disease and selecting blood components for transfusion therapy. Minimum 135 hours practicum.
- CLS 450 Principles of Clinical Laboratory Administration.** (2) F, S
Principles of management, with emphasis on the clinical laboratory. Basic management process, personnel supervision, identification, and allocation of resources. *General Studies: L (if credit also earned in CLS 460).*
- CLS 460 Principles of Clinical Laboratory Education.** (1) S
Principles of learning, with application to the development of instructional objectives, strategies, and evaluation for teaching-learning situations in the laboratory. *General Studies: L (if credit also earned in CLS 450).*

MICROBIOLOGY (MIC)

- MIC 205 Microbiology.** (3) F, S, SS
Basic course for persons without credit in BIO 181, emphasizing general principles; role of microorganisms in health, ecology, and applied fields. May not be used for Microbiology major credit unless a diagnostic test is passed. Prerequisites: BIO 100 (or PLB 108) and CHM 101 or instructor approval. *General Studies: SG (if credit also earned in MIC 206).*
- MIC 206 Microbiology Laboratory.** (1) F, S, SS
Principles and laboratory techniques used in identifying and handling microorganisms. 3 hours lab. Pre- or corequisite: MIC 205 or 220. *General Studies: SG (if credit also earned in MIC 205).*
- MIC 220 Biology of Microorganisms.** (3) F, S
Basic course for persons with credit in BIO 181. Detailed study of microbial cells, their structure, genetics, physiology, and taxonomy. Corequisites: BIO 182; CHM 115.
- MIC 302 Advanced Bacteriology Laboratory.** (2) F, S
Advanced laboratory techniques in bacterial growth, physiology, genetics, and microscopy. Required of Microbiology majors. 4 hours lab. Prerequisites: completion of L requirement and either A or B. (A) MIC 206 and 220 or (B) MIC 205 and 206 and instructor approval. *General Studies: L (if credit also earned in MIC 401).*
- MIC 360 Bacterial Physiology.** (3) F, S
Mechanisms and control of cell metabolism, structures, and functions. Prerequisite: MIC 220. Pre- or corequisite: BCH 361 or instructor approval.
- MIC 380 Medical Parasitology.** (3) F
Parasitic diseases of humans, including life cycle events and clinical manifestations. Prerequisite: MIC 205 or 220.
- MIC 381 Pathogenic Microbes.** (3) S
Host-microbial interactions in infectious disease, with emphasis on pathogenesis, host defenses, and molecular mechanisms of microbial virulence. Prerequisite: MIC 360 or 6 hours of microbiology with instructor approval.
- MIC 401 Research Paper.** (1) F, S, SS
A paper of 15 or more pages based on library or laboratory research in collaboration with a faculty member. Required of all Microbiology majors. Prerequisites: MIC 302; completion of L requirement. *General Studies: L (if credit also earned in MIC 302).*
- MIC 420 Immunology: Molecular and Cellular Foundations.** (3) F
Molecular and cellular foundations of immunology. Antibody/antigen interactions, cellular response, cytokines, immunogenetics, immunoregulation, autoimmunity, psychoneuroimmunology research/medical perspectives. Prerequisites: CHM 231 (or 331) and MIC 205 (or 220) or instructor approval.
- MIC 421 Experimental Immunology.** (2) F, S
An introduction to the basic techniques, methods, and assays used in immunology. 6 hours lab. Prerequisites: CHM 231 and 331 and MIC 302 or instructor approval.
- MIC 425 Advanced Immunology.** (3) S 2001
A 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) S
Survey of genetic exchange and regulatory processes in bacteria and their viruses. Bacteria and viruses as tools in genetic engineering. Prerequisites: BIO 340 and MIC 205 (or 220) or instructor approval.
- MIC 442 Bacterial Genetics Laboratory.** (1) N
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) F, S
Molecular genetic principles: plasmid construction, purification, and characterization; PCR; mutageneses; 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: BIO 340 and MIC 302 or instructor approval.
- MIC 446 Techniques in Molecular Biology/Genetics Lab.** (2) F, S
Molecular genetic techniques; plasmid construction, purification, and characterization; PCR; mutageneses; 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) F
Biology, classification, and enrichment culture of the nonpathogenic bacteria. 2 hours lecture, 6 hours lab. Prerequisite: MIC 302.
- MIC 485 General Virology.** (3) F
Fundamental nature of viruses, their replication, pathogenesis, and ecology. Prerequisites: BIO 340 and CHM 331 or instructor approval.
- MIC 486 General Virology Laboratory.** (2) N
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.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

MIC 494 Special Topics. (3) N

(a) Clinical Bacteriology Laboratory

MIC 495 Undergraduate Research. (1–6) F, S, SS

Supervised research in microbiology. May be repeated for credit. Lab. Prerequisites: MIC 206, 220, 302; instructor approval.

MIC 527 Neuroimmunology. (3) S 2003

Studying 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) N

Pathogenic mechanisms and host responses in viral and/or bacterial diseases. Prerequisites: MIC 381 and 420 or instructor approval.

MIC 585 Molecular Virology. (3) N

Selected topics concerning molecular aspects of eukaryotic virus replication and pathogenesis. Prerequisite: instructor approval.

MIC 591 Seminar. (1–3) F, S

Topics may be selected from the following:

- (a) Bacterial Ecology
- (b) Current Research in Microbiology
- (c) Enzymology
- (d) Genetic Engineering
- (e) Genetics
- (f) Immunology
- (g) Molecular Virology
- (h) Neuroimmunology
- (i) Pathogenic Bacteriology

Department of Military Science

Army ROTC**Lt. Col. Samuel Hawes***Chair***(TCB 104) 480/965-3318****www.asu.edu/clas/military****PROFESSORS**

DALGLEISH, HAWES, WALLER

ASSISTANT PROFESSORS

MASSEY, ROMESBURG, RUDOLPH

INSTRUCTORS

GRIFFIN, RINGENOLDUS

CLINICAL ASSOCIATE PROFESSOR

COX

PURPOSE

The Department of Military Science curriculum consists of the basic course (MIS 101, 102, 201, and 202) and the advanced course (MIS 301, 302, 401, and 402). The goal of this professional education curriculum is to prepare students with leadership potential to be commissioned as U.S. Army officers. Objectives include developing the following characteristics in students: leadership and managerial skills, the ability to think creatively, the ability to speak and write effectively, appreciation of the requirements for national security, and an understanding of the nature and functions of the U.S. Army. Upon successful completion of the advanced course and graduation, qualified students receive commissions in the Active Army (on a competitive basis), U.S. Army Reserve, or Army National Guard.

In addition to the military science curriculum, core courses in the field of national defense studies are both an

integral and parallel source of the department's program. Integrally, they provide MIS courses at all levels with topical intensity and highlight such professionally related areas as military technology; weapons procurement; national intelligence, secrecy, and counterintelligence; civil-military relations; security coalitions and regional defense communities; national, regional, and global levels of strategy; generalship skill-in-action; deterrence dynamics and structure; military doctrine; service-branch livelihood, appropriations rivalry, and interservice cooperation; personnel recruitment, morale, training, advancement, and bureaucratic organization; military reform; threat and threat perception; military-historical experience and analogy; media and biographical insights; the rationale and matrices of security analysis and research; and independently selectable topics.

The department also fields an independent but parallel set of 400-level courses in the areas of geostrategic, politico-strategic, and national defense policy and analysis—available to students irrespective of Reserve Officers' Training Corps (ROTC) status, departmental major, or college affiliation—for assigned credit toward General Studies, social science, and global awareness requirements for graduation. (See "Classification of Courses," page 60, for a description of course 499 Individualized Instruction.)

GENERAL QUALIFICATIONS

Basic Course. Any student who is enrolled in ASU (or approved by the professor of military science) can enter into military science basic classes. It is strongly recommended that the student be in good physical shape because some of the curriculum requires physical exertion.

Advanced Course. Any student who is enrolled in ASU (or approved by the professor of military science) may participate in military science advanced classes. However, to be fully enrolled in the advanced course and compete for and obtain a commission in the U.S. Army, students must meet the following requirements:

1. be a citizen of the United States (noncitizens may enroll but must obtain citizenship before commissioning);
2. be of sound physical condition and pass the U.S. Army physical fitness test;
3. meet the required professional military educational requirements; and
4. be at least 17 years of age for entrance into the advanced course and be able to complete all commissioning requirements before age 27.

Only those students in the basic and advanced courses who meet the required standards according to military regulations are eligible to receive financial assistance through the U.S. Army. Faculty of the Department of Military Science are available during normal office hours to answer questions or provide counseling.

The following are various options open to students who wish to obtain a commission in the U.S. Army. Contact the Department of Military Science personnel for more information.

Four-Year Program. Students may enroll in Army ROTC during their freshman year. They take the basic course during the first two years, receiving a total of 12 semester hours

of credit for four semesters of study. Upon satisfying the requirements, they enter the advanced course, where they earn 12 additional semester hours for four semesters of study. Students are also required to attend a five-week advanced summer camp at Fort Lewis, Washington, between their junior and senior years. All commissioned officers must meet certain Professional Military Education requirements by completing courses in English, math, and computer literacy. Selected majors such as nursing, engineering, and architecture, among others, may require an additional semester or two, or summer school, to complete all requirements for a degree and commission without excessive course overloads. Upon successful completion of the advanced course and requirements for a degree, students are commissioned as second lieutenants in the Active Duty Army, U.S. Army Reserve, or Army National Guard.

Two-Year Program. Students must have at least two academic years of college work remaining, either at the undergraduate or graduate level. The student must also have reached academic junior status. This program is open to all students with the exception of three- and four-year Army ROTC scholarship winners (see “Scholarship Programs” on this page). Students seeking enrollment in the two-year program should make application during the spring semester of the calendar year in which they desire to enter the program. They must provide SAT/ACT scores and pass the Army physical fitness test. After successfully completing a paid five-week basic camp, students may enroll in the advanced course. (The camp is conducted during June and July at Fort Knox, Kentucky.) Students who have previous military experience or who are currently members of the National Guard or Reserves may be admitted directly into the two-year program, provided they are academic juniors. They then follow the same program and meet the same requirements as stated for advanced course students in the four-year program.

Qualifications for Admittance to the Advanced Course. The following qualifications are required for admittance to the advanced course:

1. successful completion of the basic course for the students in the four-year ROTC program; for the students in the two-year program, selection for and completion of the six-week basic summer camp or prior military service;
2. score at least 850 on SAT or 19 on ACT;
3. passing the Army physical examination;
4. achieving and maintaining the minimum cumulative GPA required for graduation in the student's selected major, but no less than 2.00;
5. attainment of at least junior class standing; and
6. maintenance of full-time student status.

Pay and Allowances. Each advanced course student receives one-half the pay of a second lieutenant during attendance at the six-week advanced camp. Uniforms, housing, and meals are provided at camp without cost to the students, and they are reimbursed at the current mileage rate

for travel to and from the camp. Students who attend basic camp receive the pay of an army recruit during attendance at basic camp as well as the current mileage rate for travel to and from the camp. All students in the advanced course, regardless of scholarship status, are paid about \$1,500 tax-free for each of these two years.

Simultaneous Membership Program. Under this program, ROTC students may simultaneously be members of the Army Reserves or the National Guard. The combination of advance course allowance and pay for Army Reserve or National Guard participation provides more than \$1,250 for each semester's involvement.

Scholarship Programs. The Army ROTC offers scholarship programs for outstanding young men and women who are motivated toward a career as professional officers in the U.S. Army. These scholarships are awarded in varying amounts for tuition. In addition, the scholarship pays \$150.00 per month subsistence allowance and \$225.00 each semester for textbooks and supplies. A scholarship for four years is available to freshmen who enter the four-year program. Applications must be submitted in accordance with a schedule furnished by high school counselors. Selection is made on a nationwide basis. Scholarships are also available for three- and two-year periods, commencing with the sophomore and junior years of ROTC respectively. Applications are open to all students in good standing with the university; previous ROTC or military experience is not required for application for three- and two-year scholarships. Selection is made by a review board on campus. Acceptance of any of the three scholarship programs requires a service commitment to serve in the Active Army for a period of up to four years after commissioning and graduation.

Active Duty Requirements. Graduates of Army ROTC may serve as officers in the Active Army, Army National Guard, or Army Reserves. Active duty commitments may vary from four years to as little as three months. Scholarship students have up to a four-year active duty commitment.

Graduate and Professional Studies Programs. A delay from call to active duty for up to four years is available to outstanding students who desire to earn graduate or professional degrees. Special programs for graduate and professional studies are available to both active Army appointees and Reserve component appointees in the following areas: medicine, osteopathy, and clinical psychology.

MILITARY SCIENCE (MIS)

MIS 101 Introduction to the Military. (3) F

Overview of mission, organization, and structure of the Army and its role in national defense; discussion of current military issues. 3 hours lecture/conference, 2 hours lab.

MIS 102 Land Navigation, First Aid, and Survival. (3) S

Introduction to military maps and land navigation; first aid, and lifesaving techniques; basic outdoor survival skills. 3 hours lecture/conference, 2 hours lab.

MIS 201 American Military History. (3) F

A study of the role of the military in American life during war and peace from colonial times to the present day. 3 hours lecture/conference, 2 hours lab.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see “General Studies,” page 87. For graduation requirements, see “University Graduation Requirements,” page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see “Classification of Courses,” page 60.

MIS 202 Introduction to Leadership Dynamics. (3) S

Introduction to interpersonal dynamics involved in military team operations; theory and application of military leadership principles. 3 hours lecture/conference, 2 hours lab.

MIS 205 ROTC Basic Camp. (4) SS

Six-week training program emphasizing practical hands-on skills and leadership development. Taken in lieu of MIS 101, 102, 201, 202. Conducted at Fort Knox, Kentucky.

MIS 301 Advanced Military Science I. (3) F

Theory and dynamics of the individual soldier and military units in offensive combat operations. 2 hours lecture-conferences, 1.5 hours of Leadership Practical Application, 1 2-day field exercise, 3 1-day field exercises. Prerequisites: MIS 101 and 102 and 201 and 202 or equivalents. Corequisite: EPE 105 Physical Education Activity (Army Master Fitness).

MIS 302 Advanced Military Science II. (3) S

Theory and dynamics of military units in defensive combat operations. 2 hours lecture-conferences, 1.5 hours Leadership Practical Application, 1 3-day field exercise, 2 1-day field exercises. Prerequisites: MIS 101 and 102 and 201 and 202 or equivalents. Corequisite: EPE 105 Physical Education Activity (Army Master Fitness).

MIS 303 ROTC Advanced Camp. (4) SS

Six-week training program emphasizing leadership development and advanced military skills, including tactics, land navigation, and physical training. Conducted at Fort Lewis, Washington. Prerequisites: MIS 301, 302.

MIS 401 Advanced Military Science III. (3) F

The military legal system; preparation and conduct of military training; leadership development; ethics and professionalism of the military officer. 3 hours lecture-conferences, 2 hours Leadership Practical Application, 1 2-day field exercise, 3 1-day field exercises. Prerequisites: MIS 301, 302. Corequisite: EPE 105 Physical Education Activity (Army Master Fitness).

MIS 402 Advanced Military Science IV. (3) S

Military correspondence; career planning and personal affairs in service; conduct of training; leadership development; ethics and professionalism of the military officer. 3 hours lecture, 2 hours Leadership Practical Application, 1 3-day field exercise, 2 1-day field exercises. Prerequisites: MIS 301, 302. Corequisite: EPE 105 Physical Education Activity (Army Master Fitness).

MIS 410 American Defense Policy I. (3) F

Evolution, organization, and execution of U.S. national security policy. *General Studies: SB.*

MIS 412 American Defense Policy II. (3) S

Contemporary problems and analytical issues in the formation and implementation of U.S. national security. Prerequisite: MIS 410. *General Studies: SB.*

MIS 414 Comparative Defense Policy Analysis. (3) F

Historical problems and analytical issues in the evolution, organization, application, and control of effective military establishments in various political systems. *General Studies: SB.*

MIS 416 Soviet/C.I.S. Foreign and Defense Policies. (3) S

Analysis of foreign and security policies of the Soviet Union/C.I.S. and of the successor states to the Warsaw Pact. *General Studies: SB.*

MIS 499 Individualized Instruction: National Defense Analysis. (1–3) N

Molecular and Cellular Biology

Bertram L. Jacobs
Director, Executive Committee
 480/965-0743
lsvl.la.asu.edu/mcb

GRADUATE PROGRAMS

The interdisciplinary M.S. and Ph.D. degrees with a major 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 Departments of Anthropology and Physics and Astronomy.

For more information, contact the director or see the *Graduate Catalog*.

MOLECULAR AND CELLULAR BIOLOGY (MCB)

See the *Graduate Catalog* for the MCB courses.

Molecular Biosciences/Biotechnology

J. Kenneth Hooper

Chair

Department of Plant Biology

(LSE 218) 480/965-3414

Edward A. Birge

Codirector

Department of Microbiology

(LSE 210) 480/965-1457

lsvl.la.asu.edu/mbb

MOLECULAR BIOSCIENCES/ BIOTECHNOLOGY—B.S.

The interdepartmental B.S. degree in Molecular Biosciences/Biotechnology is designed to prepare students for productive careers in rapidly expanding areas within the life sciences, such as biotechnology, medicine, and biomedical research or any area of biology at the molecular and cellular level. Courses and faculty are drawn primarily from the Departments of Plant Biology and Microbiology, with additional participation by the Departments of Biology and Chemistry and Biochemistry.

General Program

The B.S. degree program consists of approximately 62 semester hours of course work in required courses plus two courses in mathematics specifically designed for this program. The required major courses (21 total semester hours) are as follows:

MBB 245 Cellular and Molecular Biology.....	3
MBB 343 Genetic Engineering and Society.....	4
MBB 484 Internship	6
or MBB 499 Individualized Instruction (6)	
MBB 490 Capstone: Issues in Biotechnology	4
MIC 206 Microbiology Laboratory <i>SG</i>	1
MIC 220 Biology of Microorganisms	3
Total	21

Choose two or more of the following courses (or combinations) for a total of eight to 16 semester hours:

BIO 340 General Genetics.....	4
BIO 494 ST: Cell Biotechnology.....	4
MBB 350 Applied Genetics.....	4
MBB 445 Techniques in Biotechnology.....	2
MBB 446 Techniques in Molecular Biology/Genetics Lab ¹	2
MIC 420 Immunology: Molecular and Cellular Foundations.....	3

MIC 421 Experimental Immunology ²	2
Total	8–16

¹ MBB 446 is taken with 445.

² MIC 421 is taken with 420.

Required supplemental courses in biology, chemistry, and physics (33 total semester hours) are as follows:

BCH 361 Principles of Biochemistry.....	3
BCH 367 Elementary Biochemistry Laboratory.....	1
BIO 181 General Biology <i>SQ</i>	4
BIO 182 General Biology <i>SG</i>	4
CHM 113 General Chemistry <i>SQ</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i>	5
CHM 231 Elementary Organic Chemistry <i>SQ</i> ¹	3
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> ¹	1
PHY 111 General Physics <i>SQ</i> ²	3
PHY 112 General Physics <i>SQ</i> ³	3
PHY 113 General Physics Laboratory I <i>SQ</i> ²	1
PHY 114 General Physics Laboratory II <i>SQ</i> ³	1
Total	33

¹ Both CHM 231 and 235 must be taken to secure *SQ* credit.

² Both PHY 111 and 113 must be taken to secure *SQ* credit.

³ Both PHY 112 and 114 must be taken to secure *SQ* credit.

Courses that satisfy university numeracy requirements are as follows (six total semester hours):

MAT 251 Calculus for Life Sciences <i>MA</i>	3
MAT 351 Mathematical Methods for Genetic Analysis <i>CS</i>	3
Total	6

Additional courses are available in the life or physical sciences for elective credit.

MOLECULAR BIOSCIENCES/BIO TECHNOLOGY (MBB)

MBB 245 Cellular and Molecular Biology. (3) F

Concepts that underlie relationships between cellular and subcellular structure and function, and integration of major metabolic and genetic processes. Prerequisite: BIO 181.

MBB 343 Genetic Engineering and Society. (4) F

Introduction to genetic engineering with emphasis on applications (gene therapy, DNA fingerprinting, bioremediation, transgenic animals and plants). 3 hours lecture, 3 hours lab. Cross-listed as BIO 343. Credit is allowed for only BIO 343 or MBB 343. Prerequisite: BIO 181 or equivalent.

MBB 350 Applied Genetics. (4) S

Introduction to molecular genetics with emphasis on application of genetics in solving biological questions and engineering organisms in biotechnology. 2 hours lecture, 6 hours lab. Cross-listed as PLB 350. Credit is allowed for only MBB 350 or PLB 350. Prerequisite: BIO 181 or equivalent.

MBB 445 Techniques in Molecular Biology/Genetics. (2) F, S

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: BIO 340 and MIC 302 or instructor approval.

MBB 446 Techniques in Molecular Biology/Genetics Lab. (2) F, S
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) N

MBB 490 Capstone: Issues in Biotechnology. (2) F, S

Integration of science and humanities within problem-solving exercises dealing with intellectual property, ethics, regulatory issues, business practices, and commercialization. Prerequisite: MBB major or instructor approval.

MBB 499 Individualized Instruction. (3) N

Department of Philosophy

Brad Armentd

Chair

(PS A524) 480/965-3394

www.asu.edu/clas/philosophy

REGENTS' PROFESSOR

MURPHY

PROFESSORS

COHEN, CREATH, FITCH, HUMPHREY,
MAIENSCHIN, WHITE

ASSOCIATE PROFESSORS

ARMENDT, BLACKSON, de MARNEFFE, GULESERIAN,
KOBES, MCGREGOR, REYNOLDS

ASSISTANT PROFESSORS

DEVLIN, MASON

PHILOSOPHY—B.A.

The major in Philosophy consists of 45 semester hours, 33 of which must be upper-division hours. In addition to the 45 semester hours, the mathematics proficiency requirement must be met by completing MAT 117 or higher. In exceptional cases, up to nine units may be in related fields as approved by the undergraduate advisor. Required courses are as follows:

PHI 300 Philosophical Argument and Exposition <i>L</i>	3
PHI 301 History of Ancient Philosophy <i>HU, H</i>	3
PHI 302 History of Modern Philosophy <i>HU, H</i>	3
PHI 305 Ethical Theory <i>HU</i>	3
or PHI 335 History of Ethics <i>HU</i> (3)	
PHI 312 Theory of Knowledge <i>HU</i>	3
or PHI 314 Philosophy of Science <i>HU</i> (3)	
PHI 316 Metaphysics <i>HU</i>	3
or PHI 317 Philosophy of Mind <i>HU</i> (3)	
PHI 333 Introduction to Symbolic Logic.....	3
Choose two courses below	6
PHI 401 Rationalism (3)	
PHI 402 Empiricism <i>HU</i> (3)	
PHI 403 Contemporary Analytic Philosophy <i>HU</i> (3)	
PHI 413 Advanced Symbolic Logic (3)	
PHI 420 Topics in Philosophy (3)	

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

PHI 494 Special Topics (3)	—
Total	27

Exceptions by special permission of the chair only. PHI 420 may be taken more than once.

Students planning to do graduate work in philosophy should consult an advisor to develop an appropriate selection of courses at the 300 and 400 levels. A minimum grade of “C” is necessary for each course used to fulfill the major requirements. See “College Degree Requirements,” page 332.

History and Philosophy of Science. The faculty in the Department of Philosophy offer courses bearing the HPS prefix. With the consent of the director of undergraduate studies, these courses may be taken to satisfy the requirements of the Philosophy major.

MINOR IN PHILOSOPHY

A minor in Philosophy consists of 18 semester hours, of which at least 12 must be in the upper division and approved by an advisor in the department. All courses must be passed with a minimum grade of “C.”

CERTIFICATE IN HISTORY AND PHILOSOPHY OF SCIENCE

A certificate in History and Philosophy of Science consists of 18 semester hours, of which at least 12 must be in the upper division and approved by an advisor in the department. At least nine semester hours must be HPS, and three semester hours must be PHI 314 Philosophy of Science. All courses must be passed with a minimum grade of “C.”

GRADUATE PROGRAM

The faculty in the Department of Philosophy offer a graduate program leading to the M.A. and Ph.D. degrees. See the *Graduate Catalog* for requirements.

HISTORY AND PHILOSOPHY OF SCIENCE (HPS)

HPS 311 Origins, Evolution, and Creation. (3) F
Examines scientific, mythic, and religious ideas relating to origins (particularly human). Place of antievolutionism and “scientific creationism” in American culture. Lecture, discussion. Cross-listed as BIO 344/HUM 371/REL 383. Credit is allowed for only BIO 344 or HPS 311 or HUM 371 or REL 383.

HPS 322 History of Science. (3) A
Development and application of scientific thinking from ancient times through the 17th century. *General Studies: HU, H.*

HPS 323 History of Science. (3) N
Development and application of scientific thinking from the 18th century to the present. *General Studies: HU, H.*

HPS 325 History of Chinese Science. (3) N
Explores development of traditional Chinese science in the context of Chinese thought and society and in comparison with developments elsewhere. Lecture, discussion. Cross-listed as HIS 309. Credit is allowed for only HIS 309 or HPS 325.

HPS 330 History of Biology: Conflicts and Controversies. (3) A
Focuses on the 19th and 20th centuries, considering biology as a discipline, evolution, and problems of heredity, development, and cell theory. Cross-listed as BIO 316. Credit is allowed for only BIO 316 or HPS 330. *General Studies: H.*

HPS 331 History of Medicine. (3) A
Scientific study of the human body, changing theories of disease, evolution of practical opinions on treatment, and the emerging institutionalization of medical practice. Cross-listed as BIO 318. Credit is allowed for only BIO 318 or HPS 331. *General Studies: H.*

HPS 332 The Darwinian Revolution. (3) S
Intellectual and cultural history of Darwinism and modern evolutionary theory and their impact on 19th- and 20th-century thought. Lecture, discussion. Cross-listed as BIO 346/HUM 372. Credit is allowed for only BIO 346 or HPS 332 or HUM 372.

HPS 402 Technology, Society, and Human Values. (3) A
Values that motivate humankind to create technology. Areas of conflict and resolution of conflict between values and technology. Readings and discussions with visiting lecturers. Prerequisite: junior standing.

HPS 410 Professional Values in Science. (2–3) A
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 BIO 416. Credit is allowed for only BIO 416 or HPS 410. *General Studies: L.*

PHILOSOPHY (PHI)

PHI 101 Introduction to Philosophy. (3) F, S, SS
Exploration of issues that philosophers have traditionally considered, including morality, reality, and knowledge. *General Studies: HU.*

PHI 103 Principles of Sound Reasoning. (3) F, S, SS
Fallacies, validity, and soundness of arguments. May include syllogistic, elementary symbolic, inductive logic, and scientific method. Prerequisite: ENG 101. *General Studies: L/HU.*

PHI 105 Introduction to Ethics. (3) A
Philosophical examination of such questions as, How should we live? Is morality a social invention? Does anything matter? *General Studies: HU.*

PHI 300 Philosophical Argument and Exposition. (3) S
The development of techniques of philosophical argument and exposition. Frequent written exercises. Course content may vary with instructor. Prerequisites: major; instructor approval. *General Studies: L.*

PHI 301 History of Ancient Philosophy. (3) F
History of western philosophy from its beginnings through the Hellenistic period. *General Studies: HU, H.*

PHI 302 History of Modern Philosophy. (3) S
History of western philosophy from the Renaissance through Kant. *General Studies: HU, H.*

PHI 304 Existentialism. (3) N
Covers such topics as absurdity, authenticity, the meaning of life and death, responsibility, and subjectivity. May include readings in phenomenology. *General Studies: HU.*

PHI 305 Ethical Theory. (3) A
Current theories about the nature of morality (metaethics) and about what is right and wrong (normative ethics). Prerequisite: PHI 306 or 307 or instructor approval. *General Studies: HU.*

PHI 306 Applied Ethics. (3) F, S, SS
Philosophical discussion of contemporary moral and political issues, such as abortion, euthanasia, animal rights, affirmative action, and sexual rights. *General Studies: HU.*

PHI 307 Philosophy of Law. (3) A
Nature and source of law and its relation to morality. Legal rights, legal enforcement of morals, civil disobedience, liability and responsibility, punishment, judicial reasoning, justice, property, and differences between theories of natural and positive law. *General Studies: HU.*

PHI 308 Philosophy of Art. (3) A
Central problems in philosophy of art, e.g., the nature of a work of art, modern and traditional theories of art, aesthetic perception and experience, and objectivity and relativity in art criticism. *General Studies: HU.*

PHI 309 Social and Political Philosophy. (3) A
Alternative principles and methods relevant to problems of human association and conflict; justice and power, freedom and equality, and autonomy and order are discussed. Prerequisite: PHI 305 or instructor approval. *General Studies: HU.*

PHI 310 Environmental Ethics. (3) A
Examination of a full range of philosophical positions pertaining to our moral relationship to the natural world; anthropocentrism, individualism, biocentrism. *General Studies: HU.*

PHI 311 Philosophy in Literature. (3) A
Selected works of literature introduce philosophical problems such as the nature of moral goodness and people's relation to the world and other people. *General Studies: HU.*

PHI 312 Theory of Knowledge. (3) A

Nature, sources, and limits of human knowledge. Topics may include truth, a priori knowledge, empirical knowledge, perception, induction, and skepticism. Prerequisite: 1 course from among PHI 101, 103, 300, 301, 302, 333. *General Studies: HU.*

PHI 314 Philosophy of Science. (3) A

The structure and justification of scientific theories, explanation, and theory change. The roles of observation and laws, theoretical concepts and entities, reduction, probability, confirmation, space and time, and causation. *General Studies: HU.*

PHI 315 Philosophy of Language. (3) A

Problems pertaining to the nature of language, including meaning, reference, truth, definition, analyticity, translatability, synonymy, and contributions of contemporary linguistics. Prerequisite: PHI 103 or 300 or 333. *General Studies: HU.*

PHI 316 Metaphysics. (3) A

Problems pertaining to the nature of reality. Topics may include nature of person, minds, substance, universals, space, time, causation, and modality. Prerequisite: 1 course from among PHI 101, 103, 300, 301, 333. *General Studies: HU.*

PHI 317 Philosophy of Mind. (3) A

Nature of consciousness. The common sense view of mind, behaviorism, materialism, dualism, functionalism, self-knowledge, and knowledge of other minds. Prerequisite: 1 course from among PHI 101, 103, 300, 301, 302, 333. *General Studies: HU.*

PHI 318 Philosophy of Religion. (3) A

Classical arguments for the existence of God. The argument from evil against the existence of God. Justification of religious belief. *General Studies: HU.*

PHI 319 Philosophy of Computing. (3) N

Philosophical problems surrounding the theory of computation. Turing machines, mind and AI, neural network computing, ethics, and epistemology of computing. Lecture, lab, discussion. *General Studies: CS/HU.*

PHI 325 Philosophy of Social Science. (3) N

Philosophical problems surrounding the aims, structure, and methods of the social sciences. *General Studies: HU/SB.*

PHI 332 19th-Century Philosophy. (3) N

The history of 19th-century philosophical thought, emphasizing either the German or the British traditions. Prerequisite: PHI 302. *General Studies: HU.*

PHI 333 Introduction to Symbolic Logic. (3) A

Symbolic techniques, emphasizing deductions and proofs in the propositional and first order predicate calculi.

PHI 335 History of Ethics. (3) A

Major works of moral philosophy, both ancient and modern, such as those by Plato, Aristotle, Hobbes, Hume, Kant, and Mill. Prerequisite: PHI 101 or 306 or 307 or instructor approval. *General Studies: HU.*

PHI 401 Rationalism. (3) N

Examination of classical philosophical rationalism, as in Descartes, Spinoza, Malebranche, or Leibniz. Contemporary rationalist thought may also be examined. Prerequisites: PHI 302; 1 course from among PHI 305, 309, 312, 316, 317.

PHI 402 Empiricism. (3) N

Examination of 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) A

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; 1 course from among PHI 312, 314, 315, 316, 317, 401, 402. *General Studies: HU.*

PHI 413 Advanced Symbolic Logic. (3) N

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) A

Course descriptions on file in department. Topics may be selected from the following:

- History of Philosophy
- Metaphysics/Epistemology
- Philosophy of Language/Logic
- Philosophy of Science
- Value Theory

Courses may be repeated for credit. Prerequisite: one relevant upper-division PHI course or instructor approval.

PHI 494 Special Topics. (3) N**PHI 591 Seminar.** (1–3) A

Topics may be selected from the following:

- Aesthetics
- Epistemology
- Ethics
- History of Philosophy
- Logic
- Metaphysics
- Philosophy of Language
- Philosophy of Law
- Philosophy of Science
- Social and Political Philosophy

PHI 599 Thesis. (1–12) N

Department of Physics and Astronomy

Howard G. Voss
Chair

(PS F470) 480/965-3561
phy.asu.edu

REGENTS' PROFESSORS

SMITH, SPENCE

PROFESSORS

BAUER, BENNETT, BURSTEIN, COMFORT, COWLEY,
DOAK, DOW, HESTENES, JACOB, KAUFMANN,
LINDSAY, MENENDEZ, NIGAM, PAGE, PONCE,
REZ, RITCHIE, SANKEY, SCHEINFELD, SCHMIDT,
STARRFIELD, TILLERY, TSEN, TSONG, VENABLES, VOSS,
WINDHORST, WYCKOFF

ASSOCIATE PROFESSORS

AANNESTAD, ACHARYA, ALARCON, BENIN,
CHAMBERLIN, CULBERTSON, HERBOTS,
HESTER, MARZKE

PHYSICS—B.S.

Students majoring in Physics may pursue one of two options.

Option I. Designed for students who wish to pursue physics at the bachelor or graduate degree levels, option I consists of the following required courses:

Choose between the course combinations below4

PHY 150 Physics I SQ (4)

— or —

PHY 121 University Physics I: Mechanics SQ¹ (3)

PHY 122 University Physics Laboratory I SQ¹ (1)

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

Choose between the course combinations below.....4

PHY 151 Physics II *SQ* (4)

_____ or _____

PHY 131 University Physics II: Electricity and Magnetism *SQ*² (3)

PHY 132 University Physics Laboratory II *SQ*² (1)

PHY 201 Mathematical Methods in Physics I.....3

PHY 252 Physics III *SQ*4

PHY 302 Mathematical Methods in Physics II.....2

PHY 310 Classical Particles, Fields, and Matter I.....3

PHY 311 Classical Particles, Fields, and Matter II3

PHY 314 Quantum Physics I.....3

PHY 315 Quantum Physics II.....3

PHY 333 Electronic Circuits and Measurements3

PHY 334 Advanced Laboratory I2

PHY 412 Classical Particles, Fields, and Matter III3

PHY 416 Quantum Physics III3

PHY 441 Statistical and Thermal Physics I.....3

PHY 465 Advanced Laboratory II2

Total45

¹ Both PHY 121 and 122 must be taken to secure SQ credit.

² Both PHY 131 and 132 must be taken to secure SQ credit.

Supporting mathematics courses are as follows:

Choose between the course combinations below..... 12 or 10

MAT 270 Calculus with Analytic Geometry I *MA* (4)

MAT 271 Calculus with Analytic Geometry II *MA* (4)

MAT 272 Calculus with Analytic Geometry III *MA* (4)

_____ or _____

MAT 290 Calculus I *MA* (5)

MAT 291 Calculus II (5)

Additional courses in physics and related fields are selected with the approval of the advisor. French, German, or Russian is strongly recommended to fulfill the foreign language requirement.

Option II. The interdisciplinary option II is designed for students who wish to obtain an undergraduate physics preparation for entry into other professions or graduate programs. A total of 53 hours are required, including the following courses:

Choose between the course combinations below.....4

PHY 150 Physics I *SQ* (4)

_____ or _____

PHY 121 University Physics I: Mechanics *SQ*¹ (3)

PHY 122 University Physics Laboratory I *SQ*¹ (1)

Choose between the course combinations below.....4

PHY 151 Physics II *SQ* (4)

_____ or _____

PHY 131 University Physics II: Electricity and Magnetism *SQ*² (3)

PHY 132 University Physics Laboratory II *SQ*² (1)

PHY 201 Mathematical Methods in Physics I.....3

PHY 252 Physics III *SQ*4

PHY 302 Mathematical Methods in Physics II.....2

PHY 310 Classical Particles, Fields, and Matter I.....3

PHY 311 Classical Particles, Fields, and Matter II3

PHY 314 Quantum Physics I.....3

PHY 315 Quantum Physics II.....3

PHY 333 Electronic Circuits and Measurements3

PHY 334 Advanced Laboratory I2

PHY 412 Classical Particles, Fields, and Matter III3

PHY 441 Statistical and Thermal Physics I.....3

Total40

¹ Both PHY 121 and 122 must be taken to secure SQ credit.

² Both PHY 131 and 132 must be taken to secure SQ credit.

The remaining courses are selected from physics and an area of concentration as approved by the student's advisor. Examples of possible areas of concentration are astronomy, astrophysics, materials science, physical chemistry, applied mathematics, geophysics, biological physics, philosophy of science, scientific journalism, and premedical and prelaw programs. French, German, or Russian is strongly recommended to fulfill the foreign language requirement.

Supporting mathematics courses are as follows:

Choose between the course combinations below..... 12 or 10

MAT 270 Calculus with Analytic Geometry I *MA* (4)

MAT 271 Calculus with Analytic Geometry II *MA* (4)

MAT 272 Calculus with Analytic Geometry III *MA* (4)

_____ or _____

MAT 290 Calculus I *MA* (5)

MAT 291 Calculus II (5)

Emphasis in Astronomy

The astronomy faculty offer courses in astronomy both for nonscience majors and for science and physics majors. For an emphasis in astronomy, the following courses (or their equivalents) should be taken:

AST 321 Introduction to Planetary and Stellar Astrophysics *SQ*¹.....3

AST 322 Introduction to Galactic and Extragalactic Astrophysics *SQ*².....3

AST 421 Astrophysics I3

AST 422 Astrophysics II.....3

AST 499 Individualized Instruction3

Total15

¹ Both AST 113 and 321 must be taken to secure SQ credit.

² Both AST 114 and 322 must be taken to secure SQ credit.

MINOR IN ASTRONOMY

The minor in Astronomy consists of a minimum of 24 semester hours. Required courses are as follows:

AST 113 Astronomy Laboratory I *SQ*¹1

AST 114 Astronomy Laboratory II *SQ*²1

AST 321 Introduction to Planetary and Stellar Astrophysics *SQ*¹.....3

AST 322 Introduction to Galactic and Extragalactic Astrophysics *SQ*².....3

Choose between the course combinations below.....4

PHY 150 Physics I *SQ* (4)

_____ or _____

PHY 121 University Physics I: Mechanics *SQ*³ (3)

PHY 122 University Physics Laboratory I *SQ*³ (1)

Choose between the course combinations below.....4

PHY 151 Physics II *SQ* (4)

_____ or _____

PHY 131 University Physics II: Electricity and Magnetism *SQ*⁴ (3)

PHY 132 University Physics Laboratory II *SQ*⁴ (1)

PHY 252 Physics III *SQ*4

Approved upper-division electives.....4

Total24

¹ Both AST 113 and 321 must be taken to secure SQ credit.

² Both AST 114 and 322 must be taken to secure SQ credit.

³ Both PHY 121 and 122 must be taken to secure SQ credit.

⁴ Both PHY 131 and 132 must be taken to secure SQ credit.

Electives are chosen with the approval of an astronomy advisor from upper-division courses in physics and astronomy.

MINOR IN PHYSICS

The minor in Physics consists of a minimum of 29 semester hours. Required courses are as follows:

Choose between the course combinations below.....4
PHY 150 Physics I SQ¹ (4)

_____ or _____

PHY 121 University Physics I: Mechanics SQ¹ (3)

PHY 122 University Physics Laboratory I SQ¹ (1)

Choose between the course combinations below.....4

PHY 151 Physics II SQ² (4)

_____ or _____

PHY 131 University Physics II: Electricity and Magnetism SQ² (3)

PHY 132 University Physics Laboratory II SQ² (1)

PHY 201 Mathematical Methods in Physics I.....3

PHY 252 Physics III SQ².....4

PHY 302 Mathematical Methods in Physics II.....2

PHY 310 Classical Particles, Fields, and Matter I.....3

PHY 311 Classical Particles, Fields, and Matter II.....3

PHY 314 Quantum Physics I.....3

Approved electives.....3

Total29

¹ Both PHY 121 and 122 must be taken to secure SQ credit.

² Both PHY 131 and 132 must be taken to secure SQ credit.

Electives are chosen with the approval of the physics advisor from upper-division courses in physics and astronomy.

SECONDARY EDUCATION—B.A.E.

Physics. Two options are available for physics as the major teaching field.

Option One. The major teaching field consists of 42 semester hours. Required courses are as follows:

Choose between the course combinations below.....4
PHY 150 Physics I SQ¹ (4)

_____ or _____

PHY 121 University Physics I: Mechanics SQ² (3)

PHY 122 University Physics Laboratory I SQ² (1)

Choose between the course combinations below.....4

PHY 151 Physics II SQ¹ (4)

_____ or _____

PHY 131 University Physics II: Electricity and Magnetism SQ³ (3)

PHY 132 University Physics Laboratory II SQ³ (1)

PHY 201 Mathematical Methods in Physics I.....3

PHY 252 Physics III SQ¹.....4

PHY 302 Mathematical Methods in Physics II.....2

PHY 310 Classical Particles, Fields, and Matter I.....3

PHY 311 Classical Particles, Fields, and Matter II3

PHY 333 Electronic Circuits and Measurements3

PHY 361 Introductory Modern Physics.....3

or PHY 314 Quantum Physics I (3)

PHY 480 Methods of Teaching Physics3

or PHY 484 Internship: Physics Teaching (1–4)

Approved electives.....10

Total42

¹ PHY 111, 112, 113, and 114 or equivalents may be substituted for PHY 150, 151, and 252 on approval of the advisor.

² Both PHY 121 and 122 must be taken to secure SQ credit.

³ Both PHY 131 and 132 must be taken to secure SQ credit.

Electives are chosen in physics or other closely related fields, subject to the approval of the advisor.

Option Two. Option two consists of 32 semester hours in physics and an additional 30 semester hours in chemistry (see “Minor in Chemistry,” page 357) or mathematics (see “Minor in Mathematics,” page 405). The physics portion of this program requires the following courses:

Choose between the course combinations below.....4
PHY 150 Physics I SQ¹ (4)

_____ or _____

PHY 121 University Physics I: Mechanics SQ² (3)

PHY 122 University Physics Laboratory I SQ² (1)

Choose between the course combinations below.....4

PHY 151 Physics II SQ¹ (4)

_____ or _____

PHY 131 University Physics II: Electricity and Magnetism SQ³ (3)

PHY 132 University Physics Laboratory II SQ³ (1)

PHY 201 Mathematical Methods in Physics I⁴.....3

PHY 252 Physics III SQ¹.....4

PHY 302 Mathematical Methods in Physics II.....2

PHY 310 Classical Particles, Fields, and Matter I.....3

PHY 311 Classical Particles, Fields, and Matter II.....3

PHY 333 Electronic Circuits and Measurements3

PHY 361 Introductory Modern Physics.....3

or PHY 314 Quantum Physics I (3)

PHY 480 Methods of Teaching Physics⁵.....3

or PHY 484 Internship: Physics Teaching (1–4)

Total32

¹ PHY 111, 112, 113, and 114 or equivalents may be substituted for PHY 150, 151, and 252 on approval of the advisor.

² Both PHY 121 and 122 must be taken to secure SQ credit.

³ Both PHY 131 and 132 must be taken to secure SQ credit.

⁴ Physics/Math option: MAT 274 plus MAT 342 may be substituted for PHY 201.

⁵ Physics/Chemistry: CHM 480 may be substituted for PHY 480.

Minor Teaching Field. The minor teaching field consists of 24 semester hours. Required courses are as follows:

Choose between the course combinations below.....4
PHY 150 Physics I SQ¹ (4)

_____ or _____

PHY 121 University Physics I: Mechanics SQ² (3)

PHY 122 University Physics Laboratory I SQ² (1)

Choose between the course combinations below.....4

PHY 151 Physics II SQ¹ (4)

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see “General Studies,” page 87. For graduation requirements, see “University Graduation Requirements,” page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see “Classification of Courses,” page 60.

— or —

PHY 131 University Physics II: Electricity and Magnetism <i>SQ</i> ³ (3)	
PHY 132 University Physics Laboratory II <i>SQ</i> ³ (1)	
PHY 201 Mathematical Methods in Physics I.....	3
PHY 252 Physics III <i>SQ</i> ¹	4
PHY 314 Quantum Physics I.....	3
or PHY 361 Introductory Modern Physics (3)	
PHY 480 Methods of Teaching Physics.....	3
or PHY 484 Internship: Physics Teaching (1–4)	
Approved elective.....	3
Total.....	24

¹ PHY 111, 112, 113, and 114 may be substituted for PHY 150, 151, and 252, or equivalents, on approval of the advisor.

² Both PHY 121 and 122 must be taken to secure *SQ* credit.

³ Both PHY 131 and 132 must be taken to secure *SQ* credit.

The remaining hours are selected from upper-division courses in physics or astronomy (including AST 113 and 114), subject to approval of the advisor.

GRADUATE PROGRAMS

The faculty in the Department of Physics and Astronomy offer programs leading to the degrees of Master of Natural Science, M.S., and Ph.D. See the *Graduate Catalog* for requirements.

ASTRONOMY (AST)

AST 111 Introduction to Solar Systems Astronomy. (3) F
History; properties of light; instruments; study of solar system and nearby stars. For nonscience majors. Optional lab (AST 113). *General Studies: SQ (if credit also earned in AST 113).*

AST 112 Introduction to Stars, Galaxies, and Cosmology. (3) S
Structure and evolution of stars; star clusters; galaxies; cosmology. For nonscience majors. Optional lab (AST 114). *General Studies: SQ (if credit also earned in AST 114).*

AST 113 Astronomy Laboratory I. (1) F
Astronomical observations and experiments designed to help the student become familiar with the sky, telescopes, and astronomical measurements. 2.5 hours lab. Pre- or corequisites: AST 111 (or 321); a working knowledge of high school algebra and geometry. *General Studies: SQ (if credit also earned in AST 111 or 321).*

AST 114 Astronomy Laboratory II. (1) S
Similar to AST 113, but material chosen to supplement AST 112 and 322. 2.5 hours lab. Pre- or corequisites: AST 112 (or 322); a working knowledge of high school algebra and geometry. *General Studies: SQ (if credit also earned in AST 112 or 322).*

AST 321 Introduction to Planetary and Stellar Astrophysics. (3) F
Physical laws; celestial mechanics; properties of planets, the sun, and other stars; formation and evolution of stars and planetary systems. Prerequisites: MAT 270 (or 290); PHY 150. *General Studies: SQ (if credit also earned in AST 113).*

AST 322 Introduction to Galactic and Extragalactic Astrophysics. (3) S
Evolved stars; introduction to relativity; galaxies and interstellar matter; structure and dynamics of galaxies; cosmology. Prerequisite: AST 321 or instructor approval. *General Studies: SQ (if credit also earned in AST 114).*

AST 421 Astrophysics I. (3) F
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) S
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 499 Individualized Instruction. (3) N

AST 598 Special Topics. (1–4) N

- 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

PHYSICAL SCIENCES (PHS)

PHS 110 Fundamentals of Physical Science. (4) F, S

One-semester survey of the principles of physics and chemistry. Understanding of elementary algebra is presumed. 3 hours lecture, 2 hours lab. *General Studies: SQ.*

PHS 208 Patterns in Nature. (4) F, S

Project-oriented science course with computer training to develop critical thinking, and technical skills for student-oriented science lessons K–12. Lecture, lab. Cross-listed as STE 208. Credit is allowed for only PHS 208 or STE 208. Prerequisite: college-level science course or instructor approval. *General Studies: SQ.*

PHS 484 Physical Science Internship. (3) F, S

Teach middle school students scientific concepts discussed and demonstrated in PHS 208. Hands-on experience is the focus of the teaching.

PHYSICS (PHY)

PHY 101 Introduction to Physics. (4) F, S

Emphasizes applications of physics to life in the modern world. Understanding of elementary algebra is presumed. 3 hours lecture, 1 recitation, 2 hours lab. *General Studies: SQ.*

PHY 105 Basic Physics. (3) F

One-semester survey of the principles of physics. Primarily for students who intend to take PHY 121, 131 but have not taken high school physics. 3 hours lecture, 1 recitation. Prerequisites: algebra and trigonometry.

PHY 111 General Physics. (3) F, S, SS

Noncalculus treatment of the principles of physics for nonphysics majors. Students whose curricula require a laboratory course must also register for PHY 113. 3 hours lecture, 1 recitation. Prerequisite: trigonometry. *General Studies: SQ (if credit also earned in PHY 113).*

PHY 112 General Physics. (3) F, S, SS

Continuation of PHY 111. Students whose curricula require a laboratory course must also register for PHY 114. Prerequisite: PHY 111. *General Studies: SQ (if credit also earned in PHY 114).*

PHY 113 General Physics Laboratory. (1) F, S, SS

Elementary experiments in physics. 2 hours lab. Outside preparation for experiments and report writing are required. May be taken concurrently with, or subsequent to, PHY 111. *General Studies: SQ (if credit also earned in PHY 111).*

PHY 114 General Physics Laboratory. (1) F, S, SS

See PHY 113. May be taken concurrently with, or subsequent to, PHY 112. *General Studies: SQ (if credit also earned in PHY 112).*

PHY 121 University Physics I: Mechanics. (3) F, S, SS

Kinematics, Newton's laws, work, energy, momentum, conservation laws, dynamics of particles, solids, and fluids. 3 hours lecture, 1 hour recitation. Prerequisite: MAT 270 or 290 or instructor approval. *General Studies: SQ (if credit also earned in PHY 122).*

PHY 122 University Physics Laboratory I. (1) F, S, SS

Lab accompanying PHY 121. Pre- or corequisite: PHY 121. *General Studies: SQ (if credit also earned in PHY 121).*

PHY 131 University Physics II: Electricity and Magnetism. (3) F, S, SS

Electric charge and current, electric and magnetic fields in vacuum and in materials, and induction. AC circuits, displacement current, and electromagnetic waves. 3 hours lecture, 1 hour recitation. Prerequisites: MAT 271 (or 291 or instructor approval); PHY 121. Corequisite: MAT 272 or instructor approval. *General Studies: SQ (if credit also earned in PHY 132).*

PHY 132 University Physics Laboratory II. (1) S, SS

Lab accompanying PHY 131. Pre- or corequisite: PHY 131. *General Studies: SQ (if credit also earned in PHY 131).*

PHY 150 Physics I. (4) S

Introductory physics for majors. Kinematics, Newton's Laws, basic forces, energy, momentum, special relativity. 3 hours lecture, 3 hours lab. Prerequisite: MAT 270 or 290 or equivalent. *General Studies:* SQ.

PHY 151 Physics II. (4) F

Continuation of PHY 150. Electromagnetic fields; Ampere's and Faraday's Laws; Maxwell's equations; basic circuit elements. 3 hours lecture, 3 hours lab. Prerequisites: MAT 271 (or 291 or equivalent); PHY 121, 122 (or PHY 150). *General Studies:* SQ

PHY 190 Seminar: Physics as a Curriculum and a Profession. (1) F, S

Seminar for new Physics majors. Instruction and information on curriculum, departmental functions, and professional preparation. Weekly meetings and excursions. Pass/fail grading.

PHY 201 Mathematical Methods in Physics I. (3) S

Differential equations, linear equations, vectors, matrices, Fourier series, and numerical methods. 2 hours lecture, 2 hours lab. Prerequisite: MAT 272 or equivalent. Corequisite: PHY 252.

PHY 241 University Physics III. (3) F, S

Thermodynamics, kinetic theory, physical and wave optics, relativity, photons, matter waves, atomic physics. 3 hours lecture, 1 hour recitation. Prerequisites: PHY 131; nonmajor.

PHY 252 Physics III. (4) S

Continuation of PHY 151. Wave physics, oscillations, harmonic systems, physical optics, thermodynamics, kinetic theory. 3 hours lecture, 3 hours lab. Prerequisites: MAT 272 (or equivalent); PHY 131 and 132 (or PHY 151 or equivalent). Corequisite: PHY 201. *General Studies:* SQ.

PHY 302 Mathematical Methods in Physics II. (2) F

Continuation of PHY 201. Vector calculus, complex variables, partial differential equations, special functions, numerical methods. 1 hour lecture, 3 hours lab. Prerequisite: PHY 201 or equivalent.

PHY 310 Classical Particles, Fields, and Matter I. (3) F

Particle kinematics, mechanics, conservation laws, particle motion in force fields, dynamics of two-body systems, reference frames, rigid body motion, relativity. Corequisites: PHY 302 and 314 or instructor approval.

PHY 311 Classical Particles, Fields, and Matter II. (3) S

Electrostatic and gravitational fields, Poisson and Laplace equations, dielectric materials, magnetic fields and materials, magnetic induction, Faraday's Law. Prerequisites: PHY 302, 310. Corequisite: PHY 315 or instructor approval.

PHY 314 Quantum Physics I. (3) F

Photons, models of the atom, wave properties of matter, introduction to wave mechanics, 1-dimensional systems in quantum mechanics. Prerequisites: PHY 201 and 252 or equivalents. Corequisites: PHY 302 and 310 or instructor approval.

PHY 315 Quantum Physics II. (3) S

General principles of quantum mechanics, 3-dimensional problems, approximation methods, spin, introduction to many-particle systems. Prerequisites: PHY 302, 310, 314. Corequisite: PHY 311 or instructor approval.

PHY 333 Electronic Circuits and Measurements. (3) F, S

Basic principles of electronic circuit analysis and measurement techniques using modern instrumentation and computer-aided analysis of data. 1 hour lecture, 3 hours lab. Equivalent effort outside of the lab is required. Corequisite: PHY 201 or instructor approval.

PHY 334 Advanced Laboratory I. (2) S

Selected experiments from contemporary physics. Emphasis on modern instrumentation, computer-assisted acquisition and analysis of data, and report form writing. Lecture, lab. Prerequisites: PHY 310, 314, 333.

PHY 361 Introductory Modern Physics. (3) F, S

Special relativity and introductory quantum theory with applications drawn from atomic, nuclear, and solid-state physics. 3 hours lecture, 1 recitation. Prerequisite: PHY 131.

PHY 412 Classical Particles, Fields, and Matter III. (3) F

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) F

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) F, S

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) F

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) S

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) F

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) S

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) F, S

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) F, S

Continuation of PHY 465. Prerequisite: PHY 465.

PHY 480 Methods of Teaching Physics. (3) S

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) S

Structure, elastic properties, and dynamics of crystals; electron motions in crystals under applied fields. Prerequisites: PHY 311, 315.

PHY 484 Internship: Physics Teaching. (1–4) F, S, SS

Preparation for high school physics teaching. Student works closely with a faculty member in the elementary physics program. May be repeated for a total of 6 semester hours. Prerequisite: instructor approval.

PHY 495 Project Research. (1–3) F, S

Supervised project in physics or astrophysics. May be repeated for credit. Prerequisite: instructor approval.

PHY 498 Pro-Seminar. (1–7) N**PHY 501 Methods of Theoretical Physics.** (3) F, S

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) F, S

Continuation of PHY 501. Prerequisite: PHY 501.

PHY 521 Classical Mechanics. (3) F

Variational principles, Lagrange's and Hamilton's equations, rigid body motion, canonical transformations, Hamilton-Jacobi theory.

PHY 523 Relativity. (3) N

Special and general theories of relativity. Prerequisite: PHY 532 or instructor approval.

PHY 531 Advanced Electricity and Magnetism. (3) F

Electrostatics and magnetostatics; potential theory and theory of constitutive relations; Maxwell's equations; the wave equation, plane electromagnetic waves, cavities, and wave guides.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

PHY 532 Electrodynamics. (3) S

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: PHY 412 and 531 or instructor approval.

PHY 541 Statistical Physics. (3) F

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) S

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) F, S

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) F, S

Continuation of PHY 561. Prerequisite: PHY 561 or instructor approval.

PHY 568 Elementary Particle Physics. (3) N

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) N

Continuation of PHY 568. Prerequisite: PHY 568.

PHY 576 Quantum Theory. (3) F, S

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) F, S

Continuation of PHY 576. Prerequisite: PHY 576.

PHY 578 Relativistic Quantum Theory. (3) F, S

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) F, S

Continuation of PHY 578. Prerequisite: PHY 578.

PHY 581 Solid-State Physics. (3) F

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) S

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) F, S

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) F, S

Continuation of PHY 587. Prerequisite: PHY 587.

PHY 592 Research. (1–12) N**PHY 598 Special Topics.** (1–4) F, S

- (a) Quantum Mechanics (3) S
- (b) Quantum Physics (3) S

PHY 599 Thesis. (1–12) N

Department of Plant Biology

J. Kenneth Hooper

Chair

(LS E218) 480/965-3414

lsv1.la.asu.edu/plantbiology

PROFESSORS

BACKHAUS, HOOBER, KLOPATEK, NASH, PINKAVA,
SOMMERFELD, TRELEASE, VERMAAS

ASSOCIATE PROFESSORS

BRIGGS, CLARK, DAY, FRASCH, MARTIN, PIGG,
RAMAKRISHNA, ROBERSON, STROMBERG, STUTZ,
SZAREK, TOWILL, WEBBER

ASSISTANT PROFESSOR

RHOADS

ACADEMIC PROFESSIONALS

BINGHAM, LANDRUM, LoBRUTTO, SHARP

RESEARCH PROFESSOR

WINICOV

PLANT BIOLOGY—B.S.

The Department of Plant Biology provides four curricular options to meet the needs of students whose interests are in rapidly expanding areas within the life sciences. Students may choose the general program option which allows the opportunity to develop strength in one area or discipline. Others may choose to design a more specific, but interdisciplinary program in one of the following three optional concentrations: environmental science and ecology, plant biochemistry and molecular biology, and urban horticulture.

Each concentration promotes interaction between diverse groups and captures the growing interdisciplinary nature of scientific investigations. When one of these options is chosen, the title will appear on transcripts and other university documents.

The four curricular options prepare students for careers in technical, industrial, and educational fields as well as professional degree programs in medicine or research and postgraduate education in the life sciences.

The Department of Plant Biology, in cooperation with the Department of Microbiology, also administers the newly developed B.S. degree program in Molecular Biosciences/Biotechnology. This major is for students interested in molecular and cellular biology and its application to biotechnology. For more information about this area of study, see "Molecular Biosciences/Biotechnology," page 414

General Program

The B.S. degree in Plant Biology consists of a minimum of 38 semester hours in plant biology and approved related fields.

BIO 181	General Biology <i>SQ</i>	4
BIO 182	General Biology <i>SG</i>	4
BIO 320	Fundamentals of Ecology	3
	or BIO 340 General Genetics (4)	

BIO 353 Cell Biology	3
PLB 306 Plant Anatomy	4
PLB 308 Plant Physiology	4
PLB 484 Internship	3
or PLB 499 Individualized Instruction (3)	
Total	25–26

Additional life or physical science elective courses, totaling from 11 to 16 semester hours, are also required.

Required supplemental courses in chemistry are as follows:

CHM 113 General Chemistry <i>SQ</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i>	5
Choose between the organic chemistry course combinations below	4 or 8
CHM 231 Elementary Organic Chemistry <i>SQ</i> * (3)	
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> * (1)	
_____ or _____	
CHM 331 General Organic Chemistry (3)	
CHM 332 General Organic Chemistry (3)	
CHM 335 General Organic Chemistry Laboratory (1)	
CHM 336 General Organic Chemistry Laboratory (1)	
Total	13 or 17

* Both CHM 231 and 235 must be taken to secure *SQ* credit. Additional life or physical science elective courses, totaling from 11 to 16 semester hours, are also required.

Courses meeting the university numeracy requirement are as follows:

BIO 415 Biometry <i>CS</i>	4
or PLB 430 Statistical Analyses in Environmental Science (3)	
or PLB 432 Computer Applications in Biology <i>CS</i> (3)	
MAT 210 Brief Calculus <i>MA</i>	3

Special Concentration Programs

Three special concentration programs are optional. Students who wish to pursue the general program in Plant Biology are not obligated to choose one of these specific programs. Each special concentration program is expected to be interdisciplinary and contain course work outside both the department and the College of Liberal Arts and Sciences. Each concentration includes hands-on technical training.

Environmental Science and Ecology. The B.S. degree in Plant Biology concentrating in environmental science and ecology consists of a minimum of 44 semester hours in plant biology and approved related fields.

The required major courses are as follows:

BIO 320 Fundamentals of Ecology	3
Choose between the geology course combinations below	4
GLG 101 Introduction to Geology (Physical) <i>SQ</i> , <i>G</i> ¹ (3)	
GLG 103 Introduction to Geology I—Laboratory <i>SQ</i> ¹ (1)	
_____ or _____	
GLG 110 Environmental Geology <i>SG</i> , <i>G</i> ² (3)	
GLG 111 Environmental Geology Laboratory <i>SG</i> ² (1)	
GLG 362 Geomorphology	3
or GLG 470 Hydrogeology (3)	
PLB 310 The Flora of Arizona	4

PLB 322 Environmental Science (Major)	3
PLB 420 Plant Ecology: Organisms and Populations	3
or PLB 421 Plant Ecology: Communities and Ecosystems (3)	
PLB 484 Internship	3
or PLB 499 Individualized Instruction (3)	
Total	23

¹ Both GLG 101 and 103 must be taken to secure *SQ* credit.

² Both GLG 110 and 111 must be taken to secure *SG* credit.

Required supplemental courses in biology and chemistry are as follows:

BIO 181 General Biology <i>SQ</i>	4
BIO 182 General Biology <i>SG</i>	4
CHM 113 General Chemistry <i>SQ</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i>	5
CHM 231 Elementary Organic Chemistry <i>SQ</i> *	3
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> *	1
Total	21

* Both CHM 231 and 235 must be taken to secure *SQ* credit. Additional life or physical science elective courses, totaling 16 semester hours, are also required.

Courses meeting the university numeracy requirement are as follows:

MAT 210 Brief Calculus <i>MA</i>	3
PLB 430 Statistical Analyses in Environmental Science	3
or PLB 432 Computer Applications in Biology <i>CS</i> (3)	

Plant Biochemistry and Molecular Biology. The B.S. degree in Plant Biology concentrating in biochemistry and molecular biology consists of 60 semester hours.

The required major courses are as follows:

BIO 353 Cell Biology	3
PLB 340 Plant Cell Physiology	4
PLB 350 Applied Genetics	4
PLB 444 Plant Growth and Development	3
PLB 484 Internship	3
or PLB 499 Individualized Instruction (3)	
Total	17

Additional life or physical science elective courses, totaling from 11 to 14 hours, are also required.

Required supplemental courses in biology, chemistry, and physics are as follows:

BIO 181 General Biology <i>SQ</i>	4
BIO 182 General Biology <i>SG</i>	4
CHM 113 General Chemistry <i>SQ</i>	4
CHM 115 General Chemistry with Qualitative Analysis <i>SQ</i>	5
CHM 231 Elementary Organic Chemistry <i>SQ</i> *	3
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> *	1
Choose between the course combinations below	4 or 8
BCH 361 Principles of Biochemistry (3)	
BCH 367 Elementary Biochemistry Laboratory (1)	
_____ or _____	
BCH 461 General Biochemistry (3)	
BCH 462 General Biochemistry (3)	
BCH 467 General Biochemistry Laboratory <i>L</i> (3)	
PHY 121 University Physics I: Mechanics <i>SQ</i>	3

NOTE: For the General Studies requirement, courses, and codes (such as L, *SQ*, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

PHY 122 University Physics Laboratory I <i>SQ</i>	1
Total	29 or 33

* Both CHM 231 and 235 must be taken to secure *SQ* credit.

Courses meeting the university numeracy requirement are as follows:

BIO 406 Computer Applications in Biology <i>CS</i>	3
or BIO 415 Biometry <i>CS</i> (4)	
MAT 251 Calculus for Life Sciences <i>MA</i>	3

Urban Horticulture. The B.S. degree in Plant Biology concentrating in urban horticulture consists of a minimum of 46 semester hours in plant biology and approved related fields.

BIO 320 Fundamentals of Ecology	3
or PLB 306 Plant Anatomy (4)	
or PLB 308 Plant Physiology (4)	
PLB 260 Plants in Cities: Introduction to Urban Horticulture <i>SG</i>	4
PLB 362 Landscape Plants I	3
PLB 364 Urban Forestry	3
PLB 366 Intiorscape.....	3
or PLB 372 Turf Management (3)	
or PLB 472 Greenhouse/Nursery Management (3)	
PLB 370 Environmental Landscape Management.....	3
PLB 414 Plant Pathology <i>L</i>	3
PLB 484 Internship	3
PLB 498 PS: Urban Horticulture	1
Total	26–27

Required supplemental courses in biology, chemistry, and soils are as follows:

BIO 181 General Biology <i>SQ</i>	4
BIO 182 General Biology <i>SG</i>	4
CHM 101 Introductory Chemistry <i>SQ</i>	4
CHM 231 Elementary Organic Chemistry <i>SQ</i> *.....	3
CHM 235 Elementary Organic Chemistry Laboratory <i>SQ</i> *.....	1
Choose between the course combinations below.....	4
ERS 130 Introduction to Environmental Science <i>SQ</i> (4)	
_____ or _____	
ERS 225 Soils (3)	
ERS 226 Soils Laboratory (1)	
Total	20

* Both CHM 231 and 235 must be taken to secure *SQ* credit. Additional elective courses from other disciplines, totaling seven to eight semester hours are also required. A total of 54 semester hours are required for this curricular option.

Courses meeting the university numeracy requirement are as follows:

BIO 415 Biometry <i>CS</i>	4
or PLB 430 Statistical Analyses in Environmental Science (3)	
or PLB 432 Computer Applications in Biology <i>CS</i> (3)	
MAT 210 Brief Calculus <i>MA</i>	3
Total	6–7

PLANT BIOLOGY MINOR

The minor consists of a minimum of 24 semester hours. Required courses are as follows:

BIO 181 General Biology <i>SQ</i>	4
BIO 182 General Biology <i>SG</i>	4
PLB 306 Plant Anatomy.....	4
or PLB 308 Plant Physiology (4)	
or PLB 310 The Flora of Arizona (4)	
Total	12

The remaining 12 hours are selected by the student through consultation with an academic advisor. Eight of these 12 hours must be in upper-division courses in the life sciences or other advisor-approved areas.

The minor can be designed after one of the four curricular options offered by the department. Courses not available for credit for majors in the life sciences cannot be used for the minor. This minor is not available to students in the life sciences.

GRADUATE PROGRAMS

The faculty in the Department of Plant Biology offer programs leading to the degrees of M.S. and Ph.D. The faculty also participate in programs leading to the Master of Natural Science degree when one of the concentrations is plant biology. The department participates in the interdisciplinary program for the M.S. and Ph.D. degrees in Molecular and Cellular Biology. Other select faculty collaborate in the interdisciplinary concentration in ecology.

PLANT BIOLOGY (PLB)

PLB 108 Concepts in Plant Biology. (4) F, S, SS

Introduction to concepts of plant biology that are of human relevance using commercially important, edible, and medicinal plants as examples. Not for majors in the biological sciences. 3 hours lecture, 3 hours lab. *General Studies: SQ*.

PLB 300 Comparative Plant Diversity. (4) F

Survey of major plant groups and other photosynthetic organisms. Emphasis on comparative data analysis, evolutionary inference, and phylogenetic methods. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or equivalent. *General Studies: L/SG*.

PLB 302 Plants and Civilization. (3) F

Plants and plant products used by people throughout the world. Cultivation, processing, and uses in modern life (beverages, fibers, foods, medicinals, and perfumes). Prerequisite: BIO 182 or PLB 108 or equivalent.

PLB 304 Biology of Algae and Fungi. (3) S

Ecology, economics, and evolutionary diversity of the algae and fungi. Traditional and modern biotechnological uses. 2 hours lecture, 3 hours lab. Prerequisite: BIO 182 or equivalent.

PLB 305 Desert Annuals and Cacti. (3) F

Adaptive biology of select plants. Analysis of diverse traits permitting survival in deserts: reproduction, structure, and physiology. Prerequisite: BIO 182 or equivalent.

PLB 306 Plant Anatomy. (4) F

Development and mature structure of tissues of vascular plants; patterns and modifications of the leaf, stem, root, and the flower. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or equivalent.

PLB 308 Plant Physiology. (4) S

Concepts of plant function: carbon metabolism, energy acquisition, regulation of growth and development, stress responses, and water and nutrient uptake. Prerequisites: BIO 182 (or equivalent); CHM 101 (or 115 or 231).



A sample of the flora that graces the ASU campus.

Tim Trumble photo

PLB 310 The Flora of Arizona. (4) S

Principles of taxonomy; identification of Arizona plants. 2 hours lecture, 6 hours lab. Prerequisite: BIO 182 or equivalent or instructor approval.

PLB 400 Lichenology. (3) S 2001

Chemistry, ecology, physiology, and taxonomy of lichens. 2 hours lecture, 3 hours lab. Prerequisite: BIO 182 or equivalent.

PLB 402 Mycology. (3) S

Fungal morphology and systematics with an introduction to fungal cell biology, ecology, economic significance, and growth and development. 2 hours lecture, 3 hours lab. Prerequisite: BIO 182 or MIC 206 or equivalent.

PLB 404 Phycology. (4) S

The 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. Prerequisite: BIO 182 or instructor approval.

PLB 407 Plant Fossils and Evolution. (4) S 2001

A 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. Prerequisite: BIO 182 or equivalent.

PLB 410 Angiosperm Taxonomy. (3) S

Principles underlying angiosperm phylogeny. 2 hours lecture, 3 hours lab. Prerequisite: PLB 310 or instructor approval.

PLB 411 Trees and Shrubs of Arizona. (3) F

Identification of woody plants from desert, chaparral, and forest habitats in Arizona. 1 hour lecture, 3 hours lab, field trips. Prerequisite: BIO 182 or equivalent or instructor approval.

PLB 412 Cytogenetics. (3) F

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) F

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) S

Identification and control of biotic and abiotic factors that cause common disease problems to plants. Prerequisite: BIO 182. *General Studies: L.*

PLB 416 Medical Botany. (4) SS

Exploration of plants affecting human health: modern- and folk-usage medicinal plants. Quality control, clinical evidence, plant chemistry, and ethnopharmacology. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or equivalent or instructor approval.

PLB 484 Internship. (3) N

PLB 498 Pro-Seminar. (3) F, S

(a) Plant Biology Internship
Teach fifth-grade children a simplified version of PLB 108 by planting gardens and conducting indoor plant experiments.

PLB 499 Individualized Instruction. (3) N

PLB 502 Perspectives in Plant Biology. (3) F

Introduce major areas of research within the department with the goal of broadening knowledge to enable multidisciplinary research and communication. Prerequisite: instructor approval.

PLB 591 Seminar. (1) F, S

ENVIRONMENTAL SCIENCE AND ECOLOGY

PLB 320 Environmental Science (Nonmajor). (3) F

Environmental and biological concepts used to understand ecological systems with specific references to problems caused by humans. Cannot be used for major credit in the biological sciences. Cross-listed as BIO 319. Credit is allowed for only BIO 319 or PLB 320. *General Studies: G.*

PLB 322 Environmental Science (Major). (3) F

The nature of environmental and biological interaction: historical and modern examples. Field and laboratory techniques for quantification: supporting principles. 2 hours lecture, 3 hours lab. Prerequisites: BIO 182 or GLG 101 and 103 or GLG 110 and 111.

PLB 420 Plant Ecology: Organisms and Populations. (3) S 2001
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. Prerequisite: BIO 320 or PLB 322 or equivalent.

PLB 421 Plant Ecology: Communities and Ecosystems. (3) S 2002

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. Prerequisite: BIO 320 or PLB 322 or equivalent.

PLB 422 Plant Geography. (3) N

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. Prerequisite: BIO 182 or GPH 111.

PLB 430 Statistical Analyses in Environmental Science. (3) S 2002

ANOVAS, 1-way classification of factorial and partially hierarchic designs; introductory multivariate statistics. Prerequisite: MAT 210 or equivalent.

PLB 432 Computer Applications in Biology. (3) F

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: BIO 182 and MAT 117 (or 210) or instructor approval. *General Studies: CS.*

PLB 434 Landscape Ecological Analysis and Modeling. (3) S 2001

Technical methods of landscape ecological analyses. Includes mathematical and statistical examination and modeling of landscape ecological patterns and processes. Prerequisites: BIO 320 and 406 or PLB 432 (or equivalent).

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

PLB 520 Plant Structural Adaptation. (2–3) N

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 equivalent.

PLB 522 Plant Photosynthetic Adaptation. (3) N

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) S 2001

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 340 Plant Cell Physiology.** (4) S 2001

Survey of structural and biochemical aspects of plant cell function and the relationships of cell function to whole plant processes. 3 hours lecture, 3 hours lab. Prerequisites: BIO 182 (or equivalent); CHM 101 (or 115 or 231).

PLB 350 Applied Genetics. (4) S

Introduction to molecular genetics with emphasis on application of genetics in solving biological questions and engineering organisms in biotechnology. 2 hours lecture, 6 hours lab. Cross-listed as MBB 350. Credit is allowed for only MBB 350 or PLB 350. Prerequisite: BIO 181 or equivalent.

PLB 440 Photobiology. (3) F

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 of courses in life sciences.

PLB 444 Plant Growth and Development. (3) S 2001

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 Metabolism. (3) N

General plant metabolism and typical plant products, emphasizing biosynthesis and functions of storage products, cell wall constituents, plant acids, pigments, hormones, and numerous secondary products. Prerequisite: PLB 340 or CHM 231 or instructor approval.

PLB 550 Plant Molecular Biology. (2) S 2001

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) S

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) S

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) N

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) S

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 260 Plants in Cities: Introduction to Urban Horticulture.** (4) S

Principles and practices of horticulture, emphasizing development, growth, and propagation of horticultural plants and environmental factors that affect these processes. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or PLB 108. *General Studies: SG.*

PLB 360 Southwest Home Horticulture. (2) F, S

Multimedia course for nonmajors surveying contemporary topics in southwest home horticulture, including landscaping, flower and vegetable gardening, citriculture, interiorscaping, and others.

PLB 362 Landscape Plants I. (3) F

Identification, culture, and use of amenity plants in urban landscapes. Prerequisite: PLB 260 or equivalent.

PLB 363 Landscape Plants II. (3) S

Identification, culture, and use of amenity plants in urban gardens. Prerequisite: PLB 260 or equivalent.

PLB 364 Urban Forestry. (3) F

The establishment, care, and maintenance of ornamental trees, shrubs, and vines. Prerequisite: PLB 260 or equivalent.

PLB 366 Interiorscape. (3) F 2000

Identification, culture, and use of container-grown plants for interior environments. Prerequisite: PLB 260 or instructor approval.

PLB 370 Environmental Landscape Management. (3) F

Installation, irrigation, and maintenance of amenity plants in urban landscapes with an emphasis on integrated environmental landscape technologies. 2 hours lecture, 3 hours lab. Prerequisite: PLB 260 or equivalent.

PLB 372 Turf Management. (3) N

Selection, establishment, and maintenance of turf grasses for lawn and sports areas. 2 hours lecture, 3 hours lab. Prerequisite: PLB 260 or equivalent.

PLB 472 Greenhouse/Nursery Management. (3) S 2002

Greenhouse structures, environment, and nursery operation. Includes irrigation, nutrition, and other principles relative to container-grown species. Prerequisites: ERS 130 (or 225 or 226); PLB 260.

PLB 498 Pro-Seminar. (1) N

(a) Pro-Seminar in Urban Horticulture

Department of Political Science**Robert L. Youngblood***Chair***(SS 410) 480/965-6551****www.asu.edu/clas/polisci**

PROFESSORS

BALL, BERMAN, CHAUDHURI, DAGGER, JONES,
McDONOUGH, McGOWAN, SIMON,
WALKER, YOUNGBLOOD

ASSOCIATE PROFESSORS

ASHLEY, CRITTENDEN, DANTICO, DOTY, HERRERA,
KAHN, KENNEY, MITCHELL, SIMHONY, SPRUYT

ASSISTANT PROFESSORS

C. ELMAN, M. ELMAN, GOLDSTEIN, KRUTZ, NEVITT,
REDDICK, WARNER

ASSOCIATE INSTRUCTIONAL PROFESSIONAL

KEATING

POLITICAL SCIENCE—B.A.

The B.A. degree in Political Science consists of 42 semester hours, of which 30 must be in political science and 12 in related fields consisting of courses selected from the Departments of Anthropology, Chicana and Chicano Studies, Economics, Geography, History, Psychology, and Sociology, and the African American Studies and the Women's Studies programs. At least 15 hours in political science must be in upper-division courses.

The following courses are required:

POS 101	Political Ideologies <i>SB</i>	3
POS 110	Government and Politics <i>SB</i>	3
	or POS 310 American National Government <i>SB</i> (3)	

POS 150 Comparative Government <i>SB, G</i>	3
or POS 160 Global Politics <i>SB, G</i> (3)	
POS 301 Empirical Political Inquiry <i>SB</i>	3
Total	12

Students who major in Political Science must have a minimum GPA of 2.00 for all courses that count toward the major. Upper-division courses that count toward the major must have a grade of “C” or higher; no more than one “D” grade in a lower-division course may be counted in the major. See “College Degree Requirements,” page 332. No more than six hours of POS 484 Internship may be applied to the major.

POLITICAL SCIENCE—B.S.

The B.S. degree in Political Science consists of 48 semester hours, of which 36 must be in political science and 12 in related fields consisting of courses selected from the Departments of Anthropology, Chicana and Chicano Studies, Economics, Geography, History, Psychology, and Sociology, and the African American Studies and the Women’s Studies programs. At least 21 hours in political science must be in upper-division courses.

The following courses are required:

POS 101 Political Ideologies <i>SB</i>	3
POS 110 Government and Politics <i>SB</i>	3
or POS 310 American National Government <i>SB</i> (3)	
POS 150 Comparative Government <i>SB, G</i>	3
or POS 160 Global Politics <i>SB, G</i> (3)	
POS 301 Empirical Political Inquiry <i>SB</i>	3
POS 401 Political Statistics <i>CS</i>	3
Total	15

Students who major in Political Science must have a minimum GPA of 2.00 for all courses that count toward the major. Upper-division courses that count toward the major must have a grade of “C” or higher; no more than one “D” grade in a lower-division course may be counted in the major. See “College Degree Requirements,” page 332. No more than six hours of POS 484 Internship may be applied to the major.

B.S. in Political Science with a Concentration in Public Policy Analysis

This degree and concentration combination is intended for students with a strong interest in public policy. It is designed to help students develop perspectives and skills applicable to public policy analysis and program evaluation. This concentration consists of a minimum of 36 semester hours in political science and 12 hours in related fields.

Required Courses

POS 101 Political Ideologies <i>SB</i>	3
POS 110 Government and Politics <i>SB</i>	3
or POS 310 American National Government <i>SB</i> (3)	
POS 150 Comparative Government <i>SB, G</i>	3
or POS 160 Global Politics <i>SB, G</i> (3)	
POS 220 Political Issues and Public Policy <i>SB</i>	3
POS 301 Empirical Political Inquiry <i>SB</i>	3
POS 325 Public Policy Development <i>SB</i>	3
POS 401 Political Statistics <i>CS</i>	3

POS 426 Elements of Public Policy <i>SB</i>	3
POS 484 Internship ¹	1–12
POS electives ²	6–9
Electives ³	12

¹ As approved by the political science internship coordinator.

² Additional POS elective courses are required.

³ In closely related fields, approved by a departmental academic advisor.

B.S. in Political Science with a Concentration in Public Policy Advocacy and Lobbying

This degree and concentration combination is intended for students interested in affecting public policy. It is designed to help students develop perspectives and skills useful to those engaged as activists in shaping public policy. This concentration consists of a minimum of 36 semester hours in political science and 12 hours in related fields.

Required Courses

POS 101 Political Ideologies <i>SB</i>	3
POS 110 Government and Politics <i>SB</i>	3
or POS 310 American National Government <i>SB</i> (3)	
POS 150 Comparative Government <i>SB, G</i>	3
or POS 160 Global Politics <i>SB, G</i> (3)	
POS 220 Political Issues and Public Policy <i>SB</i>	3
or POS 325 Public Policy Development <i>SB</i> (3)	
or POS 426 Elements of Public Policy <i>SB</i> (3)	
POS 301 Empirical Political Inquiry <i>SB</i>	3
POS 313 The Congress <i>SB</i>	3
POS 333 Interest Groups <i>SB</i>	3
POS 401 Political Statistics <i>CS</i>	3
POS 484 Internship ¹	1–12
POS electives ²	6–9
Electives ³	12

¹ As approved by the political science internship coordinator.

² Additional POS elective courses are required.

³ In closely related fields, approved by a departmental academic advisor.

Asian Studies Certificate or Emphasis. Students majoring in Political Science may elect to pursue an Asian Studies certificate combining courses from the major with selected outside courses of wholly Asian content. See “Asian Studies,” page 340, for more information.

Latin American Studies Certificate or Emphasis. Students majoring in Political Science may elect to pursue a Latin American Studies certificate combining courses from the major with selected outside courses of wholly Latin American content. See “Latin American Studies,” page 340, for more information.

MINOR IN POLITICAL SCIENCE

The minor in Political Science consists of 18 semester hours in political science courses, 12 hours of which must be upper-division courses. Students who minor in Political Science must have two courses from among the following:

POS 101 Political Ideologies <i>SB</i>	3
POS 110 Government and Politics <i>SB</i>	3
or POS 310 American National Government <i>SB</i> (3)	

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see “General Studies,” page 87. For graduation requirements, see “University Graduation Requirements,” page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see “Classification of Courses,” page 60.

POS 150 Comparative Government <i>SB, G</i>	3
POS 160 Global Politics <i>SB, G</i>	3

Students who minor in Political Science must have a minimum GPA of 2.00 for all courses that count toward the minor. Upper-division courses that count toward the minor must have a grade of “C” or higher; no more than one “D” grade in a lower-division course may be counted toward the minor. No more than three hours of POS 484 Internship and three hours of POS 499 Individualized Instruction may be applied to the minor.

SECONDARY EDUCATION—B.A.E.

Political Science. The major teaching field consists of 45 semester hours, 30 of which must be in political science and 15 in closely related fields.

The following courses are required:

POS 101 Political Ideologies <i>SB</i>	3
POS 110 Government and Politics <i>SB</i>	3
or POS 310 American National Government <i>SB</i> (3)	
POS 150 Comparative Government <i>SB, G</i>	3
or POS 160 Global Politics <i>SB, G</i> (3)	
POS 301 Empirical Political Inquiry <i>SB</i>	3
POS 417 The Arizona Political System <i>SB</i>	3
POS 480 Methods of Teaching Government.....	3
Total	18

Courses may be substituted for POS 417 and 480 with departmental approval.

Students who pursue this academic specialization in political science must have a minimum GPA of 2.00 for all courses that count toward the major. Upper-division courses that count toward the major must have a grade of “C” or higher; no more than one “D” grade in a lower-division course may be counted in the academic specialization. No more than six hours of POS 484 Internship may be applied to the major.

The minor teaching field consists of 24 semester hours in political science courses.

The following six courses are required:

POS 101 Political Ideologies <i>SB</i>	3
POS 110 Government and Politics <i>SB</i>	3
or POS 310 American National Government <i>SB</i> (3)	
POS 150 Comparative Government <i>SB, G</i>	3
or POS 160 Global Politics <i>SB, G</i> (3)	
POS 301 Empirical Political Inquiry <i>SB</i>	3
POS 417 The Arizona Political System <i>SB</i>	3
POS 480 Methods of Teaching Government.....	3
Total	18

Courses may be substituted for POS 417 and 480 with departmental approval.

Students who pursue this academic specialization in political science must have a minimum GPA of 2.00 for all courses that count toward the academic specialization. Upper-division courses that count toward the academic specialization must have a grade of “C” or higher; no more than one “D” grade in a lower-division course may be counted in the minor.

Social Studies. See “Social Studies,” page 438.

GRADUATE PROGRAMS

The faculty in the Department of Political Science offer programs leading to the M.A. and Ph.D. degrees. See the *Graduate Catalog* for requirements.

POLITICAL SCIENCE (POS)

- POS 101 Political Ideologies.** (3) F, S
Leading political ideas and belief systems, e.g., Marxism, liberalism, conservatism, theories of democracy, and alternative futures. *General Studies: SB.*
- POS 110 Government and Politics.** (3) F, S
Major institutions of modern government and processes of individual and group political activity, with emphasis on the American experience. Meets the federal government requirement for teacher certification. Not open to students with credit for POS 310. *General Studies: SB.*
- POS 150 Comparative Government.** (3) F, S
Political institutions and processes in selected foreign countries, including origins, strengths, and weaknesses of contemporary political systems and political development. *General Studies: SB, G.*
- POS 160 Global Politics.** (3) F, S
The nature of contemporary world politics through the study of both general theoretical topics and specific geographical areas. *General Studies: SB, G.*
- POS 220 Political Issues and Public Policy.** (3) A
Contemporary social problems and political issues, particularly development of public policy. *General Studies: SB.*
- POS 230 Current Issues in National Politics.** (3) F, S
Major issues facing national governments in the domestic field. *General Studies: L/SB.*
- POS 240 Introduction to Southeast Asia.** (3) F
An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as ASB 240/GCU 240/HIS 240/REL 240. Credit is allowed for only ASB 240 or GCU 240 or HIS 240 or POS 240 or REL 240. *General Studies: G.*
- POS 260 Current Issues in International Politics.** (3) F, S
An analysis of major current problems in world politics. *General Studies: L/SB, G.*
- POS 270 American Legal System.** (3) F, S
Concepts, institutions, classifications, and functions of law. The role of the courts and the impact of judicial decision making on social change. *General Studies: SB.*
- POS 300 Contemporary Controversies in Global Politics.** (3) F, S
Exploration of key controversies in global politics including security, economic stability, poverty, gender, race, and the environment.
- POS 301 Empirical Political Inquiry.** (3) F, S
Logic of political inquiry, including research problems, concepts, hypotheses, theories, measurement, data collection, and analysis. *General Studies: SB.*
- POS 310 American National Government.** (3) F, S
Powers, functions, and agents of American political institutions. Meets the federal government requirement for teacher certification. Not open to students with credit for POS 110. *General Studies: SB.*
- POS 311 Arizona Constitution and Government.** (2) F, S
Constitution and government of the State of Arizona. Not open to students having credit for POS 316 or 417. Meets the Arizona constitution requirement for teacher certification. May not be counted for the major or a teaching major or minor in Political Science.
- POS 313 The Congress.** (3) A
Lawmaking process in the U.S. Congress. *General Studies: SB.*
- POS 314 The American Presidency.** (3) A
Office, role, and power of the American presidency in the American political system. *General Studies: SB.*
- POS 315 The Supreme Court.** (3) A
Role of the Supreme Court in American society and politics; examination of decision-making process and impact of decisions; restraint versus activism. *General Studies: SB.*
- POS 316 State and Local Government.** (3) A
Survey of the operations, problems, and policies of state and local governments in the United States. *General Studies: SB.*
- POS 320 Public Administration.** (3) A
Role of the administrator in the political process with an examination of the basic concepts of bureaucracy. *General Studies: SB.*

POS 325 Public Policy Development. (3) A

Examination of one or more aspects of public policy development including agenda setting, policy formulation, policy implementation, and policy analysis. *General Studies: SB.*

POS 330 Contemporary Controversies in Domestic Politics. (3) F, S

Exploration of key controversies in domestic politics including the environment, the economy, poverty, gender, race, and security.

POS 331 Public Opinion. (3) A

Formation, expression, and influence of individual and organized opinion on political institutions. *General Studies: SB.*

POS 332 American Political Parties. (3) A

Development of the American party system. Party organization and functions. *General Studies: SB.*

POS 333 Interest Groups. (3) A

Examines how minority, corporate, labor, farm, consumer, environmental, health, education and public interest groups, and single issue movements influence government. *General Studies: SB.*

POS 336 Electoral Behavior. (3) A

Voting behavior and the attitudes, perceptions, and activities of the citizenry in the political process. *General Studies: SB.*

POS 340 History of Political Philosophy I. (3) A

Western political philosophers and their theories to the 17th century. *General Studies: HU, H.*

POS 341 History of Political Philosophy II. (3) A

Western political philosophers and their theories from the 17th to the 20th century. *General Studies: HU, H.*

POS 346 Problems of Democracy. (3) A

Issues and problems in democratic theory, e.g., the nature of democracy, majority rule, representation, equality, and the value of political participation. *General Studies: HU.*

POS 350 Comparative Politics. (3) A

Theoretical approaches and political institutions, such as parties, pressure groups, legislatures, and executives, from a cross-national perspective. *General Studies: SB, G.*

POS 351 Democratization. (3) F

Examines the consolidation of democracies in postauthoritarian and postcommunist settings (e.g., Latin America, Eastern Europe, Asia).

POS 355 Russia and Successor States. (3) A

Description and analysis of political institutions and practices in Russia and successor states. *General Studies: SB, G.*

POS 356 Western Europe. (3) A

Structures and behavior of governmental institutions and political processes in selected countries of Western Europe. *General Studies: SB, G.*

POS 357 South Asia Politics. (3) A

Analysis of the political culture, politics, and political systems of South Asia. Lecture, discussion. *General Studies: SB, G.*

POS 358 Southeast Asia. (3) A

Political background, governmental institutions, political dynamics, and developmental problems of Southeast Asian nations. *General Studies: SB, G.*

POS 359 African Politics and Society. (3) N

Comparative analysis of socioeconomic forces, political processes, and government institutions in Africa south of the Sahara. *General Studies: SB, G.*

POS 360 World Politics. (3) A

Theory and practice of statecraft as applied to selected issues, regions, or eras. *General Studies: SB, G.*

POS 361 American Foreign Policy. (3) A

United States in world affairs; foreign policy since World War I. Techniques in formulating American foreign policies. *General Studies: SB, G.*

POS 364 U.S. National Security Analyses. (3) A

A theoretical and empirical assessment of U.S. national security policy in the post-cold war era. *General Studies: SB.*

POS 370 Law and Society. (3) A

Analysis of debates among social scientists and legal theorists concerning the relationship between "law" and "society." *General Studies: SB.*

POS 401 Political Statistics. (3) F, S

Basic concepts in statistics as they facilitate the description, explanation, and prediction of social and political phenomena. *General Studies: CS.*

POS 410 Urban Government and Politics. (3) A

Governmental organizations, decision-making structures, and problems of urban political systems. *General Studies: SB.*

POS 417 The Arizona Political System. (3) N

Contemporary political problems within the context of Arizona's constitutional, political, and social frameworks. Meets the Arizona Constitution requirement for teacher certification. Not open to students having credit for POS 311. *General Studies: SB.*

POS 422 Politics of Bureaucracy. (3) N

Bureaucracy as a political entity; internal dynamics of public agencies; the relationship between public agencies and other political entities. *General Studies: SB.*

POS 423 Politics of Budgeting. (3) N

The policy process in budgeting; strategies used to influence this process and recent reforms in public budgeting. *General Studies: SB.*

POS 426 Elements of Public Policy. (3) A

Each section may cover one of the following topics: consumer protection, natural resources, criminal justice, environmental protection, science and technology, or theories of public policy. May be repeated for credit when topics vary. *General Studies: SB.*

POS 431 Campaigns and Elections. (3) A

Examines campaigns from a multitude of perspectives including the politician, reporter, campaign strategist, and voter. Lecture, discussion. *General Studies: SB.*

POS 433 Money and Politics. (3) A

The role of money and special interests in elections, campaign politics, and public policy-making in American politics. Lecture, discussion. *General Studies: SB.*

POS 434 Media and Politics. (3) A

The study of mass media and politics in the United States, e.g., media and elections, media and government. Lecture, discussion. *General Studies: SB.*

POS 435 Women and Politics. (3) N

Women's roles in various political contexts. Focus varies with instructor. *General Studies: SB, C.*

POS 439 Minority Group Politics in America. (3) N

Role of minority groups in American politics. *General Studies: SB, C.*

POS 442 American Political Thought. (3) A

Political theories and movements from the colonial period to the present. *General Studies: HU.*

POS 443 Topics in Contemporary Political Theory. (3) A

Major problems and theories in contemporary political thought. *General Studies: HU.*

POS 445 Asian Political Thought. (3) A

Contemporary political ideas and theories in selected Asian countries, including the impact of Marxist and non-Marxist theories on revolutionary processes. *General Studies: SB, G.*

POS 451 China, Japan, and the Koreans. (3) A

A comparative analysis of the political modernization experiences of China, Japan, and the two Koreas, focusing on their differing reactions to the West. *General Studies: SB, G.*

POS 452 China. (3) A

Background of the Communist revolution, political processes, and developmental problems in China from a comparative perspective. *General Studies: SB, G.*

POS 453 South America. (3) A

Governmental institutions, political processes, and developmental problems of the South American states. *General Studies: SB, G.*

POS 454 Mexico. (3) A

Mexican federal, state, and local governmental institutions. *General Studies: SB, G.*

POS 455 Central America and the Caribbean. (3) A

Governmental institutions, political processes, and developmental problems of the nation-states and dependent areas of Central America and the Caribbean. *General Studies: SB, G.*

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

POS 459 South and Southern Africa. (3) A

Post-apartheid South African government and politics; South Africa and the southern African region; regional security and development. *General Studies: SB, G.*

POS 463 Inter-American Relations. (3) A

Diplomatic relations among the Latin American states. Development of U.S. foreign policy toward Latin America. *General Studies: SB, G.*

POS 465 International Organization and Law. (3) A

History, practical political significance, and future of international institutions, transnational regimes, and international law. *General Studies: SB, G.*

POS 467 International Security. (3) A

Examination of issues affecting the international security of states and peoples, e.g., military, economic, technological, environmental, and demographic. *General Studies: SB, G.*

POS 468 Comparative Asian Foreign Policies. (3) A

Foreign policies of the Asian states, emphasizing their security relations and movements toward regionalism. *General Studies: SB, G.*

POS 471 Constitutional Law I. (3) A

Development of the U.S. Constitution as reflected in decisions of the Supreme Court; jurisdiction and organization of the federal courts; judicial review; separation of powers; federalism; the commerce clause; national taxing and spending power; state police power. *General Studies: SB.*

POS 472 Constitutional Law II. (3) A

Development of the U.S. Constitution as reflected in decisions of the Supreme Court: due process; equal protection of laws; individual rights; civil liberties. *General Studies: SB.*

POS 480 Methods of Teaching Government. (3) N

Methods of instruction, organization, and presentation of subject matter in political science. Prerequisite: 15 hours in political science or instructor approval.

POS 484 Internship. (1–12) N

POS 485 Political Economy. (3) A
Problems, policies, and possibilities of various political-economic systems and the interrelationship of capitalism, socialism, and democracy. *General Studies: SB.*

POS 486 International Political Economy. (3) A

Contending approaches to historical and contemporary issues of international political economy, including global welfare, equality, ecology, and peace. *General Studies: SB, G.*

POS 498 Pro-Seminar. (3) A

Small group study and research for advanced students within their major area. Prerequisite: major in the department or instructor approval. *General Studies: L.*

POS 499 Individualized Instruction. (3) N**POS 501 Methods of Political Science.** (3) N

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) A

Problems of knowledge and method in political science, with attention to both empirical and evaluative analysis.

POS 503 Empirical Political Inquiry. (3) A

Research methods and techniques of the discipline, emphasizing empirical foundations and analytic methods employed in subfields. Prerequisites: POS 401 (or equivalent); instructor approval.

POS 530 American Politics. (3) A

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) N

Examination of a particular theme or problem in political thought from both a historical and contemporary perspective. Seminar. Course may be repeated with approval of the director of graduate studies. Prerequisite: instructor approval.

POS 550 Comparative Politics. (3) A

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) A

Surveys major theoretical approaches and debates in international relations. Seminar.

POS 563 Comparative Asian Security Policies. (3) N

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) N**POS 591 Seminar.** (3) A

- (a) American Politics
- (b) Comparative Politics
- (c) Global Politics
- (d) Political Theory

POS 592 Research. (1–12) N**POS 598 Special Topics.** (3) A

- (a) American Politics
- (b) Comparative Politics
- (c) Global Politics
- (d) Political Theory

POS 599 Thesis. (1–12) N**POS 601 Advanced Experimental Research.** (3) N

Introduces experimental and quasi-experimental research designs in political research, including laboratory techniques and topics in the analysis of variance. Prerequisite: POS 503 or equivalent.

POS 602 Advanced Survey Research. (3) N

Presents design and conduct of political surveys, including sampling, instrument design, scaling, and statistical and graphical analysis of survey data. Prerequisite: POS 503 or equivalent.

POS 603 Polimetrics I. (3) A

Introduces theory and practice of linear regression analysis. Provides skills to read, understand, and evaluate professional literature using regression analysis. Prerequisites: POS 401 and 503 or instructor approval.

POS 604 Polimetrics II. (3) A

Apply quantitative techniques to research topics producing publishable papers through exposure to time-series, logit and probit, and simultaneous equations. Prerequisites: POS 401 and 503 and 603 or instructor approval.

POS 606 Qualitative and Textual Analysis. (3) S 2001

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) N

Introduction to comparative state policy emphasizing policy or performance differences among the states and the reasons for these differences. Seminar. Prerequisites: POS 530 and 603 or instructor approval.

POS 636 Electoral Behavior. (3) N

Introduces fundamental concepts of electoral behavior. Emphasizes presidential elections and examines why people vote and how their votes are determined. Seminar. Prerequisites: POS 530 and 603 or instructor approval.

POS 638 Law and Politics. (3) N

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) N

Examines contending approaches to national, social, and political change. Seminar. Prerequisite: instructor approval.

POS 660 The Modern World System. (3) N

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) N

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) N

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) N

The 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) N

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) N**POS 790 Reading and Conference.** (1–12) N**POS 792 Research.** (3) F, S

Projects in various areas of political science. Prerequisite: doctoral student.

Department of Psychology

Darwyn E. Linder

Chair

(PSY 237) 480/965-3326

www.asu.edu/clas/psych

REGENTS' PROFESSORS

CIALDINI, EISENBERG, RUSSO

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AIKEN, BARRERA, BRAUN, BRAVER, CASTRO, CHASSIN,
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REICH, SADALLA, SANDLER, SOMERVILLE, VAN ORDEN,
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ASSOCIATE PROFESSORS

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GONZALES, LESHOWITZ, MacKINNON, MILLSAP,
NAGOSHI, NEISEWANDER, NEMEROFF, SAENZ, STONE

ASSISTANT PROFESSORS

E. AMAZEEN, P. AMAZEEN, CONRAD, DAVIS, GEST,
KHOO, McBEATH

SENIOR LECTURERS

BARTON, WEIGAND, WOSINSKI

LECTURER

PALMER

The Department of Psychology maintains an Undergraduate Advisement Office staffed by trained personnel. All Psychology majors are encouraged to meet with an undergraduate advisor once each semester to ask questions regarding the choice of courses. Failure to do so may prevent graduation at the expected time. It is the responsibility of the student to consult with an undergraduate advisor.

PSYCHOLOGY—B.A.

The B.A. degree in Psychology consists of 31 semester hours in psychology, including at least 15 upper-division semester hours. Required courses, which must be passed with a minimum grade of “C,” are as follows:

PGS 101	Introduction to Psychology <i>SB</i>	3
PGS 315	Personality Theory and Research <i>SB</i>	3
	or PGS 341 Developmental Psychology <i>SB</i> (3)	
	or PGS 350 Social Psychology <i>SB</i> (3)	
PSY 230	Introduction to Statistics <i>CS</i>	3

PSY 290	Research Methods <i>L/SG</i>	4
PSY 323	Sensation and Perception	3
	or PSY 320 Learning and Motivation (3)	
	or PSY 324 Memory and Cognition (3)	
	or PSY 325 Physiological Psychology (3)	

Total16

Also required are one additional upper-division PSY course (excluding PSY 484 and 499); two additional upper-division PGS or PSY courses; and two additional psychology courses, excluding PGS 194, 270, 484, or PSY 484. A maximum of three hours in Supervised Research or Individualized Instruction may be used to complete the 31 hours of psychology requirements. Students may take a maximum of six hours of PGS 399 and six hours of PGS 499 and PSY 499 combined. Eighteen hours in courses related to psychology must be passed with a minimum grade of “C.” They must be approved by an undergraduate advisor and include MAT 119 (or higher) in addition to one course from among the following:

CSE 180	Computer Literacy <i>CS</i>	3
CSE 185	Internet and the World Wide Web	3

See “College Degree Requirements,” page 332.

PSYCHOLOGY—B.S.

The B.S. degree in Psychology consists of 31 semester hours in psychology, including at least 15 upper-division hours. Required courses, which must be passed with a minimum grade of “C,” are as follows:

PGS 101	Introduction to Psychology <i>SB</i>	3
PGS 315	Personality Theory and Research <i>SB</i>	3
	or PGS 341 Developmental Psychology <i>SB</i> (3)	
	or PGS 350 Social Psychology <i>SB</i> (3)	
PSY 230	Introduction to Statistics <i>CS</i>	3
PSY 290	Research Methods <i>L/SG</i>	4
PSY 323	Sensation and Perception	3
	or PSY 320 Learning and Motivation (3)	
	or PSY 324 Memory and Cognition (3)	
	or PSY 325 Physiological Psychology (3)	

Total16

Also required are one additional upper-division PSY course (excluding PSY 484 or 499); two additional upper-division PGS or PSY courses; and two additional psychology courses excluding PGS 194, 270, 484, and PSY 484. A maximum total of three hours in Supervised Research or Individualized Instruction may be used to complete the 31 hours of Psychology requirements. Students may take a maximum of six hours of PGS 399 and six hours of PGS 499 and PSY 499 combined. Eighteen hours in courses related to psychology must be passed with a minimum grade of “C.” They must be approved by an undergraduate advisor and include MAT 210 Brief Calculus (or higher); one life science lab course (BIO or MIC); one physical science lab course (AST, CHM, GLG, or PHY); and one course from among the following:

CSE 180	Computer Literacy <i>CS</i>	3
CSE 185	Internet and the World Wide Web	3

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see “General Studies,” page 87. For graduation requirements, see “University Graduation Requirements,” page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see “Classification of Courses,” page 60.

Further, the science courses taken to satisfy the B.S. degree requirements cannot be used to meet the College of Liberal Arts and Sciences natural science distribution requirements. See “College Degree Requirements,” page 332.

MINOR IN PSYCHOLOGY

The minor in Psychology consists of 22 hours in psychology, including the following:

PGS 101	Introduction to Psychology <i>SB</i>	3
PGS 315	Personality Theory and Research <i>SB</i>	3
	or PGS 341 Developmental Psychology <i>SB</i> (3)	
	or PGS 350 Social Psychology <i>SB</i> (3)	
PSY 230	Introduction to Statistics <i>CS</i>	3
PSY 290	Research Methods <i>L/SG</i>	4
PSY 323	Sensation and Perception	3
	or PSY 320 Learning and Motivation (3)	
	or PSY 324 Memory and Cognition (3)	
	or PSY 325 Physiological Psychology (3)	
Total	.....	16

Two additional upper-division PGS or PSY courses are required.

A maximum of three hours of research (PGS 399 or 499 or PSY 499) may be used to meet the minor requirements. Students with an appropriate equivalent course may exclude PSY 230 from the requirements. All courses must be passed with a minimum grade of “C.”

SECONDARY EDUCATION—B.A.E.

Psychology. The minor teaching field consists of 24 semester hours. See a departmental advisor.

Social Studies. See “Social Studies,” page 438.

GRADUATE PROGRAMS

The faculty in the Department of Psychology offer a program leading to the Ph.D. degree. See the *Graduate Catalog* for requirements.

PSYCHOLOGY (PGS)

PGS 101 Introduction to Psychology. (3) F, S, SS
Major areas of theory and research in psychology. Participation in department-sponsored research or an educationally equivalent alternative activity is required. *General Studies: SB.*

PGS 194 Special Topics. (1–4) N

PGS 222 Human Sexual Behavior. (3) F, S
Patterns of sexual behavior, including variations and deviations; theories of sexual attraction, sex differences, and sexual dysfunction and treatment. Prerequisite: PGS 101. *General Studies: SB.*

PGS 270 Psychology of Adjustment. (3) F, S, SS
Principles of mental health, adjustment, conflict, stress, and coping processes derived from clinical and experimental research. Intended for nonmajors; cannot be used for major credit. Prerequisite: PGS 101. *General Studies: SB.*

PGS 304 Effective Thinking. (3) A
Understanding and improving your intellectual and behavioral skills; information analysis, inference, logic, problem solving, and decision making. Prerequisite: MAT 119 or PSY 230 or equivalent. *General Studies: L.*

PGS 306 Environmental Psychology. (3) F, S, SS
Concepts and research strategies in the study of behavior in interaction with physical environment. Prerequisite: PGS 101. *General Studies: SB.*

PGS 315 Personality Theory and Research. (3) F, S, SS
Definition and description of personality in terms of theoretical and methodological approaches. Prerequisites: PGS 101; PSY 290. *General Studies: SB.*

PGS 341 Developmental Psychology. (3) F, S
Behavior development analyzed in terms of psychological principles. Current research in human development. Prerequisites: PGS 101; PSY 290. *General Studies: SB.*

PGS 344 Directed Child Study. (3–4) F, S, SS
Theories and methods of intervention with preschool children and supervised practicum in the Child Study Laboratory. 1 hour lecture, 6–8 hours practicum. Prerequisites: CDE 232 (or PGS 341); instructor approval. *General Studies: L.*

PGS 350 Social Psychology. (3) F, S, SS
Human social behavior, including such concepts as aggression, attraction, attribution, conformity, groups, helping, person perception, and persuasion. Prerequisite: PGS 101. *General Studies: SB.*

PGS 351 Honors Social Psychology. (3) N
A critical analysis of human social behavior for honors students; topics include stereotyping, social influence, attraction, aggression, helping, groups, and attitudes. Lecture, discussion. Open only to students without previous credit for PGS 350. Prerequisites: PGS 101; honors standing; instructor approval. *General Studies: L/SB.*

PGS 365 Community Psychology. (3) F, S
Mental health and psychological well-being in the community, emphasizing current issues and related research. Prerequisite: PGS 315 or 350. *General Studies: SB.*

PGS 394 Special Topics. (1–4) N

PGS 399 Supervised Research. (1–3) F, S, SS
Experience within the context of current faculty research projects. Student is assigned responsibility depending on qualifications. “Y” grade only. May be repeated for a total of 6 hours. Prerequisites: approval of faculty member before registration; “B” average in major. Pre- or corequisite: PSY 230 or equivalent.

PGS 414 History of Psychology. (3) F, S
Historical development of psychology from its philosophical beginnings to the present. Prerequisites: PGS 101; PSY 230, 290. *General Studies: L/SB.*

PGS 427 Psychology of Aging. (3) N
Analysis of loss, maintenance, and gain associated with cognitive and affective aging. Individual differences in coping with normative life transitions. Prerequisites: PGS 101, 341. *General Studies: L/SB.*

PGS 430 Industrial Psychology. (3) F, S, SS
Organizations and management systems; motivation and work performance; human factors in systems design and evaluation; personnel selection and testing. Prerequisite: MGT 301 or PGS 101.

PGS 441 Cognitive Development. (3) F, S
Experimental and theoretical literature in child development and behavior. Prerequisite: PGS 341 or instructor approval. *General Studies: L/SB.*

PGS 443 Abnormal Child Psychology. (3) F, S
The major disorders of childhood and adolescence (e.g., autism, hyperactivity, phobias, and delinquency) are covered, including cause, diagnosis, treatment, and prevention. Prerequisites: PGS 101 and 1 course from among PGS 315 and 341 and 350 or instructor approval. *General Studies: L/SB.*

PGS 444 Adolescent Psychology and Psychopathology. (3) N
An advanced level survey of normal adolescent psychological development and psychological disorders of this age period. Lecture, discussion. Prerequisites: PGS 101, 341; PSY 290. *General Studies: L.*

PGS 445 Child Language and Drawing. (3) F
Language acquisition and developmental changes in drawing, considered in the context of cognitive developmental stages. Children’s representation and communication of knowledge through language and drawing. Prerequisite: PGS 341. *General Studies: SB.*

PGS 446 Social Development. (3) N
Theory, research, and issues regarding social development are discussed. Example topics: formation of attachments, prosocial development, and gender-role development. Lecture, seminar. Prerequisite: PGS 341. *General Studies: L.*

PGS 450 Social Perception and Cognition. (3) N
A critical analysis of human social perception and social cognition. Topics include attribution, inference, memory, attention, impression formation, stereotype change. Lecture, discussion. Prerequisites: PGS 101, 350. *General Studies: L.*

PGS 451 Stereotyping, Prejudice, and Discrimination. (3) N

A critical investigation of the processes underlying, and the factors contributing to, stereotyping, prejudice, and discrimination. Lecture, discussion. Prerequisites: PGS 101, 350. *General Studies: L.*

PGS 452 Applied Social Psychology. (3) F

The study of applications of social psychological theory and concepts in natural settings; research design and data analysis. Lecture, lab-type activities. Prerequisites: PGS 101, 350; PSY 230. *General Studies: L.*

PGS 453 Organizational Behavior. (3) N

A survey of psychological theory and research as applied to the behavior of individuals in organizational settings. Lecture, discussion. Prerequisites: PGS 101, 350.

PGS 458 Group Dynamics. (3) F

Theories and methods of group leadership, group effectiveness, communication within groups, and relations between groups and individual members. Prerequisite: PGS 350.

PGS 461 Interpersonal Influence. (3) N

Principles and procedures that affect the process of social influence, consideration of attitudinal, compliance inducing, and perceptual influences. Prerequisite: PGS 350. *General Studies: SB.*

PGS 462 Health Psychology. (3) F, S

Contributions of psychology to health promotion and illness prevention, adaptation to acute and chronic illness, and to the health care system. Prerequisites: PSY 230, 290.

PGS 463 Advanced Psychology of Adjustment. (3) F

Critical analysis and effective expression of psychological theory and research of the topic of adjustment. Lecture, discussion, writing. Prerequisites: PSY 230, 290; completion of 1st-year English requirements; L course. *General Studies: L.*

PGS 464 Minority Issues in Psychology. (3) S

Psychological issues relating to the diversity of human cultural experiences and among ethnic minorities in the U.S. Prerequisite: PSY 290.

PGS 465 Psychology of Stress and Coping. (3) F

Readings in theory and research in the area of stress and coping. Lecture, discussion, class presentations. Prerequisites: PGS 315 (or 350); PSY 290. *General Studies: L.*

PGS 466 Abnormal Psychology. (3) F, S, SS

Historical and current definitions, theory, and research concerning abnormal behavior. Major categories of psychopathology, including related treatment approaches. Prerequisites: PGS 101; PSY 290. *General Studies: SB.*

PGS 467 Psychology of Magical Beliefs. (3) N

The psychological nature and bases of magical beliefs and their impact on health behaviors, eating practices, and interpersonal relations. Lecture, seminar. Prerequisites: PGS 315 and 466 and PSY 434 or instructor approval. *General Studies: L.*

PGS 468 Psychology and Law. (3) F, S

Theories, research, and practice in psychology as related to law, including criminal, civil, domestic relations, and professional issues. Lecture, discussion. Prerequisite: PSY 290.

PGS 471 Psychological Testing. (3) S

Methods and theory of psychological testing; various types of psychological tests; consideration of ethical, social, and legal aspects of testing. Prerequisite: PSY 290.

PGS 472 Clinical Psychology. (3) F, S

Clinical psychology as a science and profession. Historical development, methods of interviewing, assessment, and therapeutic intervention. Prerequisite: PGS 466.

PGS 484 Internship. (1–12) N**PGS 494 Special Topics.** (1–4) N**PGS 499 Individualized Instruction.** (1–3) N**PSYCHOLOGY (PSY)****PSY 230 Introduction to Statistics.** (3) F, S, SS

Basic concepts in descriptive and inferential statistics, emphasizing applications to psychology. The course has both self-paced (PSI) and lecture sections. Prerequisites: MAT 117; PGS 101. *General Studies: CS.*

PSY 290 Research Methods. (4) F, S

Planning, execution, analysis, and reporting of experiments. Literature, procedures, and instruments in representative areas of psychological research. 3 hours lecture, 3 hours lab. Prerequisite: PSY 230. *General Studies: L/SG.*

PSY 320 Learning and Motivation. (3) F, S, SS

Principles of conditioning and motivation; approaches to learning, including acquisition of verbal materials, concepts, and motor skills; memory and transfer. Prerequisite: PSY 290.

PSY 323 Sensation and Perception. (3) F, S

Underlying processes of vision, audition, and the other senses. Application of current research and theory in a laboratory environment. Prerequisite: PSY 290 or instructor approval.

PSY 324 Memory and Cognition. (3) F, S, SS

Processes underlying information storage and retrieval, including different kinds of memory, forgetting, depth of processing, and control processes. Prerequisite: PSY 290.

PSY 325 Physiological Psychology. (3) F, S, SS

Relationships of physiological processes to behavior. Emphasis is on nervous system functioning. Prerequisites: PSY 290 (or 2 courses in biological science); instructor approval.

PSY 330 Statistical Methods. (3) S

Advanced application of statistics to psychology. Highly recommended for students interested in attending graduate school. 3 hours lecture, 1 hour lab. Prerequisite: PSY 230. *General Studies: CS.*

PSY 390 Experimental Psychology. (3) S

Continuation of concepts in PSY 290, with emphasis on multifactor designs and programmatic sequence of experiments. Lecture, lab. Prerequisite: PSY 290. *General Studies: L.*

PSY 420 Analysis of Behavior. (3) N

Research, applications, and philosophy of the analysis and control of human behavior. Prerequisite: PSY 290. *General Studies: L.*

PSY 424 Genetic Psychology. (3) S

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) N

Critical study of physiological psychology; brain mechanisms underlying motivation, and learning. Prerequisite: PSY 325. *General Studies: L.*

PSY 426 Neuroanatomy. (4) N

Structure and function of mammalian brain, including sheep brain dissection. 3 hours lecture, 3 hours lab. Prerequisite: PSY 325 or equivalent. *General Studies: L.*

PSY 434 Cognitive Psychology. (3) S

The human organism as a processor of information, from perception to cognition. Abstract concepts, semantic memory, attention, and mental imagery. Prerequisite: PGS 101; PSY 323 or 324 or instructor approval. *General Studies: L.*

PSY 437 Human Factors. (3) F

Emphasis on human factors in high technology systems. Specific topics include systems development, systems analysis techniques, displays, and controls. Prerequisites: PSY 290 and upper-division standing or instructor approval. *General Studies: L.*

PSY 470 Psychopharmacology. (3) F, S

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 484 Internship. (1–12) N**PSY 494 Special Topics.** (1–4) N**PSY 498 Pro-Seminar.** (3) F, S

(a) Behavioral Neuroscience Research
General Studies: L.

PSY 499 Individualized Instruction. (1–3) N**PSY 501 Supervised Teaching.** (4) F

Experience in and examination of perspectives on teaching undergraduate psychology. Prerequisites: graduate standing in psychology; instructor approval.

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.

PSY 506 Survey of Research in Environmental Psychology. (3) F
Major topics and paradigms in the study of person-environment relationships. Prerequisite: instructor approval.

PSY 512 Advanced Learning. (3) N

Principles and theories of learning, emphasizing research literature. Prerequisite: instructor approval.

PSY 524 Advanced Physiological Psychology. (3) N

Contributions of physiological processes and brain function to fundamental behavioral processes. Prerequisite: instructor approval.

PSY 528 Sensation and Perception. (3) N

Principles of sensory and perceptual processes, emphasizing research literature. Prerequisite: instructor approval.

PSY 530 Analysis of Variance in Psychological Research. (3) F

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) S

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) F

Matrix algebra for multivariate procedures, component and factor analysis, canonical and discriminant analysis, classification, MANOVA, logistic regression, hierarchical linear model. Prerequisites: PSY 530 and 531 or instructor approval.

PSY 533 Structural Equation Modeling. (3) S

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) F, S

Theory and practice of psychological measurement using classical and modern test theories. Reliability assessment, test validation, test construction, test usage. Prerequisites: PSY 530 and 531 or instructor approval.

PSY 535 Cognitive Processes. (3) N

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) F, S

Statistical methods used in prevention research including epidemiological methods, logistic regression, program effect estimation, estimation, and mediation analysis. Prerequisites: PSY 530 and 531 or instructor approval.

PSY 537 Longitudinal Growth Modeling. (3) N

Growth modeling methodology to describe individual variation in development over time. Multilevel and structural equation modeling frameworks are employed. Prerequisite: PSY 533 or instructor approval.

PSY 538 Advanced Structural Equation Modeling. (3) N

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) F

Meta-analysis; searching the literature, coding study characteristics, computing effect sizes. Must be followed by PSY 540. Seminar. Prerequisites: PSY 530 and 531 or instructor approval.

PSY 540 Meta-Analysis II. (2) S

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) N

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) N

Major issues in the area of social development are topics for review and critique. Theory, research, and content are covered. Prerequisite: instructor approval.

PSY 550 Advanced Social Psychology. (3) F, S

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) F, S

Continuation of PSY 550. Prerequisite: PSY 550 or instructor approval.

PSY 553 Social Influence. (3) N

Research literature relevant, for example, to attitude formation and change, conformity, obedience, power, compliance, and altruism. Prerequisite: PSY 551 or instructor approval.

PSY 555 Experimental and Quasi-Experimental Designs for Research. (3) N

Review of research techniques. Laboratory and field research analyzed; applications to specific topics. Prerequisite: instructor approval.

PSY 569 Advanced Study of Personality. (3) N

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) F

Theory and research on assessment of personality, psychopathology, and intelligence, and construction of psychological assessment instruments. Prerequisite: admission to clinical Ph.D. program or instructor approval.

PSY 573 Psychopathology. (3) F

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) S

A 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) N

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) SS

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) N

Several theories and strategies of organizational consultation. The development of consultative skills through simulation and practical experience. Prerequisite: advanced standing in Psychology Ph.D. program or instructor approval.

PSY 624 Clinical Neuroscience. (3) S

An examination of 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.

Department of Religious Studies

Joel Gereboff
 Chair
 (ECA 377) 480/965-7145
www.asu.edu/clas/religious_studies

PROFESSORS

CADY, FELDHAUS, FOARD, SAMUELSON

ASSOCIATE PROFESSORS

CLAY, COUDERT, GEREBOFF, MOORE, MORRISON,
 SCHOBER, SWANSON, WOODWARD

ASSISTANT PROFESSORS

FESSENDEN, LEON, UMAR

LECTURER

DAMREL

RELIGIOUS STUDIES—B.A.

The B.A. degree in Religious Studies consists of 45 semester hours, 30 of which must be in religious studies (including 21 in upper-division courses) and 15 of which must be in related fields. In order for the student to become acquainted with the character and role of religions across a wide spectrum of social and historical contexts, the 30 semester hours in religious studies must include the following courses:

1. REL 305 Ritual, Symbol, and Myth;
2. at least one course from each of the following distribution areas: Religion in the Americas, Religion and Asian Cultures, and Religion and Western Cultures; and
3. two research seminars, including REL 405 Problems in Religious Studies, which may be repeated for credit; or
4. in place of a second seminar, a student may take REL 499 to write an undergraduate thesis.

The Religious Studies major is an appropriate choice for students wishing to explore such areas as African or African American studies; Islamic studies; myth, ritual, and the arts; Native American studies; and religion and politics. All majors must plan their programs in consultation with a departmental advisor. A minimum GPA of 2.50 is required in the 30 semester hours of religious studies courses.

MINOR IN RELIGIOUS STUDIES

The minor in Religious Studies consists of 18 semester hours, at least 12 of which must be in the upper division. Both REL 305 and 405 are required. For minor verification, students must consult a department advisor.

CERTIFICATES AND EMPHASES

The following are certificate programs or emphases offered in the Department of Religious Studies. For more information on each, see “Certificate Programs and Areas of Emphasis,” page 339.

Asian Studies Certificate. Students majoring in Religious Studies may elect to pursue an Asian Studies emphasis or East Asian Studies certificate combining courses from the major with selected outside courses of wholly Asian content.

Jewish Studies Certificate. Students majoring in Religious Studies may elect to pursue a Jewish Studies certificate combining courses from the major with selected outside courses in the area of Jewish Studies.

Latin American Studies Certificate. Students majoring in Religious Studies may elect to pursue a Latin American Studies certificate combining courses from the major with selected outside courses of wholly Latin American content.

Russian and East European Studies. Students majoring in Religious Studies may elect to earn a Certificate in Russian and East European Studies by successfully completing one of the options mentioned in “Russian and East European Studies,” page 341.

Southeast Asian Studies Emphasis. Students majoring in Religious Studies may elect to earn a Certificate in Southeast Asian Studies by successfully completing the requirements.

Women’s Studies. Students majoring in Religious Studies may elect to earn a Certificate in Women’s Studies by successfully completing the requirements.

GRADUATE PROGRAM

The faculty in the Department of Religious Studies offer a graduate program leading to the M.A. degree for those who wish to enter a doctoral program in the study of religions, for those who wish to teach at the community college level, and for those in nonacademic careers who desire general competence in the academic study of religions. See the *Graduate Catalog* for requirements.

RELIGIOUS STUDIES (REL)

REL 100 Religions of the World. (3) F, S

An introduction to the history of religious traditions of the world, including Buddhism, Christianity, Hinduism, Islam, Judaism, and others. Not open to students who have completed REL 200. *General Studies: HU, G.*

REL 200 The Study of Religious Traditions. (3) A

A writing-intensive course introducing analytical skills necessary for understanding religious traditions. Beliefs, practices, and communities of several religious traditions of the world. Not open to students who have completed REL 100. *General Studies: L/HU, G.*

REL 201 Religion and the Modern World. (3) A

An introduction to the nature and role of religious beliefs and practices in shaping the lives of individuals and societies, with particular attention to the modern world. *General Studies: L/HU.*

REL 202 Religion and Popular Culture. (3) F, S

Explores various intersections between religion and the popular media, including music, news, advertising, the visual arts, literature, performance, and film. Lecture, discussion. *General Studies: HU, C.*

REL 203 Saints and Sinners: Explorations in Sacred Biography.

(3) F, S

A comparison of the role of biography across religions to examine the process of categorizing people as saints or sinners. Lecture, discussion. *General Studies: HU, H.*

REL 205 Living and Dying. (3) F, S

Ways that religions have understood birth, sexuality and death and the passing of generations. Examples from traditions throughout the world. Lecture, discussion. *General Studies: HU.*

REL 210 Introduction to Judaism. (3) A

The beliefs, ceremonies, festivals, and institutions of Judaism emphasizing the contemporary era. The course presupposes no previous knowledge about Judaism. *General Studies: L/HU, H.*

REL 225 African American Religion. (3) A

Introduction to the history and development of the African American religious tradition. Lecture, discussion. *General Studies: HU, C.*

REL 240 Introduction to Southeast Asia. (3) F

An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as ASB 240/GCU 240/HIS 240/POS 240. Credit is allowed for only ASB 240 or GCU 240 or HIS 240 or POS 240 or REL 240. *General Studies: G.*

REL 260 Introduction to Islam. (3) S

Examination of Islamic beliefs, ceremonies, festivals, and institutions. Course assumes no prior knowledge about Islam. Lecture, discussion. Cross-listed as HUM 260. Credit is allowed for only HUM 260 or REL 260.

REL 270 Introduction to Christianity. (3) A

The beliefs, ceremonies, festivals, and institutions of Christianity, emphasizing the contemporary era. The course presupposes no previous knowledge about Christianity. *General Studies: HU.*

REL 301 Comparative Mysticism. (3) F

Comparative examination of Eastern and Western mystical traditions from antiquity to the present. Lecture, discussion. Prerequisite: REL 100.

REL 305 Ritual, Symbol, and Myth. (3) A

Ritual, symbol, and myth as types of religious expression, with examples selected from the nonliterate religions of the world. *General Studies: L/HU.*

REL 310 Western Religious Traditions. (3) F

Religious traditions of Judaism, Christianity, and Islam, comparing their doctrinal, institutional, and ritual systems and social histories. Lecture, discussion. *General Studies: HU, H.*

REL 315 Hebrew Bible (Old Testament). (3) A

The nature, content, background, historical situation, and message of the books of the Hebrew Bible in English translation. *General Studies: L/HU, H.*

REL 317 Introduction to Rabbinic Judaism. (3) A

A historical analysis of the thought, literature, and institutions of rabbinic Judaism. *General Studies: HU, H.*

REL 320 American Religious Traditions. (3) F, S

Examination of the formation, development, and interaction of major American religious traditions (indigenous, African American, Asian American, and Euro-American). *General Studies: HU, C, H.*

REL 321 Religion in America. (3) F, S

The history of religion in America with attention to issues of historiography, pluralism, gender, race, ethnicity, politics, and social reform. *General Studies: HU, C, H.*

REL 322 Malcolm and Martin. (3) F, S

This course examines and contrasts the lives, ministries, contributions and legacies of Malcolm X and Martin Luther King, Jr. *General Studies: HU, C.*

REL 323 Black Religion: A Biographical Approach. (3) F, S

An examination of the experiences, motivations, and contributions of a number of figures associated with African American religion. *General Studies: HU, C.*

REL 330 Native American Religious Traditions. (3) A

World views and religious thought presented through the art, architecture, literature, music, mythology, ritual, and folklore of representative tribes in North America. *General Studies: HU, C.*

REL 331 History of Native American Religious Traditions. (3) N

The role of religion in Native American history, including missionization, and religious adaptation; prophetic, messianic, and religious revitalization movements. *General Studies: L/HU, C, H.*

REL 332 South American Indian Religions. (3) F, S

An introduction to the sacred stories, ceremonies, and beliefs of Native South American peoples in their historical contexts. *General Studies: HU, G.*

REL 344 Religion and Values in Japanese Life. (3) S

Japanese values expressed in the life and annual cycles of the family, local and national identities, and popular culture. Lecture, discussion. *General Studies: HU, G.*

REL 345 Asian Religious Traditions. (3) F

Introduction to the major concepts of religious beliefs, rituals, and practices in Hinduism and Buddhism. Lecture, discussion. *General Studies: HU, G.*

REL 350 Hinduism. (3) A

The study of diverse forms of Hinduism through its institutions, literature, folklore, art, and architecture. *General Studies: L/HU, G, H.*

REL 351 Buddhism. (3) A

Doctrines, practices, and institutions of the Buddhist religion, emphasizing its role in the history and culture of Asian societies. *General Studies: L/HU, G.*

REL 355 Japanese Cities and Cultures to 1800. (3) S

Relations among ideas and literary, visual, and performing arts of the ancient aristocracy, medieval samurai, and early modern townspeople. Cross-listed as HUM 310. Credit is allowed for only HUM 310 or REL 355. *General Studies: L/HU, H.*

REL 365 Islamic Civilization. (3) F

Global historical survey of Islamic cultures and societies up to the modern period. Lecture, discussion. *General Studies: HU, H.*

REL 366 Islam in the Modern World. (3) S

Examination of the worldwide transformations of Islamic religion, cultures, and societies in the modern period. Lecture, discussion. *General Studies: HU, G, H.*

REL 371 New Testament. (3) A

Origins and literature of early Christian communities; historical investigations of the types of oral and written tradition in the New Testament. *General Studies: HU.*

REL 372 Formation of the Christian Tradition. (3) A

Origins, development, and expansion of Christianity; major themes and tensions from the New Testament world to the beginning of the Middle Ages. *General Studies: HU, H.*

REL 373 Women in Judaism. (3) S

A study of the legal, social, and cultural status of Jewish women in various historical and contemporary societies. Cross-listed as WST 372. Credit is allowed for only REL 373 or WST 372.

REL 374 Witchcraft and Heresy in Europe. (3) N

Background, origins, and development at the Inquisition. Analysis of marginal groups and their suppression. Cross-listed as HIS 340. Credit is allowed for only HIS 340 or REL 374. Prerequisite: upper-division standing or instructor approval. *General Studies: L, H.*

REL 377 Religion in Russia. (3) F, S

Examines the history of the various religious traditions of Russia and the former USSR from an interdisciplinary perspective. *General Studies: HU, H.*

REL 379 Religion, Nationalism, and Ethnic Conflict. (3) F, S

Examines the role of religion in national and ethnic conflict in the contemporary world. *General Studies: HU, G.*

REL 381 Religion and Moral Issues. (3) A

The manner in which human religiousness relates to social concerns, e.g., sexuality, the environment, bioethical issues, and violence. *General Studies: L/HU.*

REL 382 Religion, Magic, and Science. (3) F, S

The relationship and conflict between religion, magic, and science in the west from antiquity to the present. Lecture, discussion. *General Studies: L/HU.*

REL 383 Origins, Evolution, and Creation. (3) F

Examines scientific, mythic, and religious ideas relating to origins (particularly human). Place of antievolutionism and "scientific creationism" in American culture. Lecture, discussion. Cross-listed as BIO 344/HPS 311/HUM 371. Credit is allowed for only BIO 344 or HPS 311 or HUM 371 or REL 383.

- REL 385 Contemporary Western Religious Thought.** (3) A
Introduction to contemporary Jewish and Christian thought. Topics include religion and politics, problem of evil, interpretations of God, and feminist theology. *General Studies: L/HU.*
- REL 390 Women and Religion.** (3) A
The role of women in several organized religions and/or religious sects, including a study of myth and symbols as they are used to establish, maintain, and enforce sex-roles within specific religions. *General Studies: HU, G.*
- REL 405 Problems in Religious Studies.** (3) F, S
Selected topics in religious studies, involving students in research interests of instructor. May be repeated for credit when topics vary. Seminar. Prerequisite: at least 9 semester hours of REL courses or instructor approval.
- REL 410 Judaism in Modern Times.** (3) N
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) A
Examination of some of the esoteric lore of Judaism. Movements and literature such as Hasidism and Kabbalah are studied. *General Studies: HU.*
- REL 420 Religion in American Life and Thought.** (3) A
The influence of religion on American society, culture, and ideas; the distinctive character of religion in America. Prerequisite: REL 320 or 321 or equivalent. *General Studies: L/HU.*
- REL 426 American Preachers and Preaching: The Sermon in America.** (3) N
The life and work of notable American preachers. The emergence of the preacher as representative of American religion. Prerequisite: REL 320 or 321 or equivalent. *General Studies: L/HU.*
- REL 427 American Religious Thought.** (3) N
The thought of representative American religious thinkers, i.e., Jonathan Edwards, William Ellery Channing, Horace Bushnell, and Reinhold Niebuhr. Prerequisite: REL 320 or 321 or equivalent. *General Studies: HU, H.*
- REL 444 Religion in Japan.** (3) F
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) A
Issues in the interpretation and understanding of Islamic texts, history, society, culture, and rituals. Prerequisites: REL 365 and Religious Studies major or instructor approval. *General Studies: HU, G.*
- REL 470 Religion in the Middle Ages.** (3) A
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) A
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 480 Religion and Global Politics.** (3) S
Explores the nature and role of religion in international politics in the modern period. Lecture, discussion. *General Studies: G.*
- REL 486 Modern Critics of Religion.** (3) A
Major theories and critiques of religion among modern social, philosophical, and religious thinkers. *General Studies: HU.*
- REL 494 Special Topics in Religious Studies.** (3) N
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) A
For students with a major or minor emphasis in Religious Studies.
- REL 499 Individualized Instruction.** (1–3) N
- REL 501 Research Methods in Religious Studies.** (3) F
An exploration of 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) F, S
An exploration of the major themes and methods in the study of religion, with primary focus on contemporary texts. Lecture, discussion.
- REL 591 Seminar.** (3) N
Topics on methodological issues in the study of religion. Prerequisite: Religious Studies graduate student or instructor approval.
- REL 592 Research.** (1–12) N
- REL 598 Special Topics.** (3) F, S
Topics are selected from the following areas:
(a) Christianity
(b) Islam
(c) Judaism
(d) Native American Religion
(e) Problems in Religious Studies
(f) Religion in America
(g) Religion in East Asia
(h) Religion in South and Southeast Asia
(i) Study of Religion, Comparative Religion
(j) Western Religious Thought, Ethics
May be repeated for credit.

Department of Sociology

Gary W. Peterson
Chair
(SS 321) 480/965-3546
www.asu.edu/clas/sociology

PROFESSORS

BOLIN, COBAS, GORDON, HACKETT, KRONENFELD,
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MILLER-LOESSI, QIAN, SULLIVAN

ASSISTANT PROFESSOR

AGADJANIAN, GLICK, PADILLA, RHEA

SENIOR LECTURER

FINE

INSTRUCTOR

WILLIAMS

SOCIOLOGY—B.A.

The B.A. degree in Sociology requires a minimum of 30 semester hours of Sociology course work and 15 hours in closely related fields. Of the 30 required hours, a minimum of 18 hours must be upper-division with at least 12 of the 18 upper-division hours taken in residence at ASU Main Campus. All upper-division courses in the major must be completed with a grade of “C” or higher. The following courses are required:

SOC 101	Introductory Sociology <i>SB</i>	3
	or SOC 301 Principles of Sociology <i>SB</i> (3)	
SOC 390	Social Statistics I <i>CS</i>	3
SOC 391	Sociological Research <i>SB</i>	3

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see “General Studies,” page 87. For graduation requirements, see “University Graduation Requirements,” page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see “Classification of Courses,” page 60.

SOC 483 History of Social Thought <i>L/SB</i>	3
or SOC 485 Sociology of Knowledge <i>L/SB</i> (3)	
or SOC 486 Contemporary Theory <i>SB</i> (3)	
Total	12

Sociology majors may complete the remaining 18 required hours through selecting one of two options. For a general sociology degree, students must choose six courses that sample at least three of the seven sociology content areas:

1. family;
2. intergroup relations and social psychology;
3. political/comparative-historical;
4. social problems and processes;
5. stratification/occupations/organization;
6. urban sociology/demography; or
7. race and ethnicity.

If majors desire a more focused preparation in a specialized area, they may complete the remaining 18 hours in one of five focus areas: family issues, urban issues, diversity issues, work/organizational issues, and health issues. Students choosing this option must complete two required focus area courses and select the remaining four courses from a list of optional courses within that focus area. SOC 484 Internships are available within the focus area option for those who qualify.

Information concerning the two options for fulfilling major requirements is available in the Department of Sociology office, SS 321, the Sociology Advising Center, SS 304, and on the Internet at www.asu.edu/clas/sociology/undergraduate/advising.

MINOR IN SOCIOLOGY

The minor in Sociology requires 18 hours, of which 12 hours must be upper-division courses, with at least six upper-division hours completed at ASU Main Campus. The required courses are as follows:

SOC 101 Introductory Sociology <i>SB</i>	3
or SOC 301 Principles of Sociology <i>SB</i> (3)	
SOC 391 Sociological Research <i>SB</i>	3
or SOC 483 History of Social Thought <i>L/SB</i> (3)	
or SOC 485 Sociology of Knowledge <i>L/SB</i> (3)	
or SOC 486 Contemporary Theory <i>SB</i> (3)	
Total	6

The remaining four courses consist of sociology electives.

SECONDARY EDUCATION—B.A.E.

Social Studies. The major teaching field of social studies education consists of 63 semester hours, of which 30 hours may be in criminal justice, economics, geography, history, political science, psychology, and sociology and are exactly those courses required for the B.A. degree in Sociology. Of the remaining hours, two groups of 12 hours each and one of six hours are generally taken in related social sciences plus SED 480 Special Methods of Teaching Social Studies.

The minor teaching field consists of 24 semester hours, at least six of which must be upper division. SOC 101 or 301, and SOC 470 Racial and Ethnic Relations or SOC 474 African-Americans in Modern Society are required. The

remaining 18 hours must be approved by the sociology advisor in consultation with the student and must include at least one course from at least four of the following six areas:

1. family;
2. intergroup relations and social psychology;
3. political/comparative-historical;
4. social problems and processes;
5. stratification/occupations/organization; or
6. urban sociology/demography.

GRADUATE PROGRAMS

The faculty in the Department of Sociology offer programs leading to the M.A. and Ph.D. degrees. See the *Graduate Catalog* for requirements.

SOCIOLOGY (SOC)

SOC 101 Introductory Sociology. (3) F, S, SS

Fundamentals of sociology, organization of human groups and society, processes of interaction, and social change. Not open to students who have credit for SOC 301. 2 hours lecture, 1 hour discussion. *General Studies: SB.*

SOC 301 Principles of Sociology. (3) F, S, SS

Intensive and critical analysis of the concepts of sociology. Not open to students who have credit for SOC 101. *General Studies: SB.*

SOC 312 Sociology of Adolescence. (3) F, S

Cultural values and the social processes that help explain the development of the phenomenon of modern adolescence, including investigation of adolescent subcultures and cross-cultural references.

Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 315 Courtship and Marriage. (3) F, S, SS

An overview of courtship, marriage, and related processes, focusing on problematic aspects of these institutions from the sociological perspective. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 318 Overview of Aging. (3) F

Multidisciplinary introduction to gerontology. Explores the characteristics, experiences, needs, and problems of older persons. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 321 Sociology of Work. (3) S

Social and cultural analysis of industry. Occupational roles, status, and social participation of workers. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 331 Environmental Sociology. (3) F

Analysis of human organizational responses to population growth, technological change, and environmental stressors on both a national and global scale. Prerequisites: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 332 Urban Sociology. (3) F, S

Growth, characteristics, and problems of the modern city. Prerequisite: SOC 101 or 301. *General Studies: SB, G.*

SOC 333 Population. (3) F, S, SS

Theories of population change; births, deaths, and migration; population policies. Prerequisite: SOC 101 or 301. *General Studies: SB, G.*

SOC 334 Technology and Society. (3) S

Development of technology in relation to society, work, science, the environment, public health, and cultural values related to social change. Lecture, discussion. Prerequisite: SOC 101 or 301 or instructor approval.

SOC 340 The Sociology of Deviance. (3) F, S, SS

Sociological analysis of stigmatized behaviors and conditions, including the causes, effects, and management of stigma. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 341 Modern Social Problems. (3) F, S, SS

Race relations, poverty, unemployment, and other current issues. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 352 Social Change. (3) F, S

Patterns of social change, resistance to change, and change-producing agencies and processes. Prerequisite: SOC 101 or 301. *General Studies: SB, G, H.*

SOC 360 Sociological Psychology. (3) F, S

Interaction patterns between the sociocultural order and individuals; socialization process; norms, roles, and statuses; collective behavior. Prerequisite: SOC 101 or 301. *General Studies: SB.*

SOC 361 Variant Sexuality. (3) F

Sociological research and theories dealing with homosexuality, transvestism, transsexualism, and other variations in sexual orientation and gender identity. Prerequisite: SOC 101 or 301. *General Studies: SB.*

SOC 365 The Sociology of Mass Communication. (3) F, S

A sociological exploration of the major mass media as a communicative process in American society. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 368 Sociology of Everyday Life. (3) F, S

Examination of routine everyday behavior as it relates to problems of social order, control, change, identity, and relationships. Prerequisite: SOC 101 or 301 or instructor approval.

SOC 390 Social Statistics I. (3) F, S, SS

Descriptive and inferential statistical methods for analysis of social data. Computer applications. Prerequisites: SOC 101 (or 301); N1 course. *General Studies: CS.*

SOC 391 Sociological Research. (3) F, S, SS

Methods of sociological research, including the fundamental assumptions underlying research and some practical experience in research design, data collection techniques, and data analysis. Prerequisite: SOC 101 or 301 or 390 or instructor approval. *General Studies: SB.*

SOC 415 The Family. (3) F, S, SS

The family considered from the institutional viewpoint; its historical development and its adaptation to a changing culture; the family system in many cultures. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 416 Marriage Problems in Contemporary Society. (3) S

Marital and family problems in today's society from the viewpoint of personal and cultural adjustment. Prerequisites: SOC 101 (or 301) and an additional 3 hours in sociology or instructor approval. *General Studies: L/SB.*

SOC 417 Family Violence. (3) F, S

Current research and theories about domestic violence including child maltreatment, spousal aggression, and courtship violence. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 418 Aging and the Life Course. (3) F, S

Social aspects of aging. Theoretical and methodological perspectives and problems of aging such as life satisfaction, retirement, and adjustment to role loss. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 420 Sociology of Religion. (3) S

Interrelationship of culture, society, and religion; religion and social stratification; religious, economic, and political institutions; social change and religion. Emphasis on American society and institutions. Prerequisites: ASB 102 (or SOC 101 or 301) and an additional 3 hours in sociology or instructor approval. *General Studies: L/SB.*

SOC 421 Education and Society. (3) S

Contemporary sociological perspectives are used to examine effects of schools and schooling on individuals and society. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 422 Sociology of Complex Organizations. (3) F

Sociological studies of government agencies, industrial firms, labor unions, military establishments, and other large-scale organizations. Prerequisite: 6 hours in sociology, including SOC 101 or 301 or instructor approval. *General Studies: L/SB.*

SOC 423 Social Class and Stratification. (3) S

Social classes and the function of these groupings in a society. Lecture, discussion. Prerequisites: SOC 101 (or 301) and an additional 3 hours in sociology or instructor approval. *General Studies: L/SB.*

SOC 424 Women and Health. (3) S 2001

Women as health care workers and issues of health, illness, and health care for women. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: L/SB.*

SOC 427 Sociology of Health and Illness. (3) F

Social aspects of physical and mental illness and sociological analysis of the health care system and its practitioners. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: L/SB.*

SOC 429 Sociology of Law. (3) S

Examination of law as an institution; its origins, operations, and consequences. Emphasis on contemporary legal issues and problems. Prerequisite: SOC 101 or 301. *General Studies: SB.*

SOC 433 Demographic Methods. (3) S

Science of population analysis; problems in measurements of size, composition, and changes in population. Prerequisite: SOC 101 or 301. *General Studies: SB.*

SOC 446 Sociology of Crime. (3) F

The process of criminalization, exploring the behavior of the definers of crime, and the behavior of those defined as criminals. Prerequisites: SOC 101 (or 301) and 340 or instructor approval. *General Studies: SB.*

SOC 448 AIDS and Society. (3) F

Provides a sociohistorical perspective on stigma and illness in general and on AIDS in specific. Prerequisite: SOC 101 or 301 or instructor approval.

SOC 451 Comparative Sociology. (3) F

Cross-cultural study of basic social institutions; the methodology of cross-cultural research. Prerequisite: ASB 102 or SOC 101 (or 301) or instructor approval. *General Studies: SB, G.*

SOC 455 Social Movements. (3) F, S

Survey of theoretical approaches and research on historical and recent social movements. Emphasis on cultural, political, and social change. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 456 Political Sociology. (3) S

Social factors associated with voting; nature and structure of the electorate and political parties and the nature of national and international power structure. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB, G.*

SOC 464 Women's Roles. (3) S

Sociological analysis of the development, nature, and consequences of traditional and alternative roles of women in contemporary society. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: L/SB, C.*

SOC 470 Racial and Ethnic Relations. (3) F, S, SS

Problems of minorities in the United States and in other racially and ethnically heterogeneous societies. Evaluation of theories of prejudice and of research dealing with discrimination, desegregation, and assimilation. Lecture, discussion. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB, C.*

SOC 474 African-Americans in Modern Society. (3) F, S, SS

Social and cultural heritage of black Americans; achievements and current trends. Lecture, discussion. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: L/SB, C.*

SOC 483 History of Social Thought. (3) S, SS

Social thought in human culture. Background of modern sociology. Prerequisite: SOC 101 or 301. *General Studies: L/SB.*

SOC 484 Internship. (1–12) F, S

See Sociology advisor.

SOC 485 Sociology of Knowledge. (3) F

Relationship between social conditions and the development of knowledge in modern society. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: L/SB.*

SOC 486 Contemporary Theory. (3) S

Contemporary issues and crises in social theory with major focus on particular theorists. Ideological factors in theory, philosophical issues, the nature of theory and its relationship with methodology. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 500 Research Methods. (1–12) N**SOC 501 Practicum in Survey Research.** (3) F, S

A research practicum in survey field work, analysis, and reporting in the Phoenix Area Study. Prerequisite: SOC 391 or equivalent.

SOC 502 Practicum in Survey Research. (3) F, S

Continuation of SOC 501. Prerequisite: SOC 501.

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SOC 503 Sociology as a Profession I. (1) F

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) S

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) F, SS

Multiple linear regression topics relevant to sociological data analysis. Computer applications. Prerequisites: SOC 390 (or equivalent); a proficiency examination.

SOC 507 Social Statistics IIIA: Categorical Data Analysis. (3) F

Logistic regression and related topics relevant to categorical data analysis in sociology. Computer applications. Prerequisite: SOC 505 or instructor approval.

SOC 508 Social Statistics IIIB: Structural Equation Analysis. (3) S

Structural equation models are taught 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 IIIC: Event History Analysis. (3) F, S

Proportional hazards models and other methods for analyzing longitudinal data and establishing hazard rates of events for exploratory variables. Prerequisite: SOC 505 or equivalent.

SOC 515 Studies of the Family. (3) S

Current developments in the study of marriage and the family. Prerequisite: instructor approval.

SOC 585 Development of Sociology. (3) F

Major sociological theorists, including Durkheim, Weber, Marx, Parsons, Merton, Dahrendorf, Homans, and Mead. Prerequisite: instructor approval.

SOC 586 Contemporary Sociological Theory. (3) S

Analysis of major theories, including structural-functional, conflict, social exchange, symbolic interaction, and role theory. Prerequisite: instructor approval.

SOC 587 Contemporary Issues in Sociology. (3) S

Philosophy of social science. Contemporary issues in sociological theory and methods. Prerequisite: instructor approval.

SOC 588 Methodological Issues in Sociology. (3) S

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) N

Department of Speech and Hearing Science

David Ingram

Chair

(LL 173A) 480/965-2374

www.asu.edu/clas/shs

PROFESSORS

S. BACON, CASE, DORMAN, D. INGRAM,
LaPOINTE, WILCOX

ASSOCIATE PROFESSORS

LISS, SINEX

ASSISTANT PROFESSORS

AZUMA, SHARMA

CLINICAL PROFESSOR

MATHY

CLINICAL ASSOCIATE PROFESSORS

C. BACON, BROWN, MINTZ, REMSON

CLINICAL ASSISTANT PROFESSORS

COOK, K. INGRAM, WEXLER

LECTURERS

BARTO, HOWARD, NEUMANN, O'BRIEN, QUINN, RIGGS

SPEECH AND HEARING SCIENCE—B.S.

The B.S. degree in Speech and Hearing Science consists of 45 semester hours of speech and hearing science courses emphasizing the developmental and scientific aspects of language, speech, and hearing. The following courses, or their approved equivalents, are required:

SHS 250 Introduction to Phonetics	3
SHS 310 Anatomical and Physiological Bases of Speech	3
SHS 311 Physical and Physiological Bases of Hearing	3
SHS 367 Language Science <i>SB</i>	3
SHS 375 Speech Science	3
SHS 376 Psychoacoustics	3
SHS 384 Hearing Disorders	3
SHS 401 Introduction to Audiologic Evaluation	3
SHS 402 Modifying Communicative Behavior	3
SHS 431 Developmental Speech Disorders	3
SHS 450 Observation	1
SHS 465 Speech and Language Acquisition <i>SB</i>	3
SHS 470 Developmental Language Disorders	3
SHS 496 Aural Rehabilitation	3
Total	40

The remaining speech and hearing science courses to complete the major are determined by the students in consultation with an advisor. A list of approved electives is available through the department. Supporting courses from related fields must include the following or their equivalents:

BIO 201 Human Anatomy and Physiology I <i>SG</i>	4
MAT 170 Precalculus <i>MA</i>	3
PGS 101 Introduction to Psychology <i>SB</i>	3
PHY 101 Introduction to Physics <i>SQ</i>	4
PSY 230 Introduction to Statistics <i>CS</i>	3
Total	17

PSY 290 Research Methods (4) is strongly recommended.

GRADUATE PROGRAMS

The faculty in the Department of Speech and Hearing Science offer programs leading to the M.S. degree in Communication Disorders and Ph.D. degree in Speech and Hearing Science. See the *Graduate Catalog* for requirements.

SPEECH AND HEARING SCIENCE (SHS)

SHS 101 American Sign Language I. (4) F, S

Basic receptive/expressive conversational skills; basic grammar and syntax rules. Orientation to deafness and deaf culture. Lecture, drill, practice, lab.

SHS 102 American Sign Language II. (4) F, S

Further development of receptive/expressive conversation skills in ASL; finger spelling. Continued exploration of deaf culture. Lecture, drill, practice, lab. Prerequisite: SHS 101.

SHS 105 Introduction to Human Communication Disorders. (3) F, S

Introduction to hearing, language, and speech problems in children and adults. Lecture, demonstration.

SHS 201 American Sign Language III. (4) F, S

Continued development of fluency in ASL with an emphasis on more abstract concepts and the ability to narrate events. Lecture, discussion, drill, practice. Prerequisite with a grade of "C" or higher: SHS 102.

SHS 202 American Sign Language IV. (4) F, S

Further development of fluency in ASL with an emphasis on literature, folklore, and signing narratives with multiple characters. Lecture, discussion, drill, lab. Prerequisite with a grade of "C" or higher: SHS 201.

SHS 250 Introduction to Phonetics. (3) F

An introduction to English phonetics with emphasis on phonetic transcription, articulation, phonology, and disorders of speech.

SHS 310 Anatomical and Physiological Bases of Speech. (3) F

A noncadaveric study of anatomical systems that underlie human speech and language, including respiration, phonation, articulation, and related nervous system processes. Prerequisite: BIO 201.

SHS 311 Physical and Physiological Bases of Hearing. (3) F

Study of the physical characteristics of sound and of the structure and function of the human auditory system. Prerequisites: BIO 201; PHY 101.

SHS 320 Facilitating Speech and Language Development in Early Childhood. (3) F, S

Speech and language development and strategies for facilitating communication skills in early childhood educational settings.

SHS 367 Language Science. (3) F

Normative aspects and integration of language structure, comprehension, and production in children and adults. *General Studies: SB*.

SHS 375 Speech Science. (3) F

Normative aspects of speech, hearing, and language. Prerequisites: SHS 310, 311.

SHS 376 Psychoacoustics. (3) S

Introduction to acoustics, cochlear anatomy and physiology, and the perception of sound. Prerequisite: SHS 311 or instructor approval.

SHS 384 Hearing Disorders. (3) S

Pathologies of the ear and associated peripheral and central hearing disorders: characteristics, management, and effects on communication. Prerequisites: SHS 311, 376.

SHS 401 Introduction to Audiologic Evaluation. (3) F

Measurement of the basic audiologic test battery, including audiograms, immittance, masking, and speech recognition. Prerequisites: SHS 311 and 376 and 384 or equivalents.

SHS 402 Modifying Communicative Behavior. (3) S

Principles and techniques of modifying speech and language behavior. Prerequisite: SHS 250 or equivalent.

SHS 431 Developmental Speech Disorders. (3) S

Introduction to the nature of articulation, fluency, resonance, and voice disorders in childhood. Prerequisites: SHS 250 and 310 or equivalents.

SHS 450 Observation. (1) F, S

Opportunity to obtain observation experience at the ASU Speech and Hearing Center or at external sites. Prerequisite: instructor approval.

SHS 465 Speech and Language Acquisition. (3) S, SS

Speech and language development in the normal child. Prerequisite: SHS 367 or equivalent. *General Studies: SB*.

SHS 470 Developmental Language Disorders. (3) F

Introduction to the nature and treatment of language disorders in children. Prerequisite: SHS 465 or instructor approval.

SHS 483 Professional Issues in Communication Disorders. (3) F

Topics related to professional certification, accreditation, code of ethics, graduate education and other issues in speech-language pathology and audiology.

SHS 485 Acquired Speech and Language Disorders. (3) S

Introduction to acquired speech and language disorders across the lifespan. Prerequisites: SHS 250, 310.

SHS 494 Special Topics. (3) F, S

Topics may be selected from the following:

- Hearing Disorders
- Research
- Speech and Language Disorders

May be repeated for credit. Prerequisite: instructor approval.

SHS 496 Aural Rehabilitation. (3) S

Approaches to aural rehabilitation of children and adults. Introduction to educational audiology and assistive listening devices. Prerequisites: SHS 375 and 376 and 401 or equivalents.

SHS 501 Introduction to Audiologic Evaluation. (3) F

Measurement of the basic audiologic test battery, including audiograms, immittance, masking, and speech recognition. Prerequisites: SHS 311 and 376 and 384 or equivalents.

SHS 502 Differential Diagnosis for Audiology. (4) F

Differential diagnosis of cochlear and retrocochlear disorders, and assessment of vestibular system. 3 hours lecture, 2 hours lab. Prerequisite: SHS 401 or 501 or equivalent.

SHS 504 Hearing Aids. (4) S

Operation, application and fitting of amplification devices for the hearing impaired. 3 hours lecture, 2 hours lab. Prerequisite: SHS 401 or 501 or equivalent.

SHS 508 Pediatric Audiology. (3) F

Audiologic assessment, screening, and development considerations for infants and young children. Prerequisite: SHS 401 or 501 or equivalent.

SHS 511 Auditory Perception by the Hearing Impaired. (3) F

A study of 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) F

Correlation of history and physical findings with pathologic physiology and test results in speech and hearing abnormalities.

SHS 515 Audiologic Instrumentation and Calibration. (3) S

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 equivalent.

SHS 516 Auditory Evoked Potentials. (4) S

Continuation of SHS 502, including electrophysiologic assessment of peripheral and central auditory nervous system. Lecture, lab. Prerequisite: SHS 502.

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SHS 545 Speech Perception by the Hearing Impaired. (3) F
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) F
Study of 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) S
Current status of cochlear implant research and development. Prerequisites: SHS 504 and 545 or instructor approval.

SHS 565 Speech and Language Acquisition. (3) S
Speech and language development in the normal child. Prerequisite: SHS 367 or equivalent.

SHS 566 Psychology of Language. (3) S
The psycholinguistic study of the production and comprehension of language across the lifespan.

SHS 567 Neural Bases of Communication Disorders. (3) F
Neuroscience and its application to matters of normal and disordered communication. Pre- or corequisite: SHS 310 or equivalent.

SHS 570 Communication Disorders and Multicultural Populations. (3) S
Study of racial and ethnic biases and the communication behaviors and disorders in various cultural groups.

SHS 571 Augmentative Communication and Language Programming. (3) S

Focus on individuals across the age span who are 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) F
Focus on the birth to 5-year-old population who are at risk for or have communication and language disabilities. Prerequisite: SHS 470 or equivalent.

SHS 573 Language Assessment and Intervention with School-Age Populations. (3) S
Focus on later language development, linguistic demands of academic settings, assessment and intervention strategies for older children and adolescents. Prerequisite: SHS 565 or equivalent.

SHS 574 Fluency Disorders and Treatment. (3) F
Phenomena, etiology, assessment, and theories of stuttering are presented, followed by various treatment procedures for children and adults who stutter. Prerequisite: SHS 431 or equivalent.

SHS 575 Aphasia and Related Neurogenic Language Disorders. (3) S
Assessment and treatment of acquired neurolinguistic impairment. Prerequisite: SHS 567.

SHS 576 Neuromotor Speech Disorders. (3) S
Evaluation and treatment of the dysarthrias and apraxia of speech. Emphasis on acquired adult disorders.

SHS 577 Craniofacial Disorders of Communication. (3) S, SS
Communication disorders related to anomalies of the craniofacial structures, including orofacial clefting of the lip and palate. Prerequisite: SHS 310 or equivalent.

SHS 578 Disorders of Voice. (3) S
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) F
Focus on individuals across the age span who have feeding and/or swallowing disorders. Assessment and treatment strategies are presented. Prerequisite: SHS 567.

SHS 580 Clinical Practicum. (1–6) F, S, SS
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) F
Study of 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) S
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 equivalents.

SHS 584 Internship. (1–6) F, S, SS
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) S
Assessment and treatment of developmental articulation and phonological disorders. Prerequisites: SHS 250 and 310 or equivalents.

SHS 591 Seminar. (3) F, S, SS
Selected topics regularly offered:
(a) Autism and Pervasive Language Disorders
(b) Multiply Handicapped Child

SHS 596 Aural Rehabilitation. (3) S
Approaches to aural rehabilitation in children and adults. Introduction to educational audiology and assistive listening devices. Prerequisite: SHS 401 or 501 or equivalent.

SHS 792 Research. (1–12) N

SHS 799 Dissertation. (1–15) N

Women's Studies Program

Mary Logan Rothschild
Director
 (EC A209) 480/965-2358
www.asu.edu/clas/womens_studies

CORE FACULTY

Professor: Rothschild;
 Associate Professors: Ferraro, Hibner Koblitz;
 Assistant Professors: Klinger, Leong, Lind, Scheiner

AFFILIATED FACULTY

Anthropology

Professor: Koss-Chiono;
 Associate Professor: Brandt

Art

Professors: Codell, Magenta, Fahlman;
 Associate Professor: Schleif

Art History

Associate Professor: Wolfthal

Chicana and Chicano Studies

Professor: Ruiz

Communication

Professor: Valentine;
 Associate Professors: Carlson, Nakayama

Education

Professors: Edelsky, Guzetti

Educational Media and Computers

Associate Professors: Mclsaac, Wilson

English

Professors: Adams, Crowley, Gutierrez, Lightfoot,
 Nilsen, Rhodes, Sensibar;
 Associate Professors: DeLamotte, Horan, Morgan;
 Assistant Professors: Pritchard, Thompson, Tohe, Webb;
 Senior Lecturer: Obermeier;
 Lecturers: Heenan, Norton

Exercise Science and Physical Education

Assistant Professor: Swan

Family Resources and Human Development

Professor: Martin

Geography

Professor: Burns

History

Professors: Fuchs, Giffin, Lavrin, Warnicke;
 Associate Professors: Gray, Gullet, Hendricks, Stoner;
 Assistant Professor: Ramey

Justice Studies

Professors: Jurik, Romero, Zatz;
 Assistant Professors: Adelman, Menjivar

Languages and Literatures

Professors: Foster, Losse;
 Assistant Professors: Choi, George, Gruzinska, Rees;
 Assistant Research Professional: Orlich

Management

Associate Professor: Cook

Music

Professor: Williamson

Philosophy

Associate Professor: McGregor

Political Science

Associate Professor: Dantico

Psychology

Professors: Chassin, Eisenberg, Russo;
 Associate Professor: Saenz

Psychology in Education

Professors: Bernstein, Hackett, Kerr;
 Associate Professor: Moore

Recreation Management and Tourism

Professor: Allison

Religious Studies

Assistant Professor: Fessenden

Social Work

Professors: Coudrogrou, Segal;
 Associate Professor: Gerdes;
 Assistant Professors: Brzuzy, Hurdle

Sociology

Professors: Gordon, Kronenfeld, Kulis, Laner, Weitz;
 Associate Professors: Berin, Miller-Loessi;
 Assistant Professor: Agadjanian

Theatre

Professor: Knapp

ASU West Women's Studies

Professor: Stage

The Women's Studies Program is an interdisciplinary university program housed in the College of Liberal Arts and Sciences. Information on faculty affiliation is provided for reference.

WOMEN'S STUDIES—B.A. OR B.S.

Women's Studies provides our students with an intensive interdisciplinary liberal arts education that enables them to write well, think critically, and analyze problems effectively. Our students take a variety of courses, including a capstone seminar requiring original research and writing, and an internship that helps them prepare for life after college. Original undergraduate research is encouraged, and some courses involve students in studying community problems and formulating policy solutions.

The B.A. or B.S. degree in Women's Studies consists of 45 semester hours (with a grade of "C" or higher), of which 33 must be taken from WST or WSH prefixes or from other prefixes designated as part of the major. The other 12 must be in closely related fields chosen in consultation with an

academic advisor. At least 36 of the 45 semester hours required for the major must be completed in upper-division courses. In addition, for the B.S. degree, students must complete six hours in statistics, computer science, or quantitative research methods. This sequence must be approved by the Women's Studies Program advisor.

All Women's Studies majors must compile a portfolio to leave on file in the Women's Studies Program office upon graduation.

Required Courses. Students must complete the following courses:

WST 100 Women and Society <i>SB, C</i>	3
or WST 300 Women in Contemporary Society <i>SB, C</i> (3)	
WST 377 Creation of Feminist Consciousness <i>L, C</i>	3
WST 378 Contemporary Feminist Theory <i>L, C</i>	3
WST 484 Internship	3
WST 498 PS: Theoretical Issues in Women's Studies <i>L</i>	3
Total	15

Students must also complete two other courses: (1) an upper-division course that provides a humanities or fine arts perspective on the lives and contributions of women; and (2) an upper-division course on women in non-Western societies or a course on minority or ethnic women in American society.

A list of approved courses is available each term in the program office.

No course may be used to satisfy more than one requirement.

Electives in Closely Related Fields. Majors must complete 12 hours of courses in fields closely related to women's studies, one of which must be an upper-division course that provides a historical perspective on the lives and contributions of women. These courses may be used to satisfy the general education requirements in the College of Liberal Arts and Sciences.

MINOR IN WOMEN'S STUDIES

The Women's Studies minor consists of 18 semester hours, 12 of which must be in the upper division. The following courses are required:

WST 100 Women and Society <i>SB, C</i>	3
or WST 300 Women in Contemporary Society <i>SB, C</i> (3)	
WST 377 Creation of a Feminist Consciousness <i>L, C</i>	3
or WST 378 Contemporary Feminist Theory <i>L, C</i> (3)	
Total	6

Twelve additional hours of approved women's studies courses must be taken after consultation with the women's studies advisor.

Students pursuing a minor must register at least one semester before graduation and are encouraged to meet with the women's studies academic advisor early in their course of studies.

CERTIFICATE PROGRAM IN WOMEN'S STUDIES

The certificate program is equivalent to an interdisciplinary minor, consisting of 21 semester hours and is open to graduate as well as undergraduate students. Students pursu-

ing a certificate must consult with the women's studies advisor. See "Women's Studies," page 341, for a description of the certificate program.

GRADUATE STUDIES

Although the Women's Studies Program does not offer a graduate degree, it is possible to pursue a graduate degree in some existing programs with a thesis or dissertation topic related to women's studies. Information on such programs can be obtained from the Women's Studies Program office.

COURSES IN WOMEN'S STUDIES

Additional courses appear as Special Topics and vary semester to semester. A list of approved interdisciplinary courses that count toward the requirements for the major, minor, and certificate in Women's Studies. The 36 hours of requirements for Women's Studies is available each term in the program office, EC A209

WOMEN'S STUDIES (WSH)

WSH 413 Lesbian Culture: Images and Realities. (3) S

Explores aspects of lesbian experience from sociological, psychological, historical, political, and literary critical perspectives. Lecture, discussion. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: HU, C.*

WSH 464 Voices and Visions. (3) F, S

Explores the contributions of visionary women in the humanities, varying from semester to semester. Repeat credit for different topics. Lecture, discussion. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: HU, C.*

WSH 470 Women and Popular Culture. (3) S

An interdisciplinary examination of how gender is constructed in popular cultural forms. Lecture, discussion. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: HU, C.*

WOMEN'S STUDIES (WST)

WST 100 Women and Society. (3) A

Interdisciplinary introduction examining critical issues in women's studies. Not open to students who have credit for WST 300. *General Studies: SB, C.*

WST 294 Special Topics. (1–4) N

(a) Women and Social Action

WST 300 Women in Contemporary Society. (3) A

Intensive interdisciplinary examination of such topics as gender roles, work, education, sexuality, politics, health, and law. Not open to students who have credit for WST 100. *General Studies: SB, C.*

WST 313 Women and Sexuality. (3) F, S

Explores feminist theories about women's sexuality and the relationship of these theories and related research to women's experience. Lecture, discussion. Prerequisite: WST 100 or 300 or instructor approval.

WST 372 Women in Judaism. (3) S

A study of the legal, social, and cultural status of Jewish women in various historical and contemporary societies. Cross-listed as REL 373. Credit is allowed only for REL 373 or WST 372.

WST 373 Latina/Chicana Issues. (3) F, S

Course examines the roles Mexican American, Chicana, and/or Latina immigrant women play historically, socially, and politically in the United States. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: SB, C.*

WST 375 Women and Social Change. (3) F, S

Combines research and theory on a contemporary social problem with a community action experience focusing on women's social change initiatives. Lecture, field placement. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: C.*

WST 377 Creation of Feminist Consciousness. (3) F, S

Explores the development of feminist theory from its roots to 1960. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: L, C.*

WST 378 Contemporary Feminist Theory. (3) F, S
Contemporary feminist theories and exploration of the intersection of gender, race, ethnicity, and class through critical analysis. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: L, C.*

WST 380 Gender, Race, and Class. (3) F, S
Cultural diversity, class, and gender issues in American social life are explored. Lecture, seminar, analysis papers, and writing. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: SB, C.*

WST 457 Gender, Culture, and Development. (3) F, S
Economic, cultural, and sociopolitical contexts for understanding women's roles related to health, family, work, education, and politics in developing countries. Prerequisite: 6 hours of social science credit or instructor approval. *General Studies: SB, G.*

WST 460 Women and the Body. (3) F, S
An interdisciplinary look at how representations of woman as body permeate culture and affect a woman's sense of self. Lecture, discussion. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: SB, C.*

WST 477 Women and Violence. (3) F
Global examination of forms of violence against women at the individual, institutional, and cultural levels, and efforts to control it. Lecture, discussion. Prerequisite: WST 100 or 300 or instructor approval.

WST 484 Internship. (1–3) F, S
Practical experience to enhance the academic perspectives that emerge from women's studies instruction. Prerequisite: preapproval by internship coordinator required.

WST 498 PS: Theoretical Issues in Women's Studies. (3) F, S
Reading and research on important theoretical issues in women's studies. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: L.*



Matthews Center

H. Val Peterson photo

NOTE: For the General Studies requirement, courses, and codes (such as L, SQ, C, and H), see "General Studies," page 87. For graduation requirements, see "University Graduation Requirements," page 83. For an explanation of additional omnibus courses offered but not listed in this catalog, see "Classification of Courses," page 60.