The electronic catalog, found at http://catalog.arizona.edu, is the official general catalog of The University of Arizona. Students may access the catalog from any computer connected to the Internet. A complete printed version of the electronic catalog is also available in The University of Arizona Main Library.

The Academic Manual provides selected information taken from the electronic catalog. Students who are admitted to the University of Arizona will receive a complimentary copy of The University of Arizona Academic Manual when they participate in one of the many organized programs designed to assist students in the orientation, testing, advising, and registration processes. Manuals may be purchased for $4 from the ASUA Bookstore.

Announcements in this manual concerning regulations, fees, curricula, or other matters are subject to change without notice. Please refer to the electronic catalog at http://catalog.arizona.edu for the most current information.
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### Academic Calendar 1998-1999

#### Fall Semester

- **Date applications for bachelor’s degrees must be filed for degrees to be awarded at close of 1999 summer session**: August 3, Monday
- **Degrees awarded as of this date for students completing requirements at close of summer session**: August 13, Thursday
- **Residence halls open**: August 20, Thursday
- **New Student Orientation Program (last session)**: August 19–21, Wednesday-Friday
- **New Student Convocation**: August 23, Sunday
- **Classes begin**: August 24, Monday
- **Last day to register for credit**: August 31, Monday
- **Labor Day—no classes**: September 7, Monday
- **Last day to drop courses resulting in deletion of course enrollment from record**: September 18, Friday
- **Honors convocation—no classes 3:00-5:00 p.m. (Family Weekend)**: October 9, Friday
- **Last day to drop courses**: October 16, Friday
- **Veteran’s Day - no classes**: November 11, Wednesday
- **Thanksgiving recess**: November 26–29, Thursday - Sunday
- **Applications for bachelor’s degree candidacy must be filed for degrees to be awarded at close of 1999 fall semester**: December 1, Tuesday
- **Class and laboratory sessions end**: December 9, Wednesday
- **Semester examinations begin**: December 11, Friday
- **Semester examinations end**: December 18, Friday
- **Residence halls close**: December 19, Saturday
- **Winter Commencement**: December 19, Saturday

#### Winter Session

- **Classes begin**: December 21, Monday
- **Last day of registration for credit**: December 22, Tuesday
- **Last day of class/examinations**: January 12, Tuesday

#### Spring Semester

- **Residence halls open**: January 10, Sunday
- **New Student Orientation Program (last session)**: January 11–12, Monday-Tuesday
- **Classes begin**: January 13, Wednesday
- **Martin Luther King Holiday—no classes**: January 18, Monday
- **Last day to register for credit**: January 21, Thursday
- **Last day to drop courses resulting in deletion of course enrollment from record**: February 9, Tuesday
- **Last day to drop courses**: March 9, Tuesday
- **Spring recess**: March 13–21, Saturday-Sunday
- **Date applications for bachelor’s degrees must be filed for degrees to be awarded at close of 2000 spring semester**: May 3, Monday
- **Class and laboratory sessions end**: May 5, Wednesday
- **Semester examinations begin**: May 7, Friday
- **Semester examinations end**: May 14, Friday
- **Residence halls close**: May 15, Saturday
- **Spring Commencement**: May 15, Saturday

#### Summer Session

- **Presession**: 1999
  - **Classes begin**: May 17, Monday
  - **Last day of registration for credit**: May 18, Tuesday
  - **Memorial Day Holiday—no classes**: May 24, Monday
  - **Last day of class/examinations**: June 5, Saturday
- **First Summer Session**: 1999
  - **Classes begin**: June 7, Monday
  - **Last day of registration for credit**: June 9, Wednesday
  - **Independence Day—no classes**: July 5, Monday
  - **Last day of class/examinations**: July 8, Thursday
- **Second Summer Session**: 1999
  - **Classes begin**: July 12, Monday
  - **Last day of registration for credit**: July 14, Wednesday
  - **Last day of class/examinations**: August 11, Wednesday
The University of Arizona Record

The university, its colleges, and departments establish certain academic requirements which must be met before a degree is granted. These requirements concern such things as curricula and courses, majors and minors, and campus residence. Advisors, faculty, directors, department heads, and deans are available to help the student understand and meet these requirements, but the student is responsible for fulfilling them.

At the end of the student’s course of study, if requirements for graduation have not been satisfied, the degree will not be granted. Students must be familiar with their chosen catalog and are responsible for completing requirements.

Announcements in the catalog concerning regulations, fees, curricula, or other matters are subject to change without notice. For this reason, students must remain currently informed about all policies and other information that bears directly on completing a degree program.

The electronic catalog, found at http://catalog.arizona.edu, is the official general catalog of The University of Arizona. Courses, programs and policies that govern an undergraduate student’s progress towards a degree are described in the catalog. Each student is responsible for knowing and abiding by these policies. Students may access the catalog from any computer connected to the Internet. A complete printed version of the electronic catalog is also available in the UA Main Library, and in the Office of the Registrar.

The General Academic Manual, available in the ASUA Bookstore, provides information excerpted from the electronic catalog. The manual is meant as a guide to the electronic catalog; it does not contain all information available electronically.

On many subjects, more detailed information is available from the catalog, from On Course! Academic Program Requirements Reports (APRRs,) at http://www.Arizona.EDU/academic/oncourse/data/interface/, and from departments, colleges, or administrative units responsible for various programs and services. Students should seek information from these sources as needed.

Guide to Reading this Manual

This manual is divided into four sections: General Information; Admissions and Registration Information; Academic Policies and Graduation Requirements; and Colleges, Departments and Courses of Instruction. Each contains important information that bears directly on your progress toward graduation. Highlights of each section follow.

For graduate program requirements, consult The University of Arizona Graduate Catalog. To obtain a copy of the Graduate Catalog, contact the Graduate College Office. The Graduate Catalog is also available on line at http://grad.admin.arizona.edu/catalog/catalog.htm.

I. General Information

This section provides information about UA and its structure, including an outline of organization which places each school, department, and committee within the college in which they are administered. The section also contains general-policy statements and definitions of terms used in this manual. Although not a part of this section, students should be aware of the academic calendar, found immediately following this introduction. The calendar identifies start and close dates of terms as well as final examination dates and deadlines for dropping a course, registering for credit, etc.

II. Admissions and Registration Information

This section provides information regarding admissions and registration policies that apply to continuing students. For other information about admissions and registration, contact those offices.

III. Academic Policies and Graduation Requirements

A partial list of subjects discussed includes academic honors and awards, good academic standing, probation, disqualification, withdrawal procedures, academic renewal, grade appeal, the pass-fail option, general education requirements, course examination policies, proficiency examinations, absence policy, as well as information on the choice of catalog, number of units, grade-point average, and upper-division and university credit requirements for graduation. Familiarity with the information discussed in this section is essential to efficient achievement of your academic goals. For more information about academic policies and graduation requirements, consult the electronic catalog at http://catalog.arizona.edu/

IV. Colleges, Departments and Courses of Instruction

This section lists the degrees and majors administered by each college and department, and provides essential information for course selection. The listings are organized alphabetically by academic unit.

Permanent courses approved at the time this manual went to press are listed and described under the department section in which they are offered. Explanations of the course numbering system and the elements included in the course description, a description of the nature and the grades available for “house numbered” small group and individual studies courses are provided at the beginning of the section.

the University augments its permanent curriculum with “temporary” courses. These courses are listed as part of the department offerings in the Schedule of Classes each term. Consult the offering department if you wish a description of these courses. (Temporary courses are comparable to permanent courses in meeting any requirements for which they are appropriate).

Familiarity with this section can be of great assistance in helping you select courses and making you aware of the vast scope of course work available at UA.

For the most current listing of approved courses, consult the electronic catalog at http://catalog.arizona.edu/.
Acceptability of Credit
The determination of acceptability of credit for course work completed at another institution of higher learning (whether the other institution is accredited or not) is made solely at the discretion of UA. Students should check with the Office of Admissions and New Student Enrollment to determine the acceptability of transfer credit.

Catalog Under Which a Student Graduates
Students maintaining continuous enrollment at any public Arizona community college or university may graduate according to the requirements of the catalog in effect at the time of initial enrollment or according to the requirements of any single catalog in effect during subsequent regular terms of continuous enrollment. Students may maintain continuous enrollment whether attending a single public community college or university in Arizona or transferring among public institutions in Arizona while pursuing their degrees. Continuous enrollment status of a student and the catalog of determination for a student are defined by:

1. A semester in which a student earns course credit will be counted toward continuous enrollment. Noncredit courses, audited courses, failed courses, or courses from which the student withdraws do not count toward the determination of continuous enrollment for catalog purposes.

2. Students who do not meet the minimum enrollment standard stipulated in No. 1 during three consecutive semesters (fall/spring) and the intervening summer term at any public Arizona community college or university are no longer considered continuously enrolled, and must meet requirements of the public Arizona community college or university catalog in effect at the time they are readmitted or of any single catalog in effect during subsequent terms of continuous enrollment after readmission. Students are not obligated to enroll and earn course credit during summer terms, but summer enrollment may be used to maintain continuous enrollment status.

3. Students admitted or readmitted to a public Arizona community college or university during a summer term must follow the requirements of the catalog in effect the following fall semester or of any single catalog in effect during subsequent terms of continuous enrollment.

4. Students transferring among Arizona public higher education institutions must meet the admission requirements, residency requirements, and all curricular and academic requirements of the degree-granting institution.

5. Students under the 1997-98 and prior catalogs must follow the general education requirements of those catalogs; they do not have the option of using a subsequent catalog for general education purposes.

Exceptions to these policies are the prerogative of the college. Students should contact their college dean's office for more information.

The University of Arizona Affirmative Action Statement
The University of Arizona is committed to both equal employment opportunity and affirmative action and is determined to maintain those principles at all levels of the University for all persons who are employed by and participate in University-affiliated activities.

the University is committed to meeting the provisions of those federal and state laws and University policies which apply to employment and admittance to any University program. UA prohibits discrimination on the basis of age, color, disability, ethnicity, gender, national origin, religion, sexual orientation, or veteran's status and is also committed to maintaining an environment free from sexual harassment and retaliation.

A refusal to accommodate is justified only when undue hardship would result from each available alternative of reasonable accommodation.

Policy on the Accommodation of Religious Observance and Practice
A. No employee, agent, or institution under the jurisdiction of the Arizona Board of Regents shall discriminate against any student, employee, or other individual because of such individual's religious belief or practice or any absence thereof.

B. Administrators and faculty members are expected to reasonably accommodate individual religious practices. A refusal to accommodate is justified only when undue hardship would result from each available alternative of reasonable accommodation.

C. No administrator or faculty member shall retaliate or otherwise discriminate against any student, employee, or prospective employee because that individual has sought a religious accommodation pursuant to this policy.

D. It is the responsibility of the president of each university, and the executive director of the Board as to the central staff, to take such actions as are necessary to insure that the intent of this policy is implemented. In implementing this policy, the president of each university shall assure that the policy is included in the University catalog and in such other publications as will assure that all members of the University community are advised of its existence, and the manner in which information regarding its implementation may be obtained.
Persons wishing clarification of the nature or proper application of this policy should consult the Office of the Dean of Students or the Office of the Director of Human Resources, as appropriate.

Resources for Students with Disabilities
The requirements for admission to The University of Arizona are the same for all students. Prospective students with disabilities may write or call the Center for Disability Related Resources (CeDRR), in conjunction with the application process.

Center for Disability Related Resources (CeDRR)
The center's mission is to equalize the educational opportunities for students and provide support services for faculty and staff with disabilities. The program is designed to promote full inclusion and participation in the educational experience and campus life.

For more information about the programs and services available, including academic accommodations for students with disabilities, contact the center at The University of Arizona, PO Box 210064, Tucson, AZ 85721-0064, (520) 621-3268 (voice or TDD), e-mail: cedrr@info-utlzu.edu.

Strategic Alternative Learning Techniques (S.A.L.T.) Center
The S.A.L.T. Center provides services designed to maximize the educational experience of students with specific learning disabilities and attention deficit disorders. This department provides educational support services using specially trained professional staff to guide students, teach learning and compensatory strategies, and monitor academic progress. Admission to the S.A.L.T. Center is by application only. A fee is charged for all S.A.L.T. services. For information about S.A.L.T. services and the admission process, contact:

S.A.L.T. Center
The University of Arizona
PO Box 210021
Tucson, AZ 85721-0021
Phone: (520) 621-1242
FAX: (520) 1-9448
TTY: (520) 626-6072

Desert Lynx
Desert Lynx, found at http://catalog.arizona.edu, is the official general catalog of The University of Arizona. Students may access the electronic catalog from any computer connected to the Internet. A printed version of the electronic catalog is available in the UA Main Library, and in the Office of the Registrar.

On Course!
On Course! is a computerized degree-audit system which evaluates a student's progress toward graduation. It produces two degree requirement reports: 1) the Academic Program Requirements Report (APRR), which displays a complete statement of the requirements and approved courses for each UA undergraduate program, and 2) the Student Academic Progress Report (SAPR), which summarizes the student's progress toward degree completion. Reports are available for degree programs existing since 1993. APRRs are available electronically at http://www.arizona.edu/academic/oncourse/data/interface/, or from your college advisor. A student may obtain a copy of his or her SAPR through Student Link at http://www.Arizona.EDU/student_link/. Minor reports are also available. A list of undergraduate minors and minor requirements is available at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

Student Link
Student Link, at http://www.Arizona.EDU/student_link/, is a group of services that gives students access to their computerized records. Students access their information by using their student ID and personal identification numbers. Services include addresses, class schedules, course availability, grades, SAPRs, and financial aid award status. Future plans are to provide additional services.

Currently, student information is available for inquiry from 6 a.m. - 8 p.m. Monday through Saturday. At other times, batch processing prevents this service from being available.

Schedule of Classes
Information regarding the times and locations courses are scheduled is found in the Schedule of Classes available free in the ASUA Bookstore. Schedules for fall and spring semesters are available in March and October, respectively. The Summer Session Schedule of Classes is available in February.

The Schedule of Classes/Class Availability can also be found on line at http://www.arizona.edu/cgi-bin/schedule/schedule-entry.pl. Department and course descriptions are linked to the on-line schedule, which offers up-to-the-minute information on the status of course offerings, including additions, cancellations, room changes, and enrollment figures that are updated as seats are reserved.

UAInfo
UAInfo is the campus on-line information service, providing World Wide Web access to information posted by campus offices and organizations. The URL for UAInfo is http://www.arizona.edu/

All electronic resources, including Desert Lynx and the Schedule of Classes, are available through UAInfo. For information on accessing UAInfo, call the Center for Computing & Information Technology (CCIT) Help Desk at 621-HELP.
Definitions

The following statements are brief definitions of selected terms frequently used in this catalog. For more detailed information regarding these terms, consult the index to locate additional references in the manual.

**Academic Year**: The academic year refers to the part of the year defined by the fall and spring semesters, approximately mid-August through mid-May.

**APPR**: Academic Program Requirements Reports (APPRs) display the requirements and approved courses for each undergraduate program at the University. APPRs are available through the electronic catalog or directly at http://www.arizona.edu/academic/oncourse/data/interface/.

**Audit**: Audit is a registration status which allows a student to attend a course for information without receiving credit or a regular grade.

**Baccalaureate Degrees**: Baccalaureate degrees are awarded for completion of an undergraduate program of study. The colleges of Humanities, Science, and Social and Behavioral Sciences offer the Bachelor of Arts and Bachelor of Science degrees. In general, all other baccalaureate degrees identify the college or field of study with which they are associated. Bachelor’s degrees are comprised of general education courses, a major, elective courses, and in some cases, a minor.

**Course**: A course is a systematic plan of study which may utilize lecture, discussion, laboratory, recitation, seminar, workshop, studio, independent study, internship, or other similar teaching formats to facilitate learning for the student.

**Course Load**: Course load refers to the total number of units taken for credit, audit, by correspondence, or through concurrent registration at another institution.

**Degree**: A degree is a title which a university confers on a student who has satisfactorily completed a required course of study. Degree requirements are established by the University, colleges and departments, and are approved by the University faculty, administration, and the Arizona Board of Regents.

**Discipline**: A discipline is a recognized subject area or field of study within which courses and research are structured.

**Electives**: Electives are courses selected at a student’s discretion. Electives may be partially restricted, such as a selection from a specified group of courses identified to fulfill a particular requirement or they may be “free” electives which may be selected from any course for which the student has proper prerequisites. Electives provide opportunities for students to pursue personal interests and to gain general knowledge.

**General Education Requirements**: General education is a broad program of study which provides undergraduate students with the opportunity to develop skills in language and mathematics and to explore information and thought processes of different areas of study and different cultures. The structure of the general education program is common across all colleges.

**Grade Point Average**: The grade-point average is the numerical calculation of the mean average of the grades received in all courses taken at the University of Arizona for University credit and by special examination for grade, except those taken for pass/fail.

**Hours of Credit or Semester Hours**: Hours of credit or semester hours are alternative designations for units of credit.

**Major**: The major is a student’s principal field of study.

**Minor**: The minor is a secondary field of study.

**Option or Concentration**: An option is a subspecialization within a major that allows a student to place special emphasis on a particular aspect of the major field of study.

**Residence credit**: the University does not distinguish its credit offerings according to residence and nonresidence credit. See the definition of University credit below.

**SAPR**: Student Academic Progress Reports (SAPRs) summarize a student’s progress toward graduation by evaluating the student’s completed course work against the requirements of the student’s declared degree program. Students may obtain a SAPR through Student Link, at http://www.arizona.edu/student_link/.

**Semester or Term**: Semester and term are used to identify the formally designated periods during which classes are scheduled. The University schedules classes during six terms: fall and spring semesters, each lasting approximately 15 weeks; a winter inter-session term of approximately three weeks; and three summer session terms, comprised of a three-week pre-session and two five-week terms. The term regular semester refers to fall or spring semester.

**University Credit**: University credit is the term used to identify all credit offered by The University of Arizona, with the exception of correspondence credit and Special Examination for Credit. Only the grades of courses taken for University credit and by Special Examination for Grade are used in calculating the grade point average.
The University-Wide General Education Structure

General education programs provide breadth of knowledge as a balance and complement to the depth provided by the major. General education is designed to accomplish several goals: first, to afford students the opportunity to learn how different disciplines define, acquire and organize knowledge; second, to provide a basis for an examination of values; third, to develop analytic, synthetic, linguistic and computational skills useful for lifelong learning; and finally, to provide a common foundation for wide-ranging dialogue with peers on issues of significance. Taken together, the experiences of general education encourage the student to develop a critical and inquiring attitude, an appreciation of complexity and ambiguity, a tolerance for and empathy with persons of different backgrounds or values and a deepened sense of self. In short, the goal of the general education program is to prepare students to respond more fully and effectively to an increasingly complex world.

The general education program at The University of Arizona is university-wide; that is, regardless of college or major, students hold their general education requirements in common. The following presents the program in schematic form.

Foundations
Mathematics
Composition
Second Language

Tier One
Traditions & Cultures 2 courses
Individuals & Societies 2 courses
Natural Sciences 6 courses

Tier Two
Arts 1 course
Individuals & Societies 1 course
Humanities 1 course
Natural Science 1 course

G (General Knowledge) — This strand involves a general understanding and appreciation of how mathematics is used to solve problems in everyday life; for example, the mathematics of voting and elections, or of networks and paths. The G-strand does not prepare a student for any further mathematically-based work: it is a terminal course. Only those students whose major requires the most general knowledge of mathematics would take this strand. The options for this strand are MATH 122 (Mathematics in Modern Society) and PHIL 110 (Logic and Critical Thinking). Placement at the level of MATH 122 or higher is required for the G-strand.

M (Moderate Knowledge) — The M-strand is for students who require mathematical facility at the level of at least MATH 121 (Collegiate Algebra). This strand involves reasonable facility with algebra and algebraic functions, graphs, and simple modeling. Students who choose the M-strand are prepared for further mathematical work. This work may include MATH 119 (Finite Mathematics), MATH 123 (Elements of Calculus), or a statistics class from outside the mathematics department.

S (Substantial Knowledge) — This strand involves skill and facility with calculus. The S-strand begins at one of two calculus options - MATH 124 (Calculus with Applications) or MATH 125a (Calculus). Students who successfully complete the S-strand may continue on to MATH 125b, 223, or beyond. Those who choose but are not ready to begin the S-strand will be required to take preparatory work.

Each major indicates the mathematics strand that is most appropriate for its students. It is important to note that each strand provides a different level of mathematical training, but students can satisfy the mathematics requirement in their major by completing a more advanced mathematics course. Because the S-strand presumes the M-strand and the M-strand presumes the G-strand, students will have the most flexibility in their
major choice by aiming for the S-strand. A student who chooses to meet the general education mathematics requirement with the G-strand will have the most restricted set of major choices.

All questions about math placement should be directed to:

Donna Krawczyk
Mathematics 221
The University of Arizona
PO Box 210089
Tucson, AZ 85721-0089
Phone (520) 621-3762
FAX: (520) 621-8322
E-mail: krawcyz@math.arizona.edu
URL: http://www.math.arizona.edu/

Composition
A minimum of six units of English composition is required. Placement in composition courses is based on scores resulting from the UA First-Year Composition Placement Exam, and the English section of the ACT or the Test of Standard Written English portion of the SAT.

First-year students will enroll in one of four strands, varying with placement:

1. A two-course sequence of English 101 and English 102 or the ESL equivalents
2. A two-course sequence of extended English 101 and English 102 or the ESL equivalents
3. A two-course honors sequence of English 103h and English 104h
4. English 109, in combination with an AP score of 4 or 5, or a placement writing portfolio demonstrating advanced proficiency.

All questions about first-year composition should be directed to: University Composition Board

Modern Languages 380
The University of Arizona
P.O. Box 210067
Tucson, AZ 85721-0067
Phone: (520) 621-5976

Second Language
B.A. degree students may fulfill the second language requirement with one of the following options:

1. Scoring the equivalent of fourth-semester skill level on an entrance or placement examination administered by The University of Arizona.
2. Completion of a two-course sequence beyond the second semester of post-secondary language instruction.
3. Completion with a C or higher of a 300- or 400-level language course at the post-secondary level.
4. Completion of one course beyond the third semester in combination with an AP (Advanced Placement) score or a CLEP (College Level Entrance Program) score determined by the individual language department.
5. An AP score of 3 or higher or a CLEP score of 60 or higher in the language.
6. A minimum of one semester study abroad in a language program approved by the appropriate language department as the equivalent of fourth-semester skill level.

Non-B.A. degree students may fulfill the second language requirement with one of the following options:

1. Scoring the equivalent of second-semester skill level on an entrance or placement examination administered by The University of Arizona.
2. Completion with a C or better of a second semester course at the post-secondary level.
3. An AP score of 2 or higher or a CLEP score of 41 or higher in the language.
4. In the College of Engineering and Mines by a method determined within the College; however, all students in the college must also take a language placement examination on entrance to the University.

American students who are native speakers of a language other than English (e.g. Spanish, American Sign Language, Navajo) may satisfy the requirement through a proficiency exam administered by the appropriate department. Foreign students who are native speakers of languages other than English may fulfill the second language requirement through proficiency in English.

All questions about language proficiency exams should be directed to the department that will evaluate proficiency. If you are unsure which department to approach, contact

The Office of Academic Services
Modern Languages Building, Room. 347
The University of Arizona
PO Box 210067
Tucson AZ 85721-0067
Phone: (520) 621-3336
FAX: (520) 621-9300

Tier One and Tier Two
Both Tier One and Tier Two courses offer rigorous treatments of fundamental knowledge and methods of inquiry. They are designed to foster independent, creative, and interactive learning, inspiring students to think about themselves, others, and social organizations in new and insightful ways. Students are exposed to various areas of study and acquire valuable skills and knowledge applicable to their lives at university and beyond.

Tier One
Tier One courses introduce new students to fundamental issues and concepts pertinent to three study areas: traditions
The University-Wide General Education Structure

The University-Wide General Education Structure

and cultures, individuals and societies, and natural sciences. Students are required to take two courses in each segment of Tier One, for a total of six courses. Students entering the University as freshmen will be expected to complete the first tier by the end of the midpoint of their degree (e.g. for a four-year 120-unit degree program by the end of the second year of full-time work or the completion of 60 units).

Tier One
Traditions & Cultures: 2 courses
Individuals & Societies: 2 courses
Natural Sciences: 2 courses
Total: 6 courses

NOTE: Majors in the College of Engineering and Mines, the College of Science, and the School of Health-Related Professions, as well as most majors in the College of Agriculture, will be allowed to satisfy first tier Natural Science with their required chemistry and physics course work. Technically based programs in other colleges may also allow major course work to satisfy the first tier natural science requirement. Consult the APRR for your degree program or contact an academic advisor for more information.

Tier Two
Tier Two courses offer more in-depth examination of particular disciplines. The second tier is organized into four study areas: arts, humanities, individuals and societies, and natural sciences. Students are required to take one course in each segment of Tier Two, for a total of four courses. One segment may be completed by a major course; each major identifies which segment could be completed within its course work. Students are expected to complete the second tier by the conclusion of their undergraduate degree.

Arts: 1 course
Humanities: 1 course
Individuals & Societies: 1 course
Natural Science: 1 course
Total: 4 courses (one could be in major)

NOTE: For students in the College of Engineering and Mines, the College of Science, and the School of Health-Related Professions, Tier 2 will involve one course in three segments — Natural Science, Individuals & Societies and Arts & Humanities. One segment may be completed by a major course; each major will identify which segment could be completed within its course work.

Arts & Humanities: 1 course
Individuals & Societies: 1 course
Natural Science: 1 course
Total: 3 courses, (one could be in major)

Non-Western Cultures and Race, Gender Class, and Ethnicity
One course in a student’s degree program must focus on non-western cultures or on race, gender, class, or ethnicity. This requirement may be filled by a designated Tier One or Tier Two course, or by a course taken from another area of the university curriculum, as, for example, in the student’s major or minor.

For information on currently approved general education courses, see the General Education listing under Colleges, Departments, and Courses of Instruction.

Substitutions for Approved General Education Courses
Substitutions are not encouraged, and will be granted only for extraordinary circumstances. The college dean's office approves all substitutions other than those available to learning-disabled students. Substitutions approved for learning disabled students certified by S.A.L.T or CeDRR will first be approved by one of those offices before the college will grant the substitution. Substitutions granted by one college will be honored by the student’s subsequent colleges, if any.

Students requesting a substitution for an approved general education course, for any reason, must request and receive approval for the substitution prior to enrolling in the substitute course. Contact a college advisor for more information about the approval process.

In the absence of direct course equivalents, Arizona community college AGEC-approved courses may be substituted for UA-approved general education courses with the approval of the student’s college in advance of enrollment in the substitute course.

Upper-Division Writing Proficiency Examination (UDWPE)*
Every student must take the upper-division writing proficiency examination (UDWPE), which is a prerequisite to enrolling in a writing-emphasis course (see below). Students may take the exam after they have satisfied the foundations requirement in composition and accumulated at least 40 but less than 75 units toward their degree. Students register for the exam with the University Composition Board (Modern Languages 380).

The examination may be taken only once. Results are reported to students and to their major departments. Students who earn an evaluation of unsatisfactory on the exam usually are required by their department to complete further work in composition before registering for writing-emphasis courses. They should consult with their academic advisors for specific information about departmental requirements.

*This policy is currently under review. Consult your college dean’s office for more information.
Organization of Academic Units

Fifteen colleges comprise the academic divisions of the University. Colleges have principal responsibility for determining degree requirements, including the general education program required for each degree.

The fifteen colleges are the College of Agriculture, the College of Architecture, the College of Business and Public Administration, the College of Education, the College of Engineering and Mines, the College of Fine Arts, the College of Humanities, the College of Law, the College of Medicine, the College of Nursing, the College of Pharmacy, the College of Science, the College of Social and Behavioral Sciences, the Graduate College, and University College. Each college is administered by a dean who has responsibility for academic programs and policies.

Within colleges are schools, departments, divisions, or committees which have direct responsibility for course offerings and determination of requirements for majors. The academic programs and courses offered by the University through its various units are listed alphabetically in the Colleges, Departments, and Courses of Instruction section of this manual. Degree programs and course offerings are listed according to the offering college, school, department, or committee.

Academic Divisions

College of Agriculture
  School of Family & Consumer Resources
  School of Renewable Natural Resources

College of Architecture

College of Business and Public Administration
  Karl Eller Graduate School of Management
  School of Public Administration & Policy

College of Education

College of Engineering and Mines

College of Fine Arts
  School of Music & Dance

College of Humanities

College of Law

College of Medicine

College of Nursing

College of Pharmacy

College of Science

College of Social and Behavioral Sciences
  School of Library Science

Graduate College
  Graduate Interdisciplinary Programs

University College

General Departments and Divisions*
  School of Health Professions
  School of Military Science, Naval Science, & Military Aerospace Studies

*For a complete listing, see the on-line catalog at http://catalog.arizona.edu
Admissions Policies affecting Continuing Students

Residency Classification
In Arizona, as in all other states, instruction fees at publicly supported universities are lower for resident students than for nonresident students. A copy of the rules used for classifying resident students for tuition purposes can be obtained from the
Office of Residency Classification
The University of Arizona
PO Box 210066
Tucson, AZ 85721-0066
(520) 621-3636
URL: http://www.registrar.arizona.edu/Residency/residenc.htm

Credits from Community Colleges
While there is no limit to the total number of transferable units of course work that a student may apply toward the requirements for a bachelor’s degree, the choice of the 64 units is at the discretion of the student in consultation with an advisor. Transfer students are encouraged to complete freshman and sophomore level general education course work at their community colleges. Transferability of courses of independent study, internship, or practicum will be determined by the appropriate department or college at the University of Arizona and may be restricted both in number of units and in degree applicability. Students who have taken community college courses in these categories may petition for an exception.

While all courses offered for transfer will be accepted by the University according to these rules, the specific lower-division requirements of various curricula vary widely. In order to complete the baccalaureate program in the normal time span, the student should consult the appropriate college and the advisor in the appropriate university department to determine requirements of a particular program.

Community college courses which are equivalent in content to university upper-division (carrying a course number of 300 or higher) courses will be transferable as equivalents, but with lower-division credit. These courses need not be repeated at the University, but will not count toward the required number of upper-division credit hours.

Arizona General Education Curriculum (AGEC)
The Arizona public community colleges and UA have agreed upon a common structure for a general education core curriculum. This common agreement is called the Arizona General Education Curriculum (AGEC). AGEC is composed of a minimum of 35 semester units of lower-division general education course work in which a student may prepare for transfer.

Students transferring from an Arizona community college to the University have the option of completing the lower-division general education requirements at the University or completing the AGEC.

Completing the AGEC will fulfill lower-division general education requirements at the University. Students utilizing this option will still be required to fulfill lower-division program requirements and prerequisites within their college and major/minor area of study. The requirements for the AGEC are available through the Arizona community college advising center.

In the absence of a complete AGEC transfer package, transfer students from Arizona community colleges may meet their general education requirements with a combination of AGEC-approved courses taken before their initial enrollment at UA along with subsequent UA general education course work.

The Community College Transfer Guide
The community college Transfer Guide presents the lower-division requirements of bachelor’s degree programs at The University of Arizona in terms of the transferable courses available at Arizona community colleges, numbered in the community college notation. The Transfer Guide should be used in conjunction with the electronic catalog at http://catalog.arizona.edu, and the Arizona Higher Education Course Equivalency Guide. The Transfer Guide can be found on line at http://w3.arizona.edu/~oncourse/tguides/ua/home.htm. Students should refer to the community college catalogs for descriptions of the community college courses listed in the Transfer Guide.

Transfer of community college courses not listed in the Transfer Guide or the Course Equivalency Guide must be approved by The University of Arizona academic unit that offers the degree being sought. Courses accepted for transfer in this way may be restricted both in number of units transferable and the manner in which they may be used to satisfy degree requirements.

Completion of the UA General Education Requirements by Transfer Students from Out-of-state and Four-Year Instate Institutions
Transfer credits from out-of-state institutions and instate four-year institutions earned before a student’s initial enrollment at the University will be applied to student’s UA general education requirements as decided by the college declared by the student at the time of initial admission.

Those decisions will be honored by a student’s subsequent colleges, if any. Transfer students who have completed the Arizona General Education Curriculum will have completed all UA general education requirements, with the additional need to establish the second language proficiency requirement.

Applying for Readmission
1. Students absent from the University
Admissions and Registration Information

1. Students who have attended other institutions and all international students (non-immigrants) should contact the Office of Admissions & New Student Enrollment to reapply.

2. Students who have attempted 12 or more college-level units at other institutions must submit an official transcript of all course work completed at other post-secondary institutions.

3. Students who have attended other institutions since last attendance at the University must meet degree requirements as outlined in the catalog. Transcripts should be sent to the Office of Admissions & New Student Enrollment.

4. Students planning to enroll in a new college must obtain written permission to re-enroll from the dean of the college in which they wish to enter prior to readmission.

5. Students who have previously attended the University in a non-degree status must apply for regular admission if intending to enter a degree program. Application should be made through the Office of Admissions.

Note: Students who withdraw from the University for more than two consecutive regular semesters must meet degree requirements as outlined in the catalog in effect at their re-enrollment or during their registration.

Readmission Requirements

1. Students seeking readmission who were not on academic probation or under disqualification upon departure from the University are eligible to return upon application for readmission, if less than 12 college-level units have been attempted at other post-secondary institutions.

2. Students who have attempted 12 or more college-level units at other post-secondary institutions must submit an official transcript of all course work. A minimum cumulative grade point average of 2.0 on a 4.0 scale is required for course work completed at other institutions. Otherwise, students must obtain written permission to re-enroll from the dean of the college in which they plan to enroll. The Office of Admissions and New Student Enrollment will process the application for readmission according to the written recommendation of the dean.

3. Students seeking readmission who left the University on academic probation or under disqualification must receive approval from the dean of the college they wish to enter prior to readmission.

Readmission Deadlines

The last dates for receipt in the Admissions Office of all official transcripts and application forms for readmission to the University are as follows:

- For students in good standing:
  - For fall semester: August 1
  - For spring semester: November 1
  - For summer terms I & II: June 1

- For students who are disqualified or on probation:
  - For fall semester: June 1
  - For spring semester: October 1
  - For summer terms I & II: April 1

Registration

All persons must register and pay tuition and fees in order to attend class. Registration periods, with published dates, are set aside for each semester and summer session. Complete registration instructions, procedures, and deadlines for which every student is fully responsible are detailed in the Schedule of Classes, available on campus prior to the registration periods.

A student is officially registered and eligible to attend classes only when all procedures have been completed, including payment of tuition and fees. Actual course registration is accomplished using the touch-tone telephone registration system.

In addition to the basic information regarding registration, the Schedule of Classes is an essential source document for the current academic calendar, fee schedule, academic and other student regulations and procedures, and the final exam schedule, as well as for the listing of courses to be offered.

Late Payment and Late Registration Fees

A student who fails to complete payment of all fees prior to the due date for any semester or term will be assessed a nonrefundable late payment fee. Students who fail to register prior to the first day of class will be assessed an additional late registration fee. Consult the Schedule of Classes for current fee schedules.

Non-Subsidized Registration Charges

Students with outstanding registration accounts as of the 21st calendar day following the first day of classes will be charged an additional mandatory penalty fee to offset state subsidy payments the University fails to receive for unpaid students. You will be charged this penalty whether or not you have been billed for additional registration. It is especially important to note that any student who increases his or her
number of enrolled credit hours after the 21st day—including a student who has already paid full-time fees—will be subject to the late penalty charge. To avoid this mandatory penalty, you should check your account balance each time you change your registration and finalize your class schedule prior to the 21st calendar day of the semester.

Statement Of Financial Ineligibility
Students with past-due debts to The University of Arizona are considered financially ineligible to register until outstanding debts are paid in full.

Transfer To Less Advanced Course
Students unable to meet satisfactorily the requirements of courses in which they are registered may be transferred to less advanced courses in the same department if the head of the department and the instructors approve.

Retention of Student Records
The Office of the Registrar maintains a permanent record of academic work completed by each student. Support documents for the academic records are kept for three (3) years after the student graduates or date of last enrollment. After three years, it is assumed that the student accepts the accuracy of his/her records each semester. Discrepancies in the academic record should be reported to the Registrar immediately.

When a degree has been certified by the Office of the Registrar, a student’s academic record may not be altered except in those cases where a procedural or clerical error has occurred. However, if the student or the University learns facts that were not known or would not have reasonably been known within the three-year period, the academic record may be altered and/or the degree may be revoked.

Release Of Information
the University complies with all provisions of the Family Educational Rights and Privacy Act of 1974 dealing with the release of education records. A copy of The University of Arizona’s policy for implementation of the act is available in the Offices of the Registrar and the Dean of Students.

Change Of Schedule (Drop/Add)
Students may drop and/or add courses by following instructions and adhering to deadlines in the appropriate Schedule of Classes each semester.

As of the first day of classes and through the last day of registration for credit, as stated in the Academic Calendar, a student may not add a course without the permission and the signature of the instructor of the course.

Course dropped by the end of the fourth week of classes result in cancellation of registration in the course. For courses dropped after the end of the fourth week of classes until the end of the eighth week of classes, the grade of “W” may be awarded to students not passing at the time of withdrawal. Both grades show on the student’s permanent record.

The last day on which a student may drop a course is the last day of the eighth week during which classes are held, except for an extraordinary reason approved by the student’s college dean (in the case of undergraduate students) or by the Dean of Students (in the case of graduate students). For students in the colleges of Law and Medicine, withdrawals are governed by regulations established by the respective college faculties.

Change Of Registration
From Credit To Audit
After the fourth week of classes, a change in registration in a course from credit to audit will be permitted only if the student is doing passing work in that course and receives the approval of the course instructor. After the eighth week of classes, changes from credit to audit will be permitted only with permission from the student’s college dean.

Change Of Major Or College
A student may change his or her major by contacting his or her college dean and completing the appropriate forms. Students wishing to change colleges must consult the dean’s office of the college to which they wish to transfer. Change from one college to another is established by filing a change of college form with the new college. For information about timetables for changing your major or college, contact the dean of the college to which you wish to change.

Petitions
Undergraduate students may petition the University Petitions Committee for relief if they believe they deserve redress or exception to university rules, regulations, or policies regarding academic affairs, such as degree requirements. Petition forms may be obtained in the Office of the Registrar or from the college dean.

The completed form with all relevant facts and supporting evidence is submitted to the college dean for recommendation. The dean forwards the petition and recommendation to the Office of the Registrar, who then forwards the petition to the University Petitions Committee for action. The decision of the University Petitions Committee is final.

Students may also petition for redress or exception to college policies or requirements. Petitions may address a change of program, approval for overload, substitution of course work, transfer credit, modification in degree program, eligibility for registration or enrollment in the college. The necessary forms, instructions and assistance may be obtained in the office of the college dean. Petitions are filed in the college dean’s office. The decision of the dean is final.
Academic Policies and Graduation Requirements

Code Of Academic Integrity

Integrity is expected of every student in all academic work. The guiding principle of academic integrity is that a student’s submitted work must be the student’s own. Students engaging in academic dishonesty diminish their education and bring discredit to the academic community.

Students shall not violate the Code of Academic Integrity and shall avoid situations likely to compromise academic integrity. Students shall observe the provisions of the Code whether or not faculty members establish special rules of academic integrity for particular classes. Failure of faculty to prevent cheating does not excuse students from compliance with the Code.

Conduct prohibited by the Code consists of all forms of academic dishonesty, including, but not limited to: cheating, fabrication, facilitating academic dishonesty, and plagiarism as set out and defined in the Code of Conduct, modifying any academic work for the purpose of obtaining additional credit after such work has been submitted to the supervising faculty member unless the supervising faculty member approves such alterations; failure to observe rules of academic integrity established by a faculty member for a particular course; and attempting to commit any act prohibited by the Code.

Any attempt to commit an act prohibited by these rules shall be subject to sanctions to the same extent as completed acts. The procedures for reviewing a suspected violation follow:

Faculty-Student Conference. The faculty member must confer with the student within 15 working days of his/her being informed of a suspected violation.

Appeal to Department Head. The student must appeal to the department head within 10 working days of notification of the imposition of sanctions and recommendations for suspension or expulsion. The department head shall render a decision within 15 working days.

University Hearing Board. The student must appeal to the University Hearing Board within ten working days of notification that the department head has upheld the sanction or that the faculty member refuses to accept the department head’s recommendation that sanction(s) be rescinded. The University Hearing Board shall convene within 30 working days of the time the student files the appeal.

For a more detailed outline of procedures, see the complete Code of Academic Integrity. Copies are available in the Dean of Students Office, Rm. 203, Old Main.

Academic Standing, Progress, Probation and Disqualification

Good Standing

Good standing status denotes that a student is eligible to continue in or to return to The University of Arizona.

Academic Progress

Undergraduate students will be considered to be making normal progress toward a degree if their cumulative grade point average for all work attempted at UA is not less than 2.000.

Minimum Grade Point Average Required For Continued Enrollment

One of the requirements for students to be eligible to continue in the institution is that they earn minimum cumulative averages as follows:

<table>
<thead>
<tr>
<th>Total Units Completed at UA</th>
<th>Minimum GPA Based upon UA Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fewer than 14 units ..........</td>
<td>1.750</td>
</tr>
<tr>
<td>14—26 units ..................</td>
<td>1.840</td>
</tr>
<tr>
<td>27 or more units .............</td>
<td>2.000</td>
</tr>
</tbody>
</table>

For College of Law requirements, refer to: http://www.law.arizona.edu, or contact the college.

Academic Warning Status

Freshman students who have completed fewer than 27 units at the University with a University of Arizona cumulative grade point average of less than 2.000 will be on academic warning status. Academic warning status invokes no academic penalties and will not be indicated on the student’s permanent record. This status serves as a warning to students beginning their college careers that their performance is below the level required for successful completion of an academic program. Students in this status are strongly urged to seek academic counseling.

Probation

Students not meeting the standards of normal progress or academic warning status will be on probation. Students on probation are subject to such restrictions with respect to courses and extracurricular activities as may be imposed by the academic dean of the college in which the student is enrolled. Students are removed from probation upon earning the minimum cumulative grade-point average required by the table listed under “Minimum Grade Point Average Required for Continued Enrollment.”

Disqualification

Disqualification is of two types: from a particular college in the University or from the University. A student may be academically disqualified only after two consecutive regular semesters of not meeting the standards of normal progress (cumulative grade point average of 2.0) or academic warning status; or under conditions described below under “Probation or Disqualification by Special Action.”

The student recommended for disqualification from a particular college may seek immediate admission to another college in the University. Permission for admission to another college must be obtained in writing from the dean of the college into which the student plans to transfer. The letter of permission should be presented to the Office of the Registrar. Ordinarily permission will be granted only if the student plans to pursue a modified program in a curriculum of the new college and has demonstrated ability warranting such action. Those who have been given college disqualification are strongly urged to seek thorough academic and vocational counseling and guidance. Failure to secure approval to transfer to another college in the University is tantamount to university disqualification and the rules governing this type of disqualification then will apply. A
disqualified student may not attend the University as a non-degree student.

A student disqualified from a particular college who may have secured subsequent permission to register in another college is automatically on academic probation in the new college. A student may be granted college disqualification only once in his or her academic career. Any later disqualification will be considered a university disqualification.

University Disqualification
A student who receives university disqualification is restricted from registering at The University of Arizona and may return to the University only on the basis of evidence that underlying conditions have materially improved and that he or she is now capable of academic success. Students seeking readmission who left the University on academic probation or under disqualification must receive approval from the dean of the college they wish to enter prior to readmission.

Probation or Disqualification by Special Action
Upon recommendation of the dean of the college, a student may be placed on academic probation or may be disqualified at any time for neglect of academic work.

Credit Restrictions for Students under University Disqualification
Students who are under disqualification from the University may not take UA courses for credit or establish credit by examination during their periods of disqualification, although they may remove incomplete grades. With the permission of the college dean, students who have been disqualified from the University may register for correspondence enrollment.

Credit Definitions and Enrollment Policies

University Credit
University credit is the term used to identify all credit offered by The University of Arizona, with the exception of correspondence credit and Special Examination for Credit. Only the grades of courses taken for University credit and by Special Examination for Grade are used in calculating the grade point average.

Definition of Unit of Credit
Utilizing the definition that an hour of work is the equivalent of 50 minutes of class time (often called a contact hour) or 60 minutes of independent-study work, university policy requires at least 45 hours of work by each student for each unit of credit. Contact hours required for specific types of courses are as follows:

1. At least 15 contact hours of recitation, lecture, discussion, seminar, or colloquium, as well as a minimum of 30 hours of homework are required for each unit of student credit.
2. Workshops require at least 15 through 45 contact hours and the appropriate number of homework hours to comprise a total of at least 45 hours of work for each unit of credit.
3. Studios require at least 30 contact hours and at least 15 hours of homework for each unit of credit.
4. Laboratory courses must maintain a minimum of 45 contact hours per unit of credit.
5. Field trips are to be counted hour-for-hour as laboratory meetings.
6. Each unit of internship or practicum must require a minimum of 45 hours of work.

Since it would be virtually impossible for a student to complete satisfactorily 45 hours of work in less than one week, the policy regarding the duration of courses maintains that a course must cover at least a one-week period for every unit of credit given over a a five-week period.

It is understood that, when the official university calendar deviates from these guidelines, that calendar shall prevail.

The hour requirements specified above represent minimums for average students and that considerable deviation in excess of these requirements may occur, particularly at the graduate level.

Proficiency and Exemption Exams, Credit by Examination
Students may establish credit or proficiency in various disciplines under any of several modes. They are:

1. The Advanced Placement Program administered by the College Board
2. The Higher Level Examinations of the International Baccalaureate
3. The College-Level Examination Program (CLEP), also administered by the College Board
4. Departmental exemption or proficiency examinations
5. Special examination for credit or grade.

In no case may the sum of credits earned through the above examinations and/or University of Arizona correspondence courses exceed 60 units applied toward an undergraduate degree. No graduate credit may be established in this manner.

Exemption or Proficiency Exams
A number of colleges and departments regularly offer exemption or proficiency examinations covering introductory or basic areas of their disciplines. These examinations are designed and graded by the individual departments. No credit is awarded on the basis of successful performance on these, but they allow a student two privileges: (a) the opportunity of enrolling in advanced-level courses in the area of proficiency; or (b) the opportunity of satisfying various college or departmental area or proficiency requirements without taking prescribed courses.

Proficiency or exemption examinations for many courses are available to any student currently enrolled in a degree program at the University. Capable students wishing to increase their elective freedom are encouraged by university policy to examine the opportunities provided through various proficiency exams.

At the discretion of the department, the proficiency examination may include laboratory projects or other evidence of satisfactory skills in addition to
or instead examination at the two- or four-semester level. For more information about specific language proficiency requirements, contact your academic advisor.

Foreign students will be allowed credit by transfer in their native language only for those courses taken during the years equivalent to the US college years.

Passing the proficiency examination at the required level in a foreign language fulfills the language requirement. Passing a course for which the required level is prerequisite also establishes proficiency in that language. Credit may not be earned merely by passing the proficiency examination.

**Procedures and General Regulations for Exemption or Proficiency Examinations**

1. Proficiency or exemption examinations are available only to enrolled, degree-seeking students.

2. In no case does passing an exemption or proficiency examination lower the total number of units required for the bachelor's degree.

3. In normal circumstances, a student may not take a proficiency examination for the same course more than twice.

4. Proficiency or exemption examinations are normally given early in the semester or during orientation. The student must contact the appropriate department concerned for additional information and instructions.

5. Students wishing to sit for a proficiency or exemption examination in a language not normally taught at The University must contact The Office of Academic Services, Modern Languages Building, Room 347, The University of Arizona, PO Box 210067, Tucson AZ 85721-0067, Phone: (520) 621-3336, FAX: (520) 621-9300

6. The exemption or proficiency examinations are administered only on The University of Arizona campus.

7. The results of exemption or proficiency examinations, if successful, are reported in writing directly to the Office of the Registrar, with a copy to the student.

8. The student's academic record will be annotated with a statement indicating the student passed the proficiency examination at the appropriate level.

**Special Examination for Credit or Grade**

Any student currently enrolled or previously withdrawn in good standing at The University of Arizona may earn credit toward an undergraduate degree through the use of special examinations. The responsibility for preparatory study for these examinations rests entirely with the student; faculty members are under no obligation to assist with such preparation.

Special examinations are constructed and administered by the department concerned. They are designed to reflect and explore the scholastic equivalent of the course, and more comprehensive than the usual “final exam”. The examinations may be written or oral, or both, and they may include course projects, laboratory projects, written reports, or other evidence of proficiency.

Undergraduate courses currently offered by the University and designated in the catalog “CDT”; may be taken for credit by examination. Courses designated “GRD”; may be taken for grade by examination or credit by examination. Other courses generally have been excluded from this option; at department discretion, however, any course may be made available for grade by examination or credit by examination.

**Options**

1. **Special Examination for Credit:** Passing grades, recorded as “CR” (credit), become a permanent part of the student's record but are not used in computing the cumulative grade average. Failing grades are not recorded.

2. **Special Examination for Grade:** All grades, whether passing or failing, are permanently recorded and used in computing the cumulative GPA.

**Limitations**

1. The credit so earned may not duplicate units already presented for admission to the University, either collegiate or subcollegiate.

2. The credit may not be in a course which is equivalent to, or more elementary than, another course in which the student is enrolled or for which the student has already received credit. The head of the examining department has the responsibility of determining the application of this limitation in each student's case.

No credit may be earned by this type of examination for beginning or intermediate language courses in the native language of the applicant.

**Procedures**

1. Applications for Special Examination for Credit or Special Examination for Grade may be obtained from the Office of the Registrar, in Administration 210.

2. The application must be approved by the student's advisor.

3. The examining instructor and the head of the examining department must determine the eligibility of the applicant and sign the application.

4. The application is returned to the Registrar, and the $21-per-unit fee is paid to the University Cashier. No department may schedule a special examination until notified by the Cashier that the fee has been paid.

5. The examination is scheduled by the faculty member responsible, normally during the same semester in which the application is made.

6. The grade (CR or letter grade) is reported to the Registrar. The examination, together with the student's graded examination paper and any appropriate evaluations of oral performance or projects, is then filed with the department for at least one year.

7. The student may change the type of special examination for those courses designated “GRD” in the catalog any time before the scheduled hour of the examination by filing a new application. No additional fee will be charged.
CEEB Advanced Placement from High School

The Advanced Placement Program recognizes that certain students are often able to complete college-level courses while attending high school. The College Board provides course descriptions and professional consultants to help schools establish college-level courses. The program administers and grades the examinations and sends the results to the students' prospective colleges.

Successful completion of these examinations, which are administered in the student's high school, entitles the student to be considered for advanced placement, granted college credit, or both, depending upon the area and the examination scores.

Advanced placement without credit does not reduce the total units to be earned for the bachelor's degree, but allows the student to study at a higher level than otherwise possible. Advanced placement with credit reduces the units to be completed for a degree. Final decision regarding credit or placement is the prerogative of the department concerned.

The three top scores on Advanced Placement examinations are 5, 4, and 3; in many cases, a placement score of at least 3 will suffice for advanced placement and credit.

No grades are recorded for courses credited through the AP program.

University policy encourages prospective students to avail themselves of Advanced Placement programs, because successful achievement will substantially increase flexibility in future course selection.

Following is a list of AP examinations offered and their UA course equivalents.

### AP Examinations

<table>
<thead>
<tr>
<th>Score</th>
<th>General Education</th>
<th>Course credit</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>American history</td>
<td>satisfies Tier 1, TRAD 103 &amp; 104</td>
<td>HIST 106 &amp; 107</td>
<td>6 units</td>
</tr>
<tr>
<td>Art (general &amp; studio)</td>
<td>lower-division credit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Art history</td>
<td>satisfies Tier 1, TRAD 104</td>
<td>ARH 117 &amp; 118</td>
<td>6 units</td>
</tr>
<tr>
<td>Biology</td>
<td>satisfies Tier 1, NATS 102</td>
<td>none</td>
<td>4 units</td>
</tr>
<tr>
<td>Chemistry</td>
<td>satisfies Tier 1, NATS 104</td>
<td>CHEM 103a &amp; 104a</td>
<td>4 units</td>
</tr>
<tr>
<td>Computer science A</td>
<td>satisfies Tier 1, NATS 104</td>
<td>CHEM 103a/b &amp; 104a/b</td>
<td>8 units</td>
</tr>
<tr>
<td>Computer science AB</td>
<td>MIS 111</td>
<td>C SC lower-division credit</td>
<td>3 units</td>
</tr>
<tr>
<td>Economics—microeconomics</td>
<td>satisfies Tier 2, Individuals &amp; Societies</td>
<td>ECON 201a</td>
<td>3 units</td>
</tr>
<tr>
<td>Economics—macroeconomics</td>
<td>none</td>
<td>Econ 201b</td>
<td>3 units</td>
</tr>
<tr>
<td>Economics—micro &amp; macroeconomics</td>
<td>satisfies Tier 2, Individuals &amp; Societies</td>
<td>ECON 200 &amp; 201a/b</td>
<td>3 units</td>
</tr>
<tr>
<td>English literature/composition</td>
<td>general ed: a combination of AP credit/completion of ENGL 109h with C or better satisfies first-year composition requirements</td>
<td>lower-division credit &amp; English 267</td>
<td>6 units</td>
</tr>
<tr>
<td>English lang/composition</td>
<td>general ed: a combination of AP credit/completion of ENGL 109h with C or better satisfies first-year composition requirements</td>
<td>lower-division Eng. credit</td>
<td>6 units</td>
</tr>
<tr>
<td>European history</td>
<td>satisfies Tier 1, TRAD 102 &amp; 103</td>
<td>HIST 101 &amp; 102</td>
<td>6 units</td>
</tr>
</tbody>
</table>
### AP Examinations

<table>
<thead>
<tr>
<th>Score</th>
<th>General Education</th>
<th>Course credit</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>French language</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>satisfies second language requirement</td>
<td>FREN 201 &amp; 202</td>
<td>8 units</td>
</tr>
<tr>
<td>4</td>
<td>satisfies second language requirement</td>
<td>FREN 201, 202 &amp; 305a</td>
<td>11 units</td>
</tr>
<tr>
<td>5</td>
<td>satisfies second language requirement</td>
<td>FREN 201, 202, * 305 a/b</td>
<td>14 units</td>
</tr>
<tr>
<td><strong>French literature</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>satisfies second lang. requirements</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>3</td>
<td>satisfies second lang. requirements</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>4</td>
<td>satisfies second lang. requirements</td>
<td>FREN 201, 202, 401, 402</td>
<td>14 units</td>
</tr>
<tr>
<td>5</td>
<td>satisfies second lang. requirements</td>
<td>FREN 201, 202, 401</td>
<td>11 units</td>
</tr>
<tr>
<td><strong>German</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>satisfies second lang. requirements for non-BA</td>
<td>GER 101, 102</td>
<td>8 units</td>
</tr>
<tr>
<td>3</td>
<td>satisfies second lang. requirements for non-BA</td>
<td>GER 101, 102, 201</td>
<td>12 units</td>
</tr>
<tr>
<td>4</td>
<td>satisfies second lang. requirements for all degrees</td>
<td>GER 101, 102, 201 &amp; 202</td>
<td>16 units</td>
</tr>
<tr>
<td>5</td>
<td>satisfies second lang. requirements for all students</td>
<td>GER 101, 102, 201, 202, 301</td>
<td>19 units</td>
</tr>
<tr>
<td><strong>Latin-Vergil &amp; Cato/Horace</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>satisfies second lang. requirements for all students</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>4 or 5</td>
<td>satisfies second lang. requirements for all students</td>
<td>LAT 202</td>
<td>4 units</td>
</tr>
<tr>
<td><strong>Mathematics AB</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3, 4, or 5</td>
<td>satisfies math requirements for all students</td>
<td>MATH 125a or 123</td>
<td>3 units</td>
</tr>
<tr>
<td><strong>Mathematics BC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>satisfies math requirement for all students</td>
<td>MATH 125</td>
<td>3 units</td>
</tr>
<tr>
<td>3, 4, or 5</td>
<td>satisfies math requirement for all students</td>
<td>MATH 125a-b</td>
<td>6 units</td>
</tr>
<tr>
<td><strong>Music literature</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>satisfies Tier 2 arts requirement</td>
<td>MUS 107</td>
<td>3 units</td>
</tr>
<tr>
<td>4</td>
<td>satisfies Tier 2 arts requirement</td>
<td>MUS 130a</td>
<td>2 units</td>
</tr>
<tr>
<td>5</td>
<td>satisfies Tier 2 arts requirement</td>
<td>MUS 130a-b</td>
<td>5 units</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>MUS 120a-120b</td>
<td>6 units</td>
</tr>
<tr>
<td><strong>Music theory</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>satisfies Tier 2 arts requirement</td>
<td>MUS 100</td>
<td>3 units</td>
</tr>
<tr>
<td>3 or 4</td>
<td>satisfies Tier 2 arts requirement</td>
<td>MUS 120a</td>
<td>3 units</td>
</tr>
<tr>
<td>5</td>
<td>satisfies Tier 2 arts requirement</td>
<td>MUS 102a-b</td>
<td>6 units</td>
</tr>
<tr>
<td><strong>Political science</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American government and politics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3, 4, or 5</td>
<td>none</td>
<td>POL 102</td>
<td>3 units</td>
</tr>
<tr>
<td>Comparative government and politics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3, 4, or 5</td>
<td>none</td>
<td>POL 140</td>
<td>3 units</td>
</tr>
<tr>
<td>3, 4, or 5</td>
<td></td>
<td>PHYS 102-103</td>
<td>6 units</td>
</tr>
<tr>
<td><strong>Physics B</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3, 4 or 5</td>
<td>Tier 1, NATS 101 &amp; Tier 2 Natural Sciences</td>
<td>PHYS 102a-b</td>
<td>6 units</td>
</tr>
<tr>
<td><strong>Physics CE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 or 5</td>
<td>satisfies Tier 2 Natural Sciences</td>
<td>PHYS 241</td>
<td>4 units</td>
</tr>
<tr>
<td><strong>Physics CM</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 or 5</td>
<td>satisfies Tier 1, NATS 101</td>
<td>PHYS 141</td>
<td>4 units</td>
</tr>
<tr>
<td><strong>Psychology</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 or 5</td>
<td>none</td>
<td>PSYC 101</td>
<td>3 units</td>
</tr>
<tr>
<td><strong>Spanish language</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>satisfies second language requirement</td>
<td>none, proficiency met at 16-unit level</td>
<td>none</td>
</tr>
<tr>
<td>3</td>
<td>satisfies second language requirement</td>
<td>SPAN 201, 202</td>
<td>8 units</td>
</tr>
<tr>
<td>4</td>
<td>satisfies second language requirement</td>
<td>SPAN 201, 202, &amp; 251</td>
<td>11 units</td>
</tr>
<tr>
<td>5</td>
<td>satisfies second language requirement</td>
<td>SPAN 201, 202, 251 &amp; 325</td>
<td>14 units</td>
</tr>
<tr>
<td><strong>Spanish literature</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>satisfies second lang. requirement</td>
<td>none-proficiency met at 16-unit level</td>
<td>none</td>
</tr>
<tr>
<td>3</td>
<td>satisfies second lang. requirement</td>
<td>SPAN 201, 202</td>
<td>8 units</td>
</tr>
<tr>
<td>4</td>
<td>satisfies second lang. requirement</td>
<td>SPAN 201, 202 &amp; 251</td>
<td>11 units</td>
</tr>
<tr>
<td>5</td>
<td>satisfies second lang. requirement</td>
<td>SPAN 201, 202, 251 &amp; 325</td>
<td>14 units</td>
</tr>
</tbody>
</table>

*If you earn a grade of 5 in both the Spanish language and literature exams, you will receive credit for SPAN 201, 202, 251, 325, 350 and three units of upper-division literature credit, for a total of 20 units. If you earn a grade of 5 in the language exam and a 4 in the literature exam, you will receive credit for SPAN 201, 202, 241, 325 and 350, for a total of 11 units. If you earn a 4 on both exams, you will receive credit for SPAN 201, 202, 251 and 325, for a total of 12 units. If you earn a 3 in both the Spanish language and literature exams or any combination of 4 and 3 in the exams, you will receive credit for SPAN 201, 202 and 325, for a total of 11 units.*
College-Level Examination Program (CLEP)
The examinations offered under the CLEP were designed primarily to allow people who may not have been formal students for many years to achieve college-level credit for knowledge acquired through self-education and experience. By successful performance on CLEP examinations, many have been encouraged to pursue a college or university education.

Additionally, these examinations are of value as a means for students to satisfy certain requirements or earn extra course credits without having to enroll formally in the courses. General and subject exams must be taken by UA students prior to the completion of 55 units. Transfer students must take general and subject exams before finishing 55 units or before completing two regular semesters at the University. Students should consult their academic advisers or the offices of their college deans for more information.

All CLEP examinations are available through the Testing Office, Old Main 223, The University of Arizona, P.O. Box 210021, Tucson, AZ 85721-0021, (520) 621-7589, FAX: (520) 621-3993. A limited list of CLEP examinations is available through the testing centers at Arizona State University and Northern Arizona University. Resident students at UA should contact the Testing Office for additional information.

UA accepts for college credit both the general and the subject examinations of the CLEP, providing satisfactory scores are attained. Scores of 500 on the general examinations will entitle the student, upon registration at the University, to credit in each of the following general exams:

1. English Composition: six units
2. Mathematics: three units
3. Social Sciences/History: six units
4. Humanities: four units.

A score of 565 on the general exam in Natural Science will earn six units of science credit; a score of 530 will earn three units of science credit.

From three to 16 units of credit, depending upon the examination, may be earned by scores of 50 or better on most subject examinations (41 for College French, 40 for College German, and 41 for College Spanish). The number of units of credit earned is listed following the corresponding test indicated below.

CLEP Examinations

<table>
<thead>
<tr>
<th>Score</th>
<th>General education</th>
<th>Course credit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>English composition</td>
<td>see *</td>
<td>lower-division English</td>
<td>6 units</td>
</tr>
<tr>
<td>500</td>
<td>satisfies Tier 1, INDV 102 &amp; 103</td>
<td>lower-division elective credit</td>
<td>6 units</td>
</tr>
<tr>
<td>Social Science</td>
<td>satisfies Tier 1, NATS 101 &amp; 104</td>
<td>3 lower-division science credit &amp; ECOL 100 (for non-bio majors)</td>
<td>6 units</td>
</tr>
<tr>
<td>565</td>
<td>satisfies Tier 1, NATS 101</td>
<td>or lower-division science elective</td>
<td>3 units</td>
</tr>
<tr>
<td>530</td>
<td>satisfies Tier 1, TRAD 104</td>
<td></td>
<td>4 units</td>
</tr>
<tr>
<td>Humanities</td>
<td>none</td>
<td>lower-division math elective</td>
<td>3 units</td>
</tr>
<tr>
<td>500</td>
<td>POL 103</td>
<td></td>
<td>3 units</td>
</tr>
<tr>
<td>Math</td>
<td>none</td>
<td>lower-division English credit</td>
<td>6 units</td>
</tr>
<tr>
<td>500</td>
<td>satisfies Tier 2, Humanities</td>
<td></td>
<td>3 units</td>
</tr>
<tr>
<td>American government</td>
<td>none</td>
<td>lower-division English credit</td>
<td>6 units</td>
</tr>
<tr>
<td>50</td>
<td>POL 103</td>
<td></td>
<td>3 units</td>
</tr>
<tr>
<td>American literature</td>
<td>satisfies Tier 2, Humanities</td>
<td></td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>satisfies Tier 2, Humanities</td>
<td></td>
<td>3 units</td>
</tr>
<tr>
<td>Calculus with elementary functions</td>
<td>satisfies math requirement for all students</td>
<td>MATH 125a</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>satisfies math requirement for students</td>
<td></td>
<td>3 units</td>
</tr>
<tr>
<td>College algebra</td>
<td>none</td>
<td></td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>demonstrating proficiency at 202 level</td>
<td></td>
<td>3 units</td>
</tr>
<tr>
<td>College French</td>
<td>satisfies second lang. requirement for non-BA</td>
<td>FR 101 &amp; 102</td>
<td>8 units</td>
</tr>
<tr>
<td>41</td>
<td>demonstrating proficiency at 202 level</td>
<td></td>
<td>3 units</td>
</tr>
<tr>
<td></td>
<td>through dept. placement test or depart.</td>
<td></td>
<td>3 units</td>
</tr>
<tr>
<td></td>
<td>administered Special Credit by Examination</td>
<td></td>
<td>3 units</td>
</tr>
</tbody>
</table>

*Whether CLEP credits will satisfy University first-year composition requirements will be determined by the director of composition after student completes written exam administered by the Composition Program.
### CLEP Examinations

<table>
<thead>
<tr>
<th>Score</th>
<th>General education</th>
<th>Course credit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>satisfies second lang. requirements for non-BA students</td>
<td>GER 101 &amp; 102</td>
<td>8 units</td>
</tr>
<tr>
<td>48</td>
<td>satisfies second lang. requirements for all students</td>
<td>GER 101, 102, 201 &amp; 202</td>
<td>16 units</td>
</tr>
<tr>
<td>47</td>
<td>satisfies second lang. requirement for non-BA students</td>
<td>SPAN 101 &amp; 102</td>
<td>8 units</td>
</tr>
<tr>
<td>54</td>
<td>satisfies second lang. requirement for all students</td>
<td>SPAN 101, 102, 201 &amp; 202</td>
<td>16 units</td>
</tr>
<tr>
<td>75</td>
<td>satisfies second lang. requirement for all students</td>
<td>SPAN 101, 102, 202 &amp; 251</td>
<td>19 units</td>
</tr>
<tr>
<td>50</td>
<td>none</td>
<td>MIS 111</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>none</td>
<td>lower-division psych elective credit</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>satisfies Tier 2, Humanities</td>
<td>lower-division English elective/</td>
<td>6 units</td>
</tr>
<tr>
<td>50</td>
<td>departmental credit in English (l-d) or</td>
<td>humanities credit</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>together with departmentally administered/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>evaluated essay exam, credit may be given</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>for ENG 101 and/or 102</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>satisfies Tier 1, NATS 104</td>
<td>ECOL 100 &amp; 206</td>
<td>8 units</td>
</tr>
<tr>
<td>50</td>
<td>satisfies Tier 1, TRAD 103 or 104</td>
<td>none</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>satisfies Tier 1, TRAD 103 or 104</td>
<td>or HIST 107</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>satisfies Tier 1, NATS 101</td>
<td>CHEM 103a &amp; b</td>
<td>6 units</td>
</tr>
<tr>
<td>50</td>
<td>none</td>
<td>lower-division department credit</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>none</td>
<td>lower-division elective credit</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>none</td>
<td>PSYCH 101</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>none</td>
<td>ECON 201b</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>satisfies Tier 2, Individuals &amp; Societies</td>
<td>ECON 201a</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>none</td>
<td>lower-division elective credit</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>none</td>
<td>lower-division elective credit</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>College algebra–trigonometry</td>
<td>MATH 118 &amp; 3 units l-d credit</td>
<td>5 units</td>
</tr>
<tr>
<td>50</td>
<td>satisfies Tier 1, TRAD 102</td>
<td>HIST 101</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>satisfies Tier 1, TRAD 103</td>
<td>HIST 102</td>
<td>3 units</td>
</tr>
<tr>
<td>50</td>
<td>satisfies Tier 2, Individuals &amp; Societies</td>
<td>ECON 200 &amp; 201a or 201b</td>
<td>6 units</td>
</tr>
</tbody>
</table>

CLEP credit in English composition or literature may not be applied toward either an English major or minor. For both prospective and currently enrolled students utilizing CLEP examinations, credit will not be awarded in subjects at the same level. In addition, resident students will not be awarded credit through CLEP for courses equivalent to, or at a lower level than, other courses they have already established in formal course work. Passing scores for subjects credited through CLEP are recorded as CR (credit), and may not necessarily be stated in terms of a specific course equivalent. No record is made of failing scores.

**Note:** A maximum of six semester hours of general elective credit will be allowed for completion of one or more of the following: subject examination in college composition, and freshman English, general examination in English Composition. The director of composition will determine whether this credit will satisfy UA first-year English requirement after the student completes a written examination administered by the Composition Program.
Academic Policies and Graduation Requirements

Enrollment Policies
Absences—Administrative Drop
Students are expected to be regular and punctual in class attendance. The University believes that students themselves are primarily responsible for attendance. Instructors will provide students with written statements of their policies with respect to absences. Excessive or extended absence from class is sufficient reason for the instructor to recommend that the student be administratively dropped from the course.

For those courses in which enrollment is limited, missing the first class session may be interpreted as excessive absence. If this action is filed in the Registrar’s Office by the end of the fourth week of classes, it will result in cancellation of registration in the course. The date received by the Registrar determines how the administrative drop affects the student’s academic record:

*Prior to the end of the 4th week of classes in Fall/Spring (or the end of the 1st week in a Summer term), the course will be deleted from the student’s record at the end of the semester.

*An administrative drop in weeks five through eight of Fall/Spring (2nd week in a Summer term) will result in the grade of W.

*After the end of the 8th week of classes in Fall/Spring (end of 3rd week in a Summer term), administrative drops will not be processed.

The student may notify the Office of the Dean of Students when an absence from class of one week or more is unavoidable. The office will maintain a file of such reports available to instructors upon request.

PLEASE NOTE: Administrative drop is an instructor’s option, not an obligation. Instructors are not required to drop students who fail to attend class. Any student who intends to drop or withdraw from a course must do so following withdrawal instructions available in the Schedule of Classes. Students who are enrolled in a course but fail to attend class will receive an E in the course.

Graduate Credit for Seniors
A senior within 15 units of completing requirements for graduation may register for graduate work if recommended by the head of the department and approved by the Dean of the Graduate College. A petition for graduate credit in excess of senior requirements must be filed with the dean at the time of registration or within 10 days thereafter. The number of units of graduate credit for which a student may petition is limited to the difference between the 16-unit maximum of the Graduate College and the number of units needed to complete bachelor’s degree requirements.

The dean of the Graduate College will not approve a petition unless the senior has a grade average of 3.000 or better on all work already completed at the University, is proceeding toward graduation as directly as possible, and does not propose a semester load to exceed 16 units. Under such a petition, seniors may enroll in 500-level courses. Courses numbered at the 600, 700, and 900 levels are not open to undergraduates.

Maximum Units Allowed Per Semester
Approval of the college dean is required for any student to exceed the maximum number of units allowed per semester as indicated below. The semester load includes all work carried in residence as well as concurrent registration in correspondence, extension, or approved courses at other institutions. For maximum enrollment policies in the College of Medicine, please consult those colleges.

College or School Class Standing

### Agricultural & Allied Sciences

<table>
<thead>
<tr>
<th>Units</th>
<th>Agriculture</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Business &amp; Public Administration</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Engineering and Mines</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Fine Arts</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Graduate</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Humanities</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Law</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Nursing</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Pharmacy</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>School of Health Professions</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Social &amp; Behavioral Sciences</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>University</td>
<td>19</td>
</tr>
</tbody>
</table>

### Architecture

<table>
<thead>
<tr>
<th>Units</th>
<th>Freshman</th>
<th>1-29</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sophomore</td>
<td>28-62</td>
</tr>
<tr>
<td></td>
<td>Junior</td>
<td>61-94</td>
</tr>
<tr>
<td></td>
<td>Senior</td>
<td>95+</td>
</tr>
</tbody>
</table>

### B.S. in Geosciences

<table>
<thead>
<tr>
<th>Units</th>
<th>Freshman</th>
<th>1-27</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sophomore</td>
<td>28-62</td>
</tr>
<tr>
<td></td>
<td>Junior</td>
<td>63-97</td>
</tr>
<tr>
<td></td>
<td>Senior</td>
<td>98+</td>
</tr>
</tbody>
</table>

### Business & Public Administration

<table>
<thead>
<tr>
<th>Units</th>
<th>Freshman</th>
<th>1-24</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sophomore</td>
<td>25-55</td>
</tr>
<tr>
<td></td>
<td>Junior</td>
<td>56-86</td>
</tr>
<tr>
<td></td>
<td>Senior</td>
<td>87+</td>
</tr>
</tbody>
</table>

### Education

<table>
<thead>
<tr>
<th>Units</th>
<th>Freshman</th>
<th>1-25</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sophomore</td>
<td>28-62</td>
</tr>
<tr>
<td></td>
<td>Junior</td>
<td>63-97</td>
</tr>
<tr>
<td></td>
<td>Senior</td>
<td>98+</td>
</tr>
</tbody>
</table>

### Engineering & Mines

<table>
<thead>
<tr>
<th>Units</th>
<th>Freshman</th>
<th>1-27</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sophomore</td>
<td>28-62</td>
</tr>
<tr>
<td></td>
<td>Junior</td>
<td>63-97</td>
</tr>
<tr>
<td></td>
<td>Senior</td>
<td>98+</td>
</tr>
</tbody>
</table>
Academic Policies & Graduation Requirements

**Fine Arts**
- Freshman: 1-24
- Sophomore: 25-55
- Junior: 56-86
- Senior: 87+

**Health Professions**
- Freshman: 1-24
- Sophomore: 25-55
- Junior: 56-86
- Senior: 87+

**Humanities**
- Freshman: 1-24
- Sophomore: 25-55
- Junior: 56-86
- Senior: 87+

**Nursing**
- Freshman: 1-32
- Sophomore: 33-67
- Junior: 68-101
- Senior: 102+

**Law**
- 1st Year: 1-30
- 2nd Year: 31-58
- 3rd Year: 59-85

**Science**
- Freshman: 1-24
- Sophomore: 25-55
- Junior: 56-86
- Senior: 87+

**Social & Behavioral Science**
- Freshman: 1-24
- Sophomore: 25-55
- Junior: 56-86
- Senior: 87+

**University College**
- Freshman: 1-24
- Sophomore: 25-55
- Junior: 56-86
- Senior: 87+

**Full-Time Student Status**

Full-time status for an undergraduate student varies with the college and study program, but ordinarily requires a load of at least 12 units per semester. Full-time status for graduate students is more widely variable, depending upon assistantship or associateship duties and the composition of the individual student’s program. Students in doubt about their status should check with the dean of their college.

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**Semester Examinations**

**Mid-semester Examinations**

It is expected that all mid-semester examinations will occur during a regularly scheduled class period of the course. For those multiple-section courses in which it is impossible to offer mid-semester examinations during the regular class period, the following requirements for offering the examination at an alternate time must be met:

1. The course shall be identified in the schedule of classes as requiring combined hourly examinations at a time different from the regular class period;
2. The times at which combined hourly examinations will be given shall be listed in the schedule of classes;
3. The controlling academic dean shall approve such action in advance; and
4. Students whose schedules conflict with the time scheduled for the combined examination shall be provided an alternate time for taking the examination.

**Final Examinations**

All courses offered for credit shall include a final examination given at the regularly scheduled examination time. No deviation from the exam schedule, once it is printed, is authorized. All forms of examinations (quizzes, take-homes, etc.) are prohibited on any scheduled class day during the week in which regularly scheduled final exams begin. Specific exceptions for certain courses may be granted by obtaining prior approval from the appropriate department and academic dean. Students shall be informed of any such exceptions prior to the end of the fourth week of classes.

**The Grading System**

The grading system used by The University of Arizona follows:

- **A** - Excellent
- **B** - Good
- **C** - Average
- **D** - Poor
- **E** - Failure
- **P** - Passing (Special S/P and P/F grade)
- **F** - Failure (P/F grade)
- **S** - Superior (Special S/P grade)
- **I** - Incomplete
- **K** - Course in progress
- **W** - Approved withdrawal from a course
- **W/P**/W/F - Approved withdrawal from the University while passing/failing
- **O** - Audit
- **Y** - No Grade Submitted
- **CR** - Credit

*Included in calculation of the grade point average.

All medical students are graded on a superior/pass/fail basis for courses taken in the College of Medicine.

**Regular and Special Grades**

A, B, C, D, and E constitute the regular grades used at The University of Arizona. All courses other than “house numbered” courses use these grades. All individual studies courses and some small group courses with S (superior) and P (pass) use special grades which replace A and B grades. For explanation of these grades, see Section III, “Colleges, Departments and Courses of Instruction.”

For the grading systems available in honors individual studies courses (199H, 299H, 399H, 498H, and 499H), see the “Honors Center” in the Colleges, Departments and Courses of Instruction section of this manual.

**Pass-Fail Option**

For certain courses, a qualified student may elect to register under the pass-fail option. Under such registration, the only final grades available to the student are P (pass) or F (fail).

Undergraduate students may elect to take courses under the pass-fail option only after they have attained sophomore standing and only if they have earned grade-point averages of 2.000 or better.

Students registering for a course under the pass-fail option must meet the prerequisites or otherwise satisfy the instructor of their ability to take the course.
Undergraduate students may register under the pass-fail option for not more than two courses per semester up to a maximum of 12 courses. Further, they must carry a minimum of 12 units of regular grades other than P/F during each semester in which they elect courses under the pass-fail option. Any exceptions to this policy must be approved by the student’s academic dean.

Courses taken under the pass-fail option must be electives only, and may not be used to fulfill major, minor, or other specified curriculum requirements.

Each department decides which of its courses will be available under the pass-fail option. Pass-fail courses in the 500, 600, or 700 series may be offered only in law. Further, the instructor of the course must approve of its being offered pass-fail. The instructor shall be informed by the Registrar which students are enrolled under the pass-fail option.

Students may change from pass-fail enrollment to enrollment for a regular grade, or vice versa, only during the time period prior to the last day of the fourth calendar week during which classes are held, except with special permission of the student’s college dean.

If a course is taken under the pass-fail option, the grade of P or F will be permanently recorded. However, neither grade will be included in the average. If the course is passed, the units of credit will be applied toward graduation.

**COLLEGE OF MEDICINE**—All courses in the College of Medicine are graded on a superior-pass-fail system for medical students.

**TEACHING AND TEACHER EDUCATION**—Pass/fail grades are the only grades available for 493a and 493b. Enrollment in these courses will not reduce the amount for which a student can otherwise enroll under the pass-fail option. The pass-fail option is not generally available to graduate students. For more information about grading policies as they apply to graduate students, consult the Graduate Catalog.

**Incomplete Grade**

The grade of I may be awarded only at the end of a semester, when all but a minor portion of the course work has been satisfactorily completed. The grade of I is not to be awarded when the student is expected to repeat the course; in such a case, the grade of E must be assigned. Students must make arrangements with the instructor to receive an incomplete grade before the end of the semester. After the course work is completed, the instructor will assign the appropriate grade on a Change of Grade form and submit it to the Office of the Registrar for processing.

Incomplete grades do not enter into the calculation of the grade-point average for one year from the date of award. If the incomplete is not removed by the instructor within one year, the I grade will revert to a failing grade. For undergraduate courses, the one-year limit may be extended for cause approved by the instructor with the concurrence of the dean of the college in which the student is registered.

**Course in Progress**

For any course, other than 900-level courses, that requires more than one semester for completion, the grade of K is awarded by the Office of the Registrar at the end of the semester and carried to the next semester.

**Withdrawal Grade W:**

**Dropping a Course**

Prior to the end of the fourth week of classes, official withdrawal (drop) of a course cancels the registration for the course. A dean’s approval is not required. No grade for the course will appear on the student’s permanent record. During weeks five through eight, the grade of W is awarded to students who are passing at the time of withdrawal. The grade of E may be awarded to students not passing at the time of withdrawal. Either W or E will show on the student’s permanent record.

After the eighth week of classes, the grade of W can be awarded only with the approval of the student’s academic dean, and only under exceptional circumstances. The W may also be awarded in the case of complete withdrawal from the University.

**Withdrawal Grades W/P, W/F:**

**Complete Withdrawal from the University**

In the case of complete withdrawal from the University, if a student withdraws before the 21st academic day of the semester, the Registrar cancels his/her registration and no classes show on the student’s transcript. If a student withdraws from the University between the 22nd day and the last day of classes, the faculty member for each course may assign a grade of W/P (withdrawal while passing), or W/F (withdrawal while failing). Neither grade is used to calculate the GPA. The refund schedule is listed for each term in the Schedule of Classes.

**Audit Grade**

The grade of O is awarded for courses taken for audit. This grade is not awarded unless the student is registered for audit.

**Y Grade**

The grade of Y is issued to all students in a course whose instructor failed to meet the grade reporting deadline at the end of the term. This grade will not be issued to any student in a course if other students in the same course were awarded grades by the instructor.

**Averaging of Grades**

For the purpose of computing grade point averages, grade points are assigned to each grade as follows: A, 4 points; B, 3 points; C, 2 points; D, 1 point; and E, 0 points. To calculate the grade-point average, the unit value for each course in which a student receives one of the above grades is multiplied by the number of grade points for that grade. The sum of these products is then divided by the sum of the units of A, B, C, D, and E. The grade point average is based only on work attempted for University credit at The University of Arizona and upon the results of Special Examinations for Grade.
Change of Grade
Within one year of the awarding of the grade, final grades may be changed by the instructor on a change-of-grade form, only if there has been an error in computation. The grade change must be approved by the head of the instructor's department.

Academic Renewal
Under certain circumstances, an undergraduate student may apply to the Office of the Registrar for academic renewal. Academic renewal allows students to have grades for a particular period of time excluded from the grade point average. If the qualifications are met, the student may have a maximum of four consecutive semesters of course work disregarded in all calculations regarding academic standing, grade point average, and eligibility for graduation. If summer work is included in the work to be disregarded, a five-week summer term shall count as one-half semester.

To qualify for academic renewal, the following conditions must be met:

1. At the time the request is filed, a minimum of five years shall have elapsed since the most recent course work to be disregarded was completed.
2. In the interval between the completion of the most recent course work to be disregarded and the filing of the request, the student shall have completed a minimum of 30 units of regularly graded course work at the University with a minimum grade-point average of 2.500 on all work completed at the University in that interval.
3. If more than one semester or term is to be disregarded, these shall be consecutive, completed within a maximum of two calendar years, and with no intervening enrollments at the University. The maximum of two calendar years may be extended by one semester, if the time period includes a semester of involuntary absence by reason of disqualification.

If the student satisfies the conditions under this policy, the Office of the Registrar will annotate the student's permanent academic record to indicate that no work taken during the disregarded semester(s) or term(s), even if satisfactory, may apply toward graduation. However, all work will remain on the record, ensuring a true and accurate academic history.

Academic renewal may be effected only once during a student's undergraduate academic career and is not available to students who have completed requirements for a bachelor's degree.

Repeating a Course
Students wishing to repeat course work at The University of Arizona may elect one of the following options:

Establishment of Credit: Undergraduate students may repeat any course for which they have received an E or W. They may repeat this course as many times as necessary to establish credit.

First and Second Attempt Averaging: Undergraduate students may repeat only once any course in which they have received original grades of C or D. Grade-point average will be computed by averaging grades earned in the first and second attempt. Original grades of A or B may not be repeated, except as specifically provided by departments on a course-by-course basis. Credit will be allowed only once unless the course is designated "repeatable for credit" by the department.

Grade Replacement Opportunity Policy (GRO)
Undergraduates who have not received a bachelor's degree from the University may replace only once courses in which they received the grades of C, D, or E. Three courses not to exceed a maximum of 10 units may be replaced. Students must file a request with the Registrar within the first four weeks of summer term, Preession, or Winter Session.

Grades earned in the first and second attempt will remain on the academic record, but the grade earned in the second attempt will be used in the grade point average, even if lower than the first attempt. In cases in which a student passes the first attempt, but fails the repeat attempt, the failing grade is calculated in the grade-point average; however the units earned in the first attempt may be applied toward degree requirements.

A repeat attempt grade of O or W will count as an attempt, but neither will replace the grade of the first attempt. A repeated course will replace only one previous grade. Credit by Exam, Grade by Exam, Independent Study, Correspondence Courses, and Pass/Fail courses may not be repeated under GRO. Use of this grading option in Tier 1 courses is limited to courses with the same title and subtitle as well as the same course number.

The Registrar is not responsible for any changes made to courses (course cancellation, unit change, time change, etc.) by any other university office. It is the student's responsibility to notify the Office of the Registrar, Administration 210, of any change that may affect registration in the course being repeated.

Grade Appeal Policy and Procedure
A student may appeal a grade by using the following procedures. Where mentioned, the words college, dean, and department head are the department or college in which the course being appealed is offered. All time lines refer to the first regular semester after the semester or summer term in which the grade was awarded. Grade appeals are not processed during the summer sessions unless the dean determines a case warrants immediate review.

Written verification of each step below is critical. Steps three, five, and seven require the student to submit a written appeal. Therefore, either mail the appeal via return receipt or deliver it to the appropriate office and have a staff member verify the date and time of delivery. The dean's decision on whether or not the deadlines have been met is
The dean has authority to extend the deadlines, but only in extraordinary circumstances shall the appeal extend beyond the first regular semester.

Step 1: Within the first five weeks of the semester, the student should discuss their concerns with the course instructor, stating the reasons for questioning the grade. If the instructor is a teaching assistant/associate and this interview does not resolve the difficulty, the student shall discuss the problem with the person in charge of the course.

Step 2: Within the first five weeks of the semester, the student shall go to the college dean’s office to obtain any requisite forms and to review directions. The student must attest in writing that s/he has informed the instructor s/he intends to file a grade appeal.

Step 3: Within the first five weeks of the semester, the student shall carefully formulate an appeal in writing, and submit it to the instructor with a copy to the department head.

Step 4: Within two weeks from the date of receipt of the student’s written statement, the instructor shall respond to the student in writing. The instructor should explain the grading procedures and how the grade in question was determined as well as other issues raised in the student’s statement.

Step 5: If the instructor is not available or does not resolve the matter within the two-week period, the student shall, within one week thereafter, readdress and submit the written appeal to the department head.

Step 6: The department head has two weeks to consider the student’s written statement, the instructor’s written statement, and confer with each. The department head, who does not have the authority to change the grade, shall inform the instructor and the student in writing of his/her recommendation. If a grade change is recommended, the instructor may refuse to accept the recommendation. The instructor shall notify the department head and the student in writing of his/her decision.

Step 7: If the department head does not act on or resolve this matter within a two-week period, the student shall, within one week thereafter, readdress and submit the written appeal to the dean.

Step 8: The dean shall convene a committee to review the case. The committee consists of five members. Faculty representatives include one from the department of the instructor concerned, and two from closely related departments or colleges. The student council of the college provides two student representatives. Student representatives shall be full-time upper-division undergraduate students for appeals by undergraduate students or full-time graduate students for appeals by graduate students.

If the college does not have an appropriate student council, the Associated Students at The University of Arizona (ASUA) shall appoint the student members. All student members must be in good academic standing in that college.

Within the structure provided by the dean, the committee shall design its own rules of operation and select a chair other than the faculty representative from the department concerned. The student and instructor shall represent themselves. The committee may, or may not (a) meet separately with the student, the instructor, and the department head; (b) request each party to submit a brief written summary statement of the issues, and/or (c) interview other persons who have relevant information.

If feasible, the committee should meet with the student and the instructor together in an attempt to resolve the difference. The committee shall consider all aspects of the case before making its recommendation. The committee shall make a written report with recommendations and provide copies to the student, the instructor, the department head, and the dean.

Step 9: The dean shall make a final decision after full consideration of the committee’s recommendation and within four weeks of receiving the student’s appeal. The dean has the authority to change the grade and the registrar shall accept the dean’s decision. The department head, the instructor, and the student shall be notified in writing of the dean’s decision.

Graduation Requirements and Credit Requirements

Graduation Average
A graduation average of 2.00 for all University Credit course work undertaken and for any work satisfied by the Special Examination for Grade is required for the bachelor’s degree.

Note: The graduation grade average is based only on University Credit.

Major Average
Majors for undergraduate degrees require an average of 2.00 or better for all University Credit work undertaken in the major field or for any work satisfied by the Special Examination for Grade if in the major.

Averaging of Grade for Final Non-University Credit Course
Students who lack not more than a one-semester course toward the fulfillment of curriculum and minimum-graduation-credit requirements, may apply as the final course to complete the degree, a single one-semester course in residence at another accredited institution or in correspondence work through The University of Arizona. Permission must be obtained from the academic dean, prior to enrolling for the course, to apply the grade received in such a course toward the graduation average. This provision may be applied also to the required separate average of 2.00 in the major field if prior permission is obtained from the major professor and the academic dean.
University Credit Requirement
A minimum of 30 units of university credit from The University of Arizona is required for the bachelor's degree. It is further required that 18 of the final 30 units offered toward the degree be University Credit. Various departments have specific University Credit requirements for their majors, and students should consult individual departments for this information. For a definition of University Credit, see “University Credit” under Definitions in the General Information section of this manual.

For credit requirements for a specific undergraduate degree program, consult the On Course! Academic Program Requirements Report (APPRR) for that major. APRRs may be accessed through the electronic catalog or directly at http://www.arizona.edu/academic/oncourse/data/interface/

Upper-Division Unit Requirement
The University of Arizona recognizes both breadth and depth of knowledge as important characteristics of a baccalaureate degree. To insure depth of study beyond introductory levels, the University has a general policy requiring students to complete a minimum of 42 units of upper-division course work for graduation. This requirement applies to students graduating under the 1991-93 catalog or any subsequent catalog.

The special requirements of some academic programs may necessitate an exception to this requirement. For current information, students should consult their advisors, the department which offers their major, or the On Course! Academic Program Requirements Report for their major to determine if their degree program may require fewer than 42 units of upper-division credit.

Correspondence And Credit By Examination Credit Maximums
A maximum of 60 units toward a bachelor's degree may be earned through correspondence credit and/or credit by examination.

Minimum Units Required for Baccalaureate Degrees
Colleges or schools, with the approval of the University faculty and the Arizona Board of Regents, establish the minimum number of units needed to receive a bachelor's degree. The major which a student selects determines the degree which the student will receive. Total minimum number of units for completion of the baccalaureate degree varies by college and by degree program. No University of Arizona program requires less than 120 units; some programs require substantially more than 120 units.

For information about minimum number of units for a specific degree program, consult the electronic catalog at http://catalog.arizona.edu, or contact the college that administers the program.

Undergraduate Minor Requirements
Colleges or schools, with the approval of the University faculty and the Arizona Board of Regents, establish the minimum numbers of units needed to complete an undergraduate minor administered within that unit. No University of Arizona minor requires fewer than 18 units; some minors require more than 18 units. In most cases, at least nine of the 18 units must be upper-division units.

For information about minimum number of units for a specific minor, consult the electronic catalog at http://catalog.arizona.edu, or contact the department that administers the minor. A list of approved minors and minor requirements is available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

Each college determines whether or not its degrees must include a minor; however, a college may not preclude a student from declaring an existing minor. Minors are discipline-based; the discipline that labels the minor defines its content. Certification of a minor at the point of degree audit for graduation indicates that the student has met the requirements specified by the discipline defining the minor.

Any variation from the prescribed content must be approved by the minor discipline. For information about course requirements for a specific minor, consult the electronic catalog at http://catalog.arizona.edu, or contact the department that administers the minor.

Students also have the option of declaring a thematic minor. The thematic minor is developed around a theme identified by the student, using courses from two or more disciplines. The major advisor must approve all thematic minors. For more information about the approval process for thematic minors contact your major advisor.

Courses excluded from the minor: freshman composition, math courses below Math 124, military aerospace studies, military or naval science, activity courses in physical education, and first-year courses in foreign language and American Sign Language that are also used to satisfy the second language requirement in general education.

Application For Bachelor's Degree Candidacy
The University awards degrees three times annually: in May, August and December. Candidates for bachelor's degrees are required to file for degree candidacy at either the Graduation Services Office, Administration 305, or within the college, according to the following schedule:

<table>
<thead>
<tr>
<th>Date of Application filed</th>
<th>Degree</th>
</tr>
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<tbody>
<tr>
<td>May</td>
<td>no later than:</td>
</tr>
<tr>
<td></td>
<td>May 1 of the year preceding graduation</td>
</tr>
<tr>
<td>August</td>
<td>Aug. 1 of the year preceding graduation</td>
</tr>
<tr>
<td>December</td>
<td>Dec. 1 of the year preceding graduation</td>
</tr>
</tbody>
</table>

Changes In Degree-Application Information
Once a degree application has been filed, applicants are required to notify the Graduation Services Office promptly of subsequent changes in the following information:

1. anticipated date of graduation
2. degree, major, option, minor, catalog being used
3. name, local address and telephone number, permanent address

Failure to notify the office may result in delay in awarding of the degree.
After the application has been filed, the applicant becomes responsible for completing all degree program requirements by the last day of final exams in the semester or term in which the degree is to be awarded. The applicant is also responsible for providing all documentation relating to the completion of his/her degree program to the Undergraduate Academic Records and Graduation Services Office within 30 calendar days following the last day of final exams in the semester or term in which the degree is to be awarded.

Documentation may include, but not be limited to, official transcripts from other educational institutions/programs, actions resulting from University General Petitions, Change of Grade forms (including removals of I grades), etc. Failure to meet these responsibilities may result in a delay or non-awarding of the degree.

Completion of Degree Requirements In Absentia
Degree candidates who leave The University of Arizona and complete final course requirements through correspondence or transfer work are required to notify the Academic Records and Graduation Services Office of such plans before leaving the University.

Second Bachelor's Degree
Candidates for a second bachelor's degree at The University of Arizona must offer no fewer than 30 units in addition to the units required for the first degree, and must meet all requirements for the second degree. The additional units may be completed concurrently with those applying on the first degree; however, at least 30 units of UA credit must be completed for each degree.

Clearance of Accounts
Degree candidates are required to clear any indebtedness to the University before completion of degree requirements will be officially certified or the diploma released.

Collection of Fees Policy
From Arizona Board of Regents Policy Manual 4-103 (9/83)
A. The universities shall collect at the time of registration the payment or promise of payment of only those fees which are required for the proper operation of the universities and which are subject to the control of and disbursement by the universities.

B. 1. Each university shall establish procedures to collect outstanding obligations owed by students and former students.

2. Each university shall maintain a system to record all delinquent financial obligations owed to that university by students and former students.

3. Students with delinquent obligations shall not be allowed to register for classes, receive cash refunds, or obtain transcripts, diplomas, or certificate of degree. The university may allow students to register for classes, obtain transcripts, diplomas, or certificate of degree if the delinquent obligation is $25 or less.

4. Unpaid obligations shall remain a matter of record until students and former students satisfy their financial obligations or until satisfactory arrangements for repayment are made with the University.

5. The university may write off delinquent financial obligations of students according to accepted accounting principles and after appropriate collection efforts. No such write-off shall operate to relieve the student for liability for the obligation nor shall such write-off entitle the student to release of any transcript, diploma, or certificate of degree or to register for further university classes until such obligation is actually paid.

6. Each university shall include this policy in its bulletin or catalog.

Academic Honors and Awards
University Academic Honors
Honors are bestowed as recognition of outstanding academic achievement and as a means to further encourage sound scholarship. They are awarded to every undergraduate student attaining the required proficiency. For some awards, students also receive plaques and certificates. The University of Arizona supports academic achievement and is pleased to recognize and reward undergraduate students whose performance merits special attention.

Dean's List
Three categories are awarded every semester based on units completed for credit and letter grade (excluding all Pass/Fail and S grades). Also, all grades of I must be made up before the honor is bestowed.

1. Dean's List with Distinction is based on 15 units and a 4.000 grade point average.

2. Dean's List is based on 15 units and a grade point average of 3.500-3.999.

3. Honorable Mention is based on 12 units of 3.500 and above grade point average.

Students awarded these academic honors receive a certificate at the Honors Convocation the following fall. This recognition becomes part of the official record and appears on the transcript.

Academic Distinction
Two categories are awarded annually based on units completed for credit and letter grade (excluding all Pass/Fail and S grades). Also, all grades of I must be made up before the honor is bestowed.

1. Highest Academic Distinction is based on 30 units and a 4.000 grade point average.

2. Academic Distinction is based on 30 units and a grade point average of 3.500-3.999.

Students awarded these academic honors are recognized at the Honors Convocation the following fall. Those students with a 4.000 grade point average receive plaques. Those students with a 3.500-3.999 grade point average receive certificates.

Graduation with Academic Distinction
Three categories are awarded for superior scholarship in work leading to the bachelor's degree. This honor, based upon graduation grade-point average, becomes
Graduation with Honors

Graduation with Honors is bestowed on students who have completed all requirements of the University-wide Honors Program. This academic recognition becomes part of the official record and is noted on the transcript and diploma of the recipient. Honors students also wear a special stole at graduation.

Other Awards and Honors

Other awards and honors in recognition of outstanding academic achievement are bestowed through various colleges and departments. Also, colleges and departments offer participation in discipline-based honor societies and associations. Interested students should contact departmental and college advisors.

Leaving the University

Withdrawal

A withdrawal from UA is defined as leaving the University by dropping all classes after having paid registration fees. A student who withdraws from the University will receive either a WP (withdrawal while passing) or a WF (withdrawal while failing) in each course: the grade awarded will depend in each case on the student's standing in the course at the time of withdrawal.

Students are allowed seven days to complete the withdrawal process after initiating the procedure in the Dean of Students Office; however, no withdrawal may be initiated after the last day of classes of any semester and must be completed before the beginning of the final examination period. Consult the Schedule of Classes for detailed instructions and deadlines.

Undergraduate Student Leave of Absence

The undergraduate student leave of absence allows students to return after a one- or two-semester absence from campus. Students with this status need not apply for readmission, or pay readmission fees, and they may register for classes during their priority registration period. A leave of absence is granted through a student's college dean's office.

Nursing students must follow the procedure for taking a leave of absence defined in the college's Baccalaureate Student Handbook. International students who wish to take a leave of absence should contact the Center for Global Student programs (621-4627).

Application deadlines are the first day of the next semester or term. Final decisions regarding approval or disapproval of leave of absence requests will not be available until the posting of grades for the semester immediately preceding the term for which the leave is requested. Students should note that the timing of the final decision is such that notification may be made as little as one day prior to the beginning of a term for which a leave has been requested. Students should plan accordingly.

To qualify, a student must satisfy the following criteria:

a. be registered during the semester immediately prior to the beginning of the leave;

b. have a cumulative GPA of at least 2.0—both at the time of application for leave and following the posting of grades for the semester immediately preceding the term of the requested leave of absence;

c. have his or her University account paid in full, both at the time of leave application and following the posting of grades for the semester immediately preceding the term of the requested leave of absence;

d. have no pending disciplinary action.

While on a leave of absence, UA:

a. reports enrollment status to lenders and loan service entities as “not attending”;

b. suspends students insurance and use of University facilities.

Should a student not return at the end of an approved leave, s/he must apply for readmission and comply with readmission rules.

College contacts:

Agriculture
Paul Kohn
Forbes 211, 621-1374

Architecture
Susan Moody
Architecture 104, 621-6751

Fine Arts
Academic Student Services, Music 113, 621-1301

University College
Any advisor
Bear Down Gym 102, 621-7763

Humanities, Science
Social & Behavioral Sciences
Office of Academic Services
Modern Languages, 347 621-3336
Academic Policies & Graduation Requirements

Business & Public Administration
Undergraduate Programs
McClelland Hall 103, 621-2505

Engineering and Mines
Engineering 200, 621-6032

Nursing
Mary Henkel
Nursing 107, 626-6161

Education
Office of Student and Career Services
Education 247, 621-7865

Pharmacy
Pharmacy 344, 626-1427

School of Health Professions
Ina Gittings 101, 621-6989

Dismissal from Courses or From the University
Reprehensible conduct or failure to comply with university regulations may result in a student’s dismissal from a course or from the University at any time. The Dean of Students Office is responsible for this procedure. Such action may be posted on the student’s academic record. Students suspended from the University are denied student privileges during the period of suspension, and may not register for correspondence work except with permission of the dean of the college in which they have previously registered. They may not enroll in Extended University courses, nor establish credit by examination during the period of suspension.

Medical Withdrawal
Medical withdrawal is initiated from the Student Health Service. Adequate medical documentation must be supplied by the student. Students who withdraw from the University for medical reasons and who are medically encumbered must have their readmission approved by the Campus Health Service.

Retroactive Withdrawal
Under appropriate circumstances a student may petition for withdrawal after completion of classes for a term. If the student has experienced severe physical or psychological stress of such nature as to prevent satisfactory completion of course work in the semester or term in question, the student may petition for retroactive withdrawal for all courses taken that semester or term. This petition must be accompanied by adequate documentation and filed with the dean of the student’s college.

Time Limit for Obsolete Course Work
In areas of study in which the subject matter changes rapidly, material in courses taken long before graduation may become obsolete or irrelevant. Courses or degree requirements which are more than eight years old are applicable toward completion of a degree at the discretion of the student’s major department.

Accreditation may limit the applicability of courses or degree requirements to less than eight years. Departments may approve, disapprove, or request that the students revalidate the substance of such courses. Students whose programs include courses that will be more than eight years old at the expected time of graduation should consult with their major department at the earliest possible time, to determine acceptability of such courses.
Colleges, Departments and Courses of Instruction

This section provides information about each college of the campus as well as those schools, departments, committees, and divisions that participate in degree programs. General information about current university degree programs and courses is also available in this section. For more detailed information about undergraduate majors and degree requirements, consult the electronic catalog at http://catalog.arizona.edu/.

Organization of this section
Following the introductory information about course listings, the information in this section is organized alphabetically by academic unit. Each college section includes basic information about the college, including the schools, departments and divisions administered by the college; the degrees conferred; the majors available; and descriptions of current courses. Undergraduate majors are listed again with the department that offers each major. Course descriptions are found under the college or department section in which they are offered.

Course listing information
Curricular Changes
Course listings are subject to change without notice. For the most up-to-date information about university course offerings, consult the electronic catalog.

Class Schedules
To confirm or identify the semester of offering for any course, students should consult the Schedule of Classes for each term. Schedules for fall and spring classes are available in April and October, respectively. The Summer Session Schedule of Classes is available in February.

Prerequisites
Students must meet the course prerequisites or otherwise satisfy the instructor of his or her preparation to take the course. Prerequisites can be waived only at the discretion of the instructor or department involved.

Special course fees and deposits
Special course fees and deposits are applicable only under certain conditions and must be approved by the Provost and/or the Arizona Board of Regents. Fees for off-campus field trips, specialized equipment or facilities, private instruction, expendable materials and refundable deposits for equipment entrusted to students care may be assessed. Special course fees are identified in the Schedule of Classes for the term in which the course is offered.

How to Read Course Descriptions
Following is a standard course description with the individual symbols explained in the order in which they appear in the description.

Sample Course Listing:
#406. Social Structure in Modern Societies (3) [Rpt.] I 1991-92 GRD
Critical review of modern theory and research on social structure and social organization in modern societies. 2R, 3L. P, 6 units of sociology or CR. (Identical with HIST 406.) May be convened with 506. Special Fee. Smith

Explanation:
#406. Course number. #Indicates course meets gender, race, class, ethnicity, non-Western Civilization requirement.

Social Structure in Modern Societies
Course title.

(3) Number of units.

[Rpt.] May be repeated for credit. A restriction regarding the number of times a course may be repeated for credit (beyond the student’s first enrollment) or the total number of units of credit permitted for a course may be designated. [Rpt.] indicates that the course may be repeated for credit once, for a total of two enrollments. [Rpt/2] indicates that the course may be repeated for credit twice, for a maximum of three enrollments in the course; [Rpt/6 units] means that the course may be repeated until the student has received a total of six units of credit. It is the student’s responsibility to ensure that course content is not duplicated.

I Semester in which course is usually offered. I indicates fall semester; II, spring; S, summer. To ascertain course offerings for a particular semester, consult the Schedule of Classes.

1991-92 Year in which course is offered. If no year designation is given, the course is offered each year.

GRD/CDT GRD and CDT indicate that the course is available by examination. GRD indicates that the course is available by examination for a grade and credit, and CDT indicates that the course is available by examination for credit only. These options are not available for graduate credit.

Critical review... societies Course description.

2R, 3L Class structure. R, L, S, and D indicate “recitation,” “laboratory,” “studio,” and “discussion,” 2R, 3L indicates that the class meets for two hours of recitation and three hours of laboratory per week (based upon 15 weeks). For courses consisting of recitation (lecture) periods only, the number of class hours per week is the same as the unit value and is not specified in the course listing.

In addition to the above abbreviations for class structure, the College of Engineering & Mines uses the abbreviations ED and ES to designate the number of units in the areas of “engineering design” and “engineering science.” Thus 1ED, 2ES signifies that the course meets the requirement for 1 unit of engineering design and 2 units of engineering science.

P Prerequisites. Identifies courses or other experiences which must be completed prior to enrolling in the course listed.

CR Concurrent registration. Identifies courses which must be taken during the same term as the course listed.

(Identical with HIST 406) Cross listing. Identifies other departments which give credit for the same course. The complete course listing is shown in the course list of the “home” department which has instructional responsibility for the course. An abbreviated listing appears in the course list of the “cross listing” department. Exceptions are house-numbered courses, which do not have course descriptions.
May be convened with 506 Certain 400- and 500-level courses with the same number and title may be convened jointly. Students may receive credit for such courses only once, whether jointly convened or separately, unless designated [Rpt.] or unless special approval is granted by the student's major advisor. The 500-level listing designates additional requirements for graduate credit.

Special fee Special course fees apply.

Smith Professor in charge.

Note: Not all of the above information may be noted in any individual course.

Course numbering classification system

Semester Courses (Single Numbers)
A course designated by a single number (as ECON 248) is one semester in length.

Year Courses (Double Numbers)
A course designated by a double number (as POL 233a-233b) is continued through two successive semesters, the work of the first semester being prerequisite to that of the second unless otherwise indicated in the statement of prerequisites.

The number by which a course is designated indicates the level of the course. Courses are numbered as follows:

100-299: Lower-division courses primarily for freshmen and sophomores.

100-199: Primarily introductory and beginning courses.


300-499: Upper-division courses primarily for juniors and seniors.

500-599: Graduate courses. Open to exceptionally well-qualified seniors with the prior written approval of the course instructor and the Graduate College.*

600-699: Graduate courses. Not open to undergraduate students.

700-799: Graduate courses limited to doctoral students.

800-899: Courses limited to students working toward degrees offered by the College of Medicine or the College of Pharmacy. Not available for credit toward other degrees.


*Certain 400- and 500-level courses with the same number and title may be convened jointly. Students may receive credit for such courses only once, whether jointly convened or separately, unless designated [Rpt.] or unless special approval is granted by the student's major advisor.

University-wide "house-numbered" courses

Most University of Arizona courses use a combination of lectures, discussions, and laboratories as their basic teaching format. University-wide "house" numbers identify three categories of courses using alternative teaching formats: (1) courses which designate special senior-level undergraduate research or projects, (2) courses offered in small group settings, and (3) courses taught on an individual basis.

498. Senior Capstone (credit varies). A culminating experience for majors involving a substantive project that demonstrates a synthesis of learning accumulated in the major, including broadly comprehensive knowledge of the discipline and its methodologies. Senior standing required.

Grades Available: A, B, C, D, E, I, P/F, S/P*, W.

500-599: Graduate courses. Open to exceptionally well-qualified seniors with the prior written approval of the course instructor and the Graduate College.*

600-699: Graduate courses. Not open to undergraduate students.

700-799: Graduate courses limited to doctoral students.
change of ideas and practical methods, skills, and principles.


*Special (i.e., S,P,C,D,E) or regular grades may be used as departmental policy dictates; however, in any single course offering, all registrants must be graded by the same system.

Individual-studies courses are those with numbers ending in 91, 93, 94, and 99, as well as all 900-level courses. Under their generic numbers and titles, these courses, with prior approval of the responsible faculty member, may be selected by a student in any department even though the courses are not listed in the departmental course offering section.

191, 291, 391, 491, 591, 691, 791. Preceptorship (Credit varies.) Specialized work on an individual basis, consisting of instruction and practice in actual service in a department, program, or discipline. Teaching formats may include seminars, in-depth studies, laboratory work and patient study.

Grades Available: S/P, C, D, E, I, W.

193, 293, 393, 493, 593, 693, 793. Internship (Credit varies) Specialized work on an individual basis, consisting of training and practice in actual service in a technical, business, or governmental establishment.

Grades Available: S/P, C, D, E, I, W.

194, 294, 394, 494, 594, 694, 794. Practicum (Credit varies) The practical application, on an individual basis, of previously studied theory and the collection of data for future theoretical interpretation.

Grades Available: S/P, C, D, E, I, W.

199, 299, 399, 499, 599, 699, 799.* Independent Study (Credit varies) Qualified students working on an individual basis with professors who have agreed to supervise such work.

Grades Available: S/P, C, D, E, I, W.

*Graduate students doing independent work which cannot be classified as actual research will register for credit under course number 599, 699, or 799.

900. Research (Credit varies) Individual research, not related to thesis or dissertation preparation, by graduate students.

Grades Available: S/P, C, D, E, K, W.

908. Case Studies (Credit varies) Individual study of a particular case, or report thereof.

Grades Available: S/P, C, D, E, K, W.

909. Master's Report (Credit varies) Individual study or special project or formal report thereof submitted in lieu of thesis for certain master's degrees.

Grades Available: S/P, E, K, W.

910. Thesis (Credit varies) Research for the master's thesis (whether library research, laboratory or field observation or research, artistic creation, or thesis writing). Maximum total credit permitted varies with the major department.

Grades Available: S/P, E, K, W.

915. Master's Recitals (Credit varies) For master's students in music performance.

Grades Available: S/P, E, K, W.

920. Dissertation (1 to 9) Research for the doctoral dissertation (whether library research, laboratory or field observation or research, artistic creation, or dissertation writing).

Grades Available: S/P, E, K, W.

925. Doctoral Recitals (1 to 9) For doctoral students in music performance.

Grades Available: S/P, E, K, W.

930. Supplementary Registration (1 to 9) For students who have completed all course requirements for their advanced degree programs. May be used concurrently with other enrollments to bring to total number of units to the required minimum.

Grades Available: K.

4931, 5931. Legislative Internship [493 (12), 593 (9)] II Working experience at the Arizona State Legislature; responsibilities draw upon student's area of major expertise and include preparing written and oral reports, summarizing legislative proposals, and providing information to legislators and legislative committees. Participating programs include but are not limited to: architecture, economics, English, geography and regional development, history, hydrology, journalism, management, management information systems, marketing, political science, psychology, public administration, secondary education, sociology, statistics, and urban planning. Students in other programs are eligible and should consult the department head or, in the case of the College of Law, the dean, for appropriate arrangements.

Grades Available: A, B, C, D, E, I, W.

915. Master's Recitals (Credit varies) For master's students in music performance.

Grades Available: S/P, E, K, W.
# Accounting (ACCT)

**Baccalaureate Degree**
Bachelor of Science in Business Administration (B.S.B.A.)

**Graduate Degree**
Master of Accounting (M.Ac.)

**Program Requirements**
For undergraduate academic Program Requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/ondcourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/ondcourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

## Accounting (ACCT)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 210</td>
<td>Introduction to Managerial Accounting</td>
<td>3</td>
<td>This course covers concepts and procedures of fund accounting for partnerships. P, ACCT 400B, advanced standing in the College of Business and Public Administration. Credit allowed for one of these courses: ACCT 420, ACCT 520. May be convened with ACCT 520.</td>
</tr>
<tr>
<td>ACCT 200</td>
<td>Introduction to Financial Accounting</td>
<td>3</td>
<td>This course covers concepts and procedures of fund accounting for corporations. P, ACCT 310, advanced standing in the College of Business and Public Administration. Credit allowed for one of these courses: ACCT 420, ACCT 520. May be convened with ACCT 520.</td>
</tr>
<tr>
<td>ACCT 310</td>
<td>Analytical Procees for Financial Statements</td>
<td>3</td>
<td>This course covers concepts and procedures of fund accounting for corporations. P, ACCT 310, advanced standing in the College of Business and Public Administration. Credit allowed for one of these courses: ACCT 420, ACCT 520. May be convened with ACCT 520.</td>
</tr>
<tr>
<td>ACCT 400A</td>
<td>Principles of Accounting</td>
<td>4</td>
<td>This course covers concepts and procedures of fund accounting for corporations. P, ACCT 310, advanced standing in the College of Business and Public Administration. Credit allowed for one of these courses: ACCT 420, ACCT 520. May be convened with ACCT 520.</td>
</tr>
<tr>
<td>ACCT 400B</td>
<td>Intermediate Financial Accounting</td>
<td>3</td>
<td>This course covers concepts and procedures of fund accounting for corporations. P, ACCT 310, advanced standing in the College of Business and Public Administration. Credit allowed for one of these courses: ACCT 420, ACCT 520. May be convened with ACCT 520.</td>
</tr>
<tr>
<td>ACCT 420</td>
<td>Advanced Federal Taxation</td>
<td>3</td>
<td>This course covers concepts and procedures of fund accounting for corporations. P, ACCT 310, advanced standing in the College of Business and Public Administration. Credit allowed for one of these courses: ACCT 420, ACCT 520. May be convened with ACCT 520.</td>
</tr>
<tr>
<td>ACCT 422</td>
<td>Advanced Federal Taxation</td>
<td>3</td>
<td>This course covers concepts and procedures of fund accounting for corporations. P, ACCT 310, advanced standing in the College of Business and Public Administration. Credit allowed for one of these courses: ACCT 420, ACCT 520. May be convened with ACCT 520.</td>
</tr>
<tr>
<td>ACCT 425</td>
<td>Accounting Theory and Institutions</td>
<td>3</td>
<td>This course covers concepts and procedures of fund accounting for corporations. P, ACCT 310, advanced standing in the College of Business and Public Administration. Credit allowed for one of these courses: ACCT 420, ACCT 520. May be convened with ACCT 520.</td>
</tr>
<tr>
<td>ACCT 431</td>
<td>Principles of Auditing</td>
<td>3</td>
<td>This course covers concepts and procedures of fund accounting for corporations. P, ACCT 310, advanced standing in the College of Business and Public Administration. Credit allowed for one of these courses: ACCT 420, ACCT 520. May be convened with ACCT 520.</td>
</tr>
<tr>
<td>ACCT 510</td>
<td>Inference in Accounting and Auditing</td>
<td>3</td>
<td>This course covers concepts and procedures of fund accounting for corporations. P, ACCT 310, advanced standing in the College of Business and Public Administration. Credit allowed for one of these courses: ACCT 420, ACCT 520. May be convened with ACCT 520.</td>
</tr>
</tbody>
</table>

The University of Arizona

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URL: http://www.bpa.arizona.edu/bpa_departments/acct/index.html

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.
Graduate-level requirements include a special project. P, ACCT 520. May be convened with ACCT 422.

525. Accounting Theory and Institutions (3) I
   For a description of course topics see ACCT 425. Graduate-level requirements include a special project. P, ACCT 520. May be convened with ACCT 425.


529. International Accounting and Taxation (3) I For a description of course topics see ACCT 429. Graduate-level requirements include a special project P, ACCT 522 or consent of instructor. May be convened with ACCT 429.

531. Principles of Auditing (3) I II For a description of course topics see ACCT 431. Graduate-level requirements include a special project P, ACCT 500B, MBA candidates only. May be convened with ACCT 431.

535. Seminar in Auditing (3) II Analysis and discussion of current topics in auditing. P, ACCT 531.


553. Financial Accounting (3) I II For a description of course topics see ACCT 451. Graduate-level requirements include a special project P, ACCT 500B. May be convened with ACCT 451.

569. Managerial Accounting (3) I II Concepts and analytic procedures necessary for the generation and use of accounting data in management planning and control. P, ACCT 550, MBA candidates only.

599. Independent Study (1-3) [Rpt.]


796. Seminar
   a. Auditing (1-3) I II
   b. Managerial Accounting (1-3) I II
   c. Taxation (1-3) I II (Identical with FIN 696C)
   d. Accounting Theory (1-3) I II (Identical with FIN 696D)
   e. Behavioral (1-3) I II

699. Independent Study (1-5) [Rpt.]

797. Workshop
   a. Research Design (1-3) [Rpt./6 units] I II P. Open only to Ph.D. students in accounting.

799. Independent Study (1-3) [Rpt.]

900. Research (1-3) [Rpt.]

930. Supplementary Registration (1-9) [Rpt.]

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**Aerospace and Mechanical Engineering (A ME/NEE)**

The University of Arizona
PO Box 210119
Tucson AZ 85721-0119
Phone: (520) 621-2235,
FAX (520) 621-3885
URL: http://www.arizona.edu/

**Baccalaureate Degrees**

Bachelor of Science in Aerospace Engineering (B.S.Ae.E.)

Bachelor of Science in Mechanical Engineering (B.S.M.E.E.)

**Graduate Degrees**

Master of Science (M.S.)

Doctor of Philosophy (Ph.D.)

**Majors and Degrees**

Aerospace Engineering (B.S.Ae.E., M.S., Ph.D.)

Aerospace Engineering (B.S.Ae.E., M.S., Ph.D.)

**Program Requirements**

For undergraduate academic program requirements, consult the *On Course! Academic Program Requirements Reports (APRPs)*. APRPs for all undergraduate majors are available on line at http://www.arizona.edu/academic/oncourse/data/interfac1e/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interfac1e/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above. To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

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**Aerospace and Mechanical Engineering (A ME)**

195. Colloquium
d. Our Future in Space and Space in Our Future (1) I Field trips.

199. Independent Study (1-3) [Rpt.]

230. Thermodynamics (3) I II Basic laws and an incompressible viscous and inviscid flows. Control volume formulation of conservation Equations, dimensional analysis, viscous pipe flow, fluid machinry, boundary layer concepts and drag. 3ES P, AME 250, MATH 254.

232. Gas Dynamics (3) I II Homentropic flow with area changes, normal and oblique shocks, one-dimensional flows with friction and heat addition, choking, method of characteristics, applications. 2 ES, 1ED, P, A ME 300, MATH 254.

234. Aerospace Structures (3) I II Application of the principles of mechanics to the structural analysis of aerospace components. Topics covered are: analysis of stress and strain, constitutive relations, plane problems of elasticity, torsion, bending, elastic stability, energy methods, and finite element methods. 1ED P, AME 300, C E 217; CR, A ME 302.

330. Intermediate Thermodynamics (3) I II Power systems; non-reacting and reacting mixtures; heat transfer, design exercises. 2 ES, 1ED, P, A ME 230.

331. Introduction to Fluid Mechanics (3) I II Fundamentals of fluid mechanics with coverage of theory and applications of incompressible viscous and inviscid flows. Control volume formulation of conservation Equations, dimensional analysis, viscous pipe flow, fluid machinry, boundary layer concepts and drag. 3ES P, A ME 250, MATH 254.

352. Dynamics of Machines (3) I II Analysis of motions and forces in machines, design exercises. 1.5 ED, 1.5 ES, P, A ME 250.

399. Independent Study (1-5) [Rpt.]

399H. Honors Independent Study (1-3) [Rpt.]

400. Senior Mechanical Laboratory (2) I II Investigations involving thermal power and mechanical systems. Writing Emphasis course. 1R, 3L, 2 ES, P, AME 300.

401. Senior Aerospace Laboratory (1-3) I II Laboratory investigations involving aero-
419. Engineering Design (3) I Role of design in engineering; strength design factors, stress and strain analysis, deflection analysis and introduction to failure and fatigue theory, design of specific machine components. 1 ES, 2ED P, A ME 324, A ME 420.

420. Aircraft Conceptual Design (3) II Student groups develop conceptual designs for aircraft with specified performance and figures of merit. Design issues include program organization, configuration, aerodynamics, weights, and performance. Design groups develop computer flight simulators to evaluate performance. 3ED P, A ME 420, A ME 421B. May be taken in consecutive semesters. 3ES. 4R. 4ED. P, A ME 412A.

421. Aerospace Engineering Design (3) II Application of engineering fundamentals, including structural analysis, structural vibrations, aero-elasticity and finite element methods to aerospace vehicle design project. 3 ED. P, A ME 420, A ME 428. May be taken with A ME 522.

422. Introduction to Space Technologies (3) I The space environment: vacuum, microgravity, radiation, free molecule flow and drag on bodies. Resource utilization in deep space. Introduction to orbital mechanics. Space transportation, spacecraft thermal design, automation and robotics, communications, space power, space structures. 1.5ES, 1.5 ED. P, A ME 323. May be taken with A ME 522.

423. Aerospace Propulsion (3) I Basic laws; application to turbojets, ramjets, convergent-divergent nozzles, rocket engines, general propulsion systems. 2ES. 1ED P, A ME 230, A ME 323, A ME 331.

424. Dynamics of Space Flight (3) I Two and three body motion; orbit transfer and interplanetary transfer, space vehicle stability and control. 2 ES. 1ED P.

425. Stability and Control of Aerospace Vehicles (3) I Static and dynamic stability of rigid and nonrigid vehicles; automatic control of aircraft, missiles and spacecraft. 2ES. 1ED P, A ME 321.

426. Space Mission Conceptual Design (3) II Introduction to spacecraft design and modern tools available to aid the designer. Includes brief case histories of some of the more successful spacecraft missions and design of a mission. 3ED P, A ME 424. May be taken with A ME 528.

427. Space Mission Conceptual Design (3) II Development of numerical techniques for the solution of ordinary and partial differential equations that arise in heat transfer and fluid mechanics; classification of equations, methods of solutions, examples. 3ES. P, A ME 302, A ME 331. May be taken with A ME 531.


429. HVAC System Design (3) I Computer aided design of air conditioning systems for commercial and industrial buildings, including equipment and component selection. Energy-efficient concepts and controls will be emphasized. 1 ES, 2ED P, A ME 230 CR, A ME 331. (Identical with NEE 440). May be taken with A ME 540.

430. Renewable Energy Systems (3) I Solar radiation intensity and location; basic concepts of solar thermal processes; collectors; applications for solar thermal processes; collectors; applications for water heating, active and passive building heating and cooling, industrial processes. Wind energy fundamentals. Aerodynamics of propellers and windmills, optimal blade design and economics. 1.5 ES, 1.5 ED P, A ME 230, A ME 331, ECE 207. (Identical with NEE 445). May be taken with A ME 545.


432. Finite Element Methods (3) I Introduction to space mission design and successful space missions and design of a mission. 3ED P, A ME 424. May be taken with A ME 528.


434. Space Mission Conceptual Design (3) II Introduction to spacecraft design and modern tools available to aid the designer. Includes brief case histories of some of the more successful spacecraft missions and design of a mission. 3ED P, A ME 424. May be taken with A ME 528.


437. Control System Design (3) I II Mathematical modeling of dynamical systems, hardware and software issues; computer simulations; classical control methods including transient response, steady-state errors, bode diagrams, root locus and design of closed loop control systems; introduction to state feedback design and digital control. 2 ES, 1ED P, A ME 250, A ME 301; CR, A ME 300.

438. Control of Manufacturing Process (3) I II Modeling and control of manufacturing processes; mathematical modeling of manufacturing processes including, metal forming, turning, milling and welding; review of classical control methods; introduction to nonlinear control systems analysis and simulation; analysis, design and applications of digital control systems; robotics; hardware and software issues; computer simulations. 1R, 2L. 1.5 ES. 1.5ED P, A ME 250, A ME 300, A ME 412A, A ME 412B A ME 455. May be taken with A ME 556.

439. Mechanical Vibrations (3) I Free and forced vibrations of simple mechanical systems; effects of damping; introduction to multidegree of freedom systems. 3ES P, A ME 250, MATH 254.

440. Elasticity and Nonlinear Stresses (3) I Basic laws of solid mechanics; orthopedic, vascular, muscle, skin; feedback control (physiological systems); heat transfer; thermodynamics (temperature regulation, exercise, hyperthermia, instrumentation). 3ES P, A ME 302, A ME 330, A ME 331, A ME 410. May be taken with A ME 562.
472. Reliability Engineering (3) I Time-to-failure, failure-rate, and reliability determination for early, useful and wear-out lives; equipment reliability prediction; spare parts provisioning; reliability growth; reliability allocation. 1.5 ES, 1.5ED. P; CR, A ME 473 or SIE 408 and SIE 572. May be convened with A ME 572.

473. Probabilistic Mechanical Design (3) I Application of probability theory and statistics to mechanical and structural design; modern mechanical reliability methods; design philosophy. 1.5 ES, 1.5ED. P; CR, A ME 573.

474. Reliability and Quality Analysis (3) I Probability and statistics with applications to reliability engineering, discrete and continuous statistical models for engineering variables, fundamentals of statistics. 1.5 ES, 1.5ED. P, A ME 574.

493. Internship (1-6) [Rpt./] II

495. Colloquium s. Senior Colloquium (1) I II

496. Honors Thesis (3) [Rpt./] II

499H. Honors Independent Study (1-5) [Rpt./] II

500A. Advanced Engineering Analysis (3) I Vector calculus, linear algebra; ordinary differential equations, calculus of variations. P, undergraduate mathematics equivalent to A ME 301.

500B. Advanced Engineering Analysis (3) II Complex variables, partial differential equations, eigenfunction expansions and transform methods.

502. Aircraft Conceptual Design (3) II For a description of course topics see A ME 420. Graduate-level requirements include development of a three degree-of-freedom flight simulator with active stability augmentation. May be convened with A ME 420.

503. Fluid Mechanics (3) I Time-to-failure, failure-rate, and reliability determination for early, useful and wear-out lives; equipment reliability prediction; spare parts provisioning; reliability growth; reliability allocation. 1.5 ES, 1.5ED. P; CR, A ME 474 or SIE 408 and SIE 572. May be convened with A ME 572.

504. Energy Utilization and Management (3) I For a description of course topics see A ME 440. Graduate-level requirements include an in-depth research paper. (Identical with NEE 540). May be convened with A ME 440.

528. Space Mission Conceptual Design (3) II For a description of course topics see A ME 428. Graduate-level requirements include additional design project and report. May be convened with A ME 428, A ME 500A.

529. Space Mission Conceptual Design (3) II For a description of course topics see A ME 428. Graduate-level requirements include additional design project and report. May be convened with A ME 428, A ME 500A.

531. Numerical Methods in Fluid Mechanics and Heat Transfer (3) I For a description of course topics see A ME 431. Graduate-level requirements include three additional projects. May be convened with A ME 431.

532. Convective Transport Phenomena (3) I Convective energy, mass and momentum transfer; internal and external flow; exact, approximate and numerical solutions; application to current problems. P, A ME 432, computer programming ability; CR, A ME 500A.

533. Conduction Heat Transfer (3) II Conduction of heat; steady, transient, moving heat source, phase change, hyperbolic conduction, nonlinear problems and composite media; separation of variables. Laplace transform, integral transform, and Green's function methods. P, A ME 432; CR, A ME 500B.

534. Radiative Heat Transfer (3) I Fundamentals of radiative heat transfer; radiative properties of materials; gray-body and spectral exchange between surfaces; participating media; radiation combined with conduction and convection. Intended for students with strong interests in heat transfer, combustion, and applications such as energy conversion systems, materials processing, and space technology. P, A ME 432.

536A. Fundamentals of Fluid Mechanics (3) I Fundamental equations of motions; surface tension; kinematics of vorticity; integral solutions; irrotational flows; simple viscous flows. P, A ME 500A.

536B. Fundamentals of Fluid Mechanics (3) II Small-disturbance inviscid theory; low Reynolds number flows; vorticity dynamics; boundary layers. P, A ME 500B.

542. HVAC System Design (3) I For a description of course topics see A ME 442. Graduate-level requirements include comprehensive design project. (Identical with NEE 542). May be convened with A ME 442.

547. Direct Energy Conversion (3) II For a description of course topics see A ME 447. Graduate-level requirements include in-depth research paper. (Identical with NEE 545). May be convened with A ME 447.

548. Combustion Generated Air Pollution (3) II Pollutant formation in combustion processes and methods of control; diffusion models for atmospheric dispersion, including plume rise calculations. P, A ME 230, A ME 331A.


552. Computer Aided Analysis and Mechanical Systems (3) I For a description of course topics see A ME 452. Graduate-level requirements include an additional project and extra questions on exams. May be convened with A ME 452.

553. Computer Multibody Dynamics (3) II Computational methods in multidynamics; Euler parameters; automatic generation and numerical methods in solving equations of motion; application in vehicle dynamics, spacecraft, and robotics. P, A ME 552, knowledge of kinetics, dynamics, and numerical methods.

554. Optimal Control of Parametric Systems (3) I For a description of course topics see A ME 454. Graduate-level requirements include more theoretically oriented design project. May be convened with A ME 454.

555. Modern Control Theory (3) I Nonlinear dynamical systems, Lyapunov stability, Lyapunov control system design, controllable and reachability sets. P, A ME 455.

566. Control of Manufacturing Process (3) I II For a description of course topics see A ME 456. Graduate-level requirements include more in-depth homework with focus on theoretical considerations, and design project requiring implementation of a five degree of freedom robot. May be convened with A ME 456.
558. Advanced Modeling and Control Theory of Mechanical Systems (3) I II State space representation of linear systems; topics include controllability, observability, stability, full state feedback, reduced order feedback, pole placement, optimal regulators, optimal observers. P, A ME 455.


561. Finite Element Analysis in Structural Mechanics (3) III Advanced problems in structural analysis using the finite element method; analysis of complex systems; dynamics. Composite structures and material systems; program development. P, A ME 461.

562. Composite Materials (3) I For a description of course topics see A ME 462. Graduate-level requirements include an additional project on composite materials. May be convened with A ME 462.

563. Finite Element Analysis in Nonlinear Solid Mechanics (3) I Finite element methods, including material nonlinearity (elastic, plastic, viscoelastic); geometric nonlinearity (finite deformations), numerical solution methods, and nonlinear programs. P, A ME 461.


566. Biomechanical Engineering (3) III For a description of course topics see A ME 466. Graduate-level requirements include a project and additional reading assignments. May be convened with A ME 466.

567. Geometric Modeling and Computer Graphics (3) I (Identical with ECE 567, which is home).

572. Reliability Engineering (3) I For a description of course topics see A ME 472. For a description of course topics see A ME 472. Graduate-level requirements include a special report of 30 pages on a specific reliability engineering topic. May be convened with A ME 472.

573. Probabilistic Mechanical Design (3) I For a description of course topics see A ME 473. For a description of course topics see A ME 473.

Graduate-level requirements include additional homework with focus on theoretical considerations, and a research project. May be convened with A ME 473.

574. Reliability and Quality Analysis (3) I For a description of course topics see A ME 474. Graduate-level requirements include additional assignments and independent study, Monte Carlo simulation. May be convened with A ME 474.

575. Reliability Testing (3) II Mean-time-between-failure and reliability confidence limits; sequential testing; sampling; accelerated, sudden-death, suspended-items, nonparametric, and Bayesian testing. P, A ME 472.

576. Advanced Probabilistic Design (3) II Advanced methods for mechanical and structural reliability analysis, system reliability analysis, random loading models, applications to fatigue, fracture, buckling, creep, etc. P, A ME 473.

577. Maintainability Engineering (3) II Extension of 572; complex systems reliability; maintainability engineering; reliability and availability of maintained systems; operational readiness; system effectiveness; maintainability demonstration. P, A ME 472.

599. Independent Study (1-6) [Rpt./]


603. Boundary Element Method (3) I Introduction to BEM, applications to Laplace equation, conduction-convection problems, transient problems, problems involving material nonlinearities, large strain problems, and design sensitivity-analyses through BEM. P, A ME 461, A ME 561.

620. Advanced Computational Aerodynamics (3) I Governing equations for computational aerodynamics and fluid dynamics techniques for solving partial differential equations, grid generation and multigrid techniques; applications to compressible and incompressible viscous flows. P, A ME 431, A ME 500B, A ME 536B.

632. Advanced Topics in Heat Transfer (3) II Topics will depend on instructor(s). Possible topics include linear and nonlinear convective stability, turbulent convective heat transfer, advanced analytical and numerical methods in heat transfer, boiling and condensation, multiphase flow, and heat transfer phenomena. P, A ME 500A, A ME 500B, A ME 532, A ME 536A, A ME 536B.


695. Colloquium

a. Research Conference (1-4) [Rpt./]

696. Seminar

g. Gradute Seminar (1-4) [Rpt./]

699. Independent Study (1-6) [Rpt./]

799. Case Studies (3) [Rpt./]

900. Research (1-4) [Rpt./]

908. Case Studies (3) [Rpt./]

909. Master's Report (1-4) [Rpt./]

910. Thesis (1-6) [Rpt./]

920. Dissertation (1-6) [Rpt./]

930. Supplementary Registration (1-1) [Rpt./]

Nuclear and Energy Engineering (NEE)

109. History of Technology and Society (3) I (Identical with MSE 109, which is home.)

199. Independent Study (2-5) [Rpt./]

299. Independent Study (2-5) [Rpt./]


381. Introduction to Nuclear Reactor Engineering (3) I II The analysis and design of nuclear assemblies, with emphasis on design. 1ES, 2ED. P, NEE 380.

399. Independent Study (1-2-5) I II

399H. Honors Independent Study (1-3) [Rpt./]

406. Nuclear Engineering Laboratory (4) I Experimental techniques for determining various parameters in nuclear systems; experiments using the critical and subcritical reactors. 3R, 3L. 3ED. P, NEE 380 or NEE 483; non-majors may substitute NEE 486 for prerequisites. Writing Emphasis course for nuclear engineering students. May be convened with NEE 506.

414A. Nuclear Engineering Design (3) I Modern engineering design methods to effectively use thermal energy and power. Covers: economic analysis and modeling of thermal equipment; optimization techniques; steady state and dynamic simulation of energy systems. Comprehensive project. 3ED. P, NEE 381; CR, A ME 432. May be convened with NEE 514A.

414B. Nuclear Engineering Design (3) II A multi-disciplined design project of modern energy systems. Covers: project management tools, design techniques, proposal and project reports, written and oral presentations. Comprehensive team project based on environmental
487A. Introduction to Radioactive Waste Management (3) I Background in the technology of low level radioactive wastes from institutional, research and fuel cycle sources. 1.5 ES, 1.5 ED. May be convened with NEE 587A.

487B. Introduction to Radioactive Waste Management (3) II Background in the technology of high level wastes, including reprocessing and disposal, from the fuel cycle, both national and international approaches. 1.5ES, 1.5 ED. P, NEE 487A. May be convened with NEE 587B.

494. Practicum (2) [Rpt./] II
494. Practicum a. Operation of the University of Arizona TRIGA Reactor (2) [Rpt./] S P, NEE 380 or NEE 588.

498. Senior Capstone (1-3) II
498H. Honors Thesis (3) [Rpt./] II

499. Independent Study (2-5) [Rpt./] II

506. Nuclear Engineering Laboratory (4) I For a description of course topics see NEE 406. Graduate-level requirements include an in-depth research paper. 2R, 3L. P, NEE 380 or NEE 588; NEE 483 or NEE 583. Non-majors may substitute 486/586 for the prerequisites. May be convened with NEE 406.

514A. Nuclear Engineering Design (3) II For a description of course topics see NEE 414A. Graduate-level requirements include an additional project involving more intensive application of techniques taught. May be convened with NEE 414A.

514B. Nuclear Engineering Design (3) II For a description of course topics see NEE 414B. Graduate-level requirements include an additional project involving more intensive application of techniques taught. May be convened with NEE 414B.

540. Energy Utilization and Management (3) I (Identical with A ME 540, which is home). May be convened with NEE 440.

542. HVAC System Design (3) I (Identical with A ME 542, which is home). May be convened with NEE 442.

543. Power Plant Engineering (3) I The application of fluid dynamic heat transfer and mechanical interaction principles to the engineering design of a power plant. P, NEE 582, NEE 588.

545. Renewable Energy Systems (3) II (Identical with A ME 545, which is home). May be convened with NEE 445.

556. Engineering System Simulation (3) II For a description of course topics see NEE 456. Graduate-level requirements include an in-depth research paper. May be convened with NEE 456.

563. Energy from Biomass (3) II (Identical with ABE 563, which is home). P, NEE 456. May be convened with NEE 463.

581. Nuclear Fuel Cycles (3) II For a description of course topics see NEE 481. Graduate-level requirements include an in-depth research paper. May be convened with NEE 481.

582. Contemporary Nuclear Power Systems (3) I For a description of course topics see NEE 482. Graduate-level requirements include an in-depth research paper. May be convened with NEE 482.

583. Reactor Dynamics and Control (3) II For a description of course topics see NEE 483. Graduate-level requirements include an in-depth research paper. P, NEE 380 or NEE 588; non-majors may substitute NEE 486/NEE 586 for the prerequisites. May be convened with NEE 483.

584. Radiation Effects (3) II For a description of course topics see NEE 484. Graduate-level requirements include an in-depth research paper. May be convened with NEE 484.

585A. Radiation Health Physics and Safety (3) I For a description of course topics see NEE 485A. Graduate-level requirements include an in-depth research paper. May be convened with NEE 485A.

585B. Radiation Health Physics and Safety (3) II For a description of course topics see NEE 485B. Graduate-level requirements include an in-depth research paper. May be convened with NEE 485B.

586. Nuclear Energy and Power (3) I For a description of course topics see NEE 486. Graduate-level requirements include an in-depth research paper. May be convened with NEE 486.

587A. Introduction to Radioactive Waste Management (3) I For a description of course topics see NEE 487A. Graduate-level requirements include an in-depth research paper. May be convened with NEE 487A.

587B. Introduction to Radioactive Waste Management (3) II For a description of course topics see NEE 487B. Graduate-level requirements include an in-depth research paper. May be convened with NEE 487B.

588. Reactor Theory I (3) I Fundamentals of nuclear reactor theory; introduction to the nuclear processes occurring in a reactor; slowing down and diffusion of neutrons in moderating materials; analysis of bare and reflected homogeneous reactors. P or CR, MATH 422A or MATH 422A.

599. Independent Study (2-5) [Rpt./] II

681A. Analytical Methods of Transport Theory (3) I Application of the Boltzmann equation to neutron and photon transport problems; exact solutions, the method of singular eigenfunctions, spherical harmonic expansions, the moments methods, integral transport theory, invariant embedding, variational techniques, applications to slowing-down problems. P, NEE 689, MATH 422A, MATH 422B.

682. Nuclear Safety (3) II Possible incidents involving nuclear materials in critical reactors, chemical processing systems, fuel shipment operations or subcritical arrays, including assessments of the magnitudes and consequences of nuclear incidents; determination of criteria for evaluating nuclear system safety, including plant siting and operational procedures. P, NEE 380.

683. Nonlinear Reactor Dynamics (3) II Nonlinear dynamics of nuclear reactors; shutdown mechanisms, inertial effects, nonlinear
stability criteria, time-dependent neutron transport, neutron waves, and applications to pulsed reactors, start-up transients, reactor stability, and reactor safety. P. NEE 583.

687. Experimental Nuclear Engineering (3) I Advanced experimental studies using the nuclear reactor and radiation detection systems. P. NEE 406 or NEE 506; NEE 588.

689. Reactor Theory II (3) II Fundamental theory of heterogeneous reactors, integral transport, blackness theory, perturbation theory, and applications; temperature coefficient, changes in reactivity due to fission product accumulation, fuel consumption, and conversion. P. NEE 588.

690. Master’s Report (3) [Rpt.]/

691. Thesis (2-8) [Rpt.]/

692. Dissertation (1-9) [Rpt.]/

693. Independent Study (2-5) [Rpt.]/

694. Research (2-5) [Rpt.]/

695. Course Work (1-9) [Rpt.]/

696. Proseminar (1-1) [Rpt.]/

AFRICAN AMERICAN STUDIES (AFAS)

Martin Luther King Bldg., Rm.305
The University of Arizona
PO Box 210128
Tucson AZ 85721-0067
Phone: (520) 621-5665
FAX: (520) 621-9768
E-mail: jkunnie@u.arizona.edu or avarogae@aquac citas.arizona.edu
URL: http://www.coh.arizona.edu/aas/aas.html

Baccalaureate Degree

The African American Studies Program does not offer a baccalaureate degree. The AFAS director can assist students who are interested in African American Studies and are pursuing the Interdisciplinary Studies major (IDS).

Minor

An undergraduate minor is available.

Program Requirements

For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

African American Studies (AFAS)

160. Minority Relations and Urban Society (3) I II (Identical with SOC 160, which is home).

190. Introduction to African History (3) (Identical with HIST 190, which is home).

195. Colloquium

a. African Aesthetics (1) I


222. African American Studies: A History of Ideas (3) II The theoretical and philosophical ideas expressed by thinkers of the African world. Issues in the areas of epistemological relativism, ethics, political philosophy and the history of ideas will be examined. (Identical with ANTH 222, PHIL 222).

224. Models of Resistance: Post 16th Cent. African Liberation Movements in Southeast (3) I There were actually several “Souths” during the Holocaust of Enslavement. However, courses taught in the era of African enslavement have tended to focus on the northern most regions, such as Virginia, which are often taken to represent-if not constitute-the South. This course looks at the other “South” and the French and Spanish colonizers of South Carolina, Florida, and Louisiana. It offers a different perspective of the beginnings of the Great Enslavement and compares and contrasts the lives and struggles of enslaved, freed, and self-emancipated Africans in the Southwest during the tenure of Spain. (Identical with HIST 224).


235. African Literature in Translation (3) II (Identical with FREN 245, which is home).

239. Images of Africa (3) I (Identical with FREN 249, which is home).

243. African History (1-3) II (Identical with FREN 249, which is home).

249. Independent Study (3) I II (Identical with FREN 249, which is home).

259. Historical Overview of African Cinema and Filmmaking (3) I Stresses techniques, styles, aesthetics, and comparative content analysis. Explores “socialist realist” narrative and other themes.

301. Introduction to Research Methods in African American Studies (3) I II Research methodologies and theoretical framework pertinent to the diverse disciplines of African American Studies.


329. Cultures and Societies of Africa (3) II (Identical with ANTH 329, which is home).

330. Minority Groups and American Politics (3) I II (Identical with POL 330, which is home).

339. Introduction to African and African-American Art (3) I II (Identical with ARH 339, which is home).

342. Writers, Women and the Gods: The Caribbean Novel (3) [Rpt./ 1] Examination of novels written by women in the Caribbean, with focus on the turn to local, folk or alternative culture; the uses of religion in narrative and as image; and the construction of a uniquely female identity or voice. Since the 1960s, women’s writing in the Caribbean has helped to redefine fiction in the Americas. (Identical with ENGL 342, W S 342).


347. The Old South (3) I II (Identical with HIST 347, which is home).

348. The South Since the Civil War (3) I II (Identical with HIST 348, which is home).

351. Race and Class in Latin America (3) II (Identical with HIST 351, which is home).

384. Topics in African History (3) [Rpt./ 1] (Identical with HIST 384, which is home).

396. Proseminar

h. Honors Proseminar (4) I II

399. Independent Study (3) [Rpt./ I I

399H. Honors Independent Study (1-3) [Rpt./ I I

426. Archaeology of Africa (3) I II (Identical with ANTH 426, which is home). May be convened with AFAS 526.

435. The Coming of the Civil War, U.S. 1845-1861 (3) I (Identical with HIST 435, which is home).

436. Civil War and Reconstruction, U.S. 1861-1878 (3) II (Identical with HIST 436, which is home).

450. French Literature of Black America and the Caribbean (3) I (Identical with FREN 450, which is home).

467. Race and Ethnic Relations (3) I II (Identical with SOC 467, which is home).

468. Government and Politics of Africa (3) I II (Identical with POL 468, which is home).

478. African American Literature (3) I (Identical with ENGL 478, which is home).

487A-487B. Race and Public Policy (3-3) I (Identical with POL 487A-POL 487B, which is home).

495. Colloquium

b. Studies in Black America (3) I II (Identical with HIST 495B, which is home).
Agricultural and Biosystems Engineering (ABE)

Shantz Bldg., Rm. 403
The University of Arizona
PO Box 210038
Tucson AZ 85721-0038
Phone: (520) 621-1607
Fax: (520) 621-3963
E-mail: kcrist@arizona.edu
URL: http://arizona.edu/ABE

Baccalaureate Degree
Bachelor of Science in Agricultural and Biosystems Engineering (B.S.A.B.E.)*

Graduate Degrees
Master of Science (M.S.)*
Doctor of Philosophy (Ph.D.)*

Major and Degrees
Agricultural and Biosystems Engineering (B.S.A.B.E., M.S., Ph.D.)*

*Jointly administered with the College of Engineering & Mines.

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available online at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Agricultural and Biosystems Engineering (ABE)

120. Microcomputing Applications (3) I II
Introduction to the use of microcomputers in word processing, spreadsheets, presentation graphics, networks and other areas. 1R, 6L. (Identical with AGTM 120, FCR 120, N SC 120, PL S 120, ENGR 120).

195. Colloquium
a. Introduction to Teaching Agriculture and Related Sciences (1) I II

197. Workshop

498. Senior Capstone (1-3) I II
499. Independent Study (1-6) [Rpt./] I II
526. Archaeology of Africa (3) I II (Identical with ANTH 526, which is home).

596. Seminar
j. Issues in African Art History (3) [Rpt./ 3] I II (Identical with ARH 596J, which is home).

AGRICULTURAL AND BIOSYSTEMS ENGINEERING (ABE) 596. Seminar conven ed with AFAS 426.

250. Water and Its Uses (3) I GRD Introductory course on water sources, uses, management and conservation; biological, economic, and health issues. Open to non-majors only. (Identical with SWES 250).

299. Independent Study (1-3) [Rpt./]
299H. Honors Independent Study (1-3) [Rpt./] I II
300. Operations and Systems (2) I Expanded coverage of concepts of ergonomics, computer decision making, and personal planning using computer simulation and market and management policies.

320. Introduction to Computer Aided Design (3) II Introduction to computer aided design concepts and techniques. Two and threedimensional drawing presentation, methods of graphical communications, data analysis, design synthesis and production methods. 1R, 6L. IED. P. Computer literacy (DOS). (Identical with ENGR 320).

393. Internship (1-6) [Rpt./] I II
399. Independent Study (1-4) [Rpt./]
399H. Honors Independent Study (1-3) [Rpt./] I II
404. Irrigation Principles and Management (3) II GRD Principles of operating farm irrigation systems, evaluation of systems, selection of systems, basic irrigation scheduling, measurements of water flow, soil moisture, pump and system efficiencies. 2R, 3L. IED. P. MATH 117R or MATH 117S; SWES 200. Open to non-majors only; Field trips. (Identical with SWES 404). May be convened with ABE 504.

406. Applied Hydraulics (3) I GRD Fundamentals of hydraulics applicable to irrigation of agricultural lands, including fluid properties, hydrostatics, irrigation flow characteristics, open channel and pipeline applications, and measurement of flowing water. P, MATH 118 or MATH 123 or MATH 125A; PHYS 102 Open to non-majors only. (Identical with WS M 406). May be convened with ABE 506.

406. Environmental Simulation (3) II Introduction to the usage of mathematical tools and techniques to analyze physical, chemical and biological components of the environment. P. MATH 123 or MATH 124. May be convened with ABE 508.


415. Agri-biosystems Process Engineering (3) II Application of the principles of heat transfer, thermodynamics, psychrometrics and fluid flow to the development and solution of problems in 1) soil temperature and moisture distribution, 2) radiation balances of plants and ventilated greenhouses and 3) photosynthesis and transpiration. P. A M 230. May be convened with ABE 515.

416. Simulation of Biological Systems (3) S Fundamental differential equations of plant systems are solved using analog computer methodology. Analysis of soil temperature and moisture, mulched systems, plant growth, and greenhouse environments are simulated using dynamic digital programs, CO2 and ACSL. Parameters of radiation, heat, and moisture transfer, CO2 and unique soil properties are utilized to provide realistic simulation of cyclic conditions. P. Knowledge of computer programming. May be convened with ABE 516.

423. Agricultural Systems Analysis and Design (3) II Application of systems analysis to agricultural and biologically related problems; computer modeling and use of operations research methods. IED. May be convened with ABE 523.

426. Soil and Water Conservation Engineering (3) II S Methods for estimating runoff from croplands, Universal Soil Loss Equation, design of terraces, waterways, small earth dams, erosion control structures. 1.5 ES. P. ABE 406 or C E 321 or A ME 331. (Identical with C E 426, WS M 426). May be convened with ABE 526.


455. Irrigation Engineering (3) II Introduction to soil and water relationships, irrigation systems, irrigation water supply, and irrigation management; basic designs. IED. P. C E 321 or A ME 331. (Identical with C E 455). May be convened with ABE 555.

456. Irrigation Systems Design (3) I Design and operation of surface, sprinkler, and trickle irrigation systems. 2ED. P. ABE 455; Field trips. May be convened with ABE 556.

457. Irrigation Engineering Laboratory (1) II Data acquisition and analysis pertinent to design and evaluation of irrigation systems. 1ES. CR. ABE 455 Field trips. May be convened with ABE 557.

458. Drainage of Irrigated Lands (3) II Origin and nature of drainage problems in arid lands; drainage theories, investigations and design for irrigated agriculture. 1.5 ED. P. C E 321 or A ME 331; Field trips. (Identical with C E 458). May be convened with ABE 558.

463. Energy from Biomass (3) II Biomass energy sources; collection and processing methods; thermal, anaerobic digestion and fermentation conversion processes, energetic, economic and environmental issues. P. A M 230. (Identical with N EE 463). May be convened with ABE 563.

467. Advanced Watershed Hydrology (3) II (Identical with WS M 467, which is home).

470. Scientific and Technical Sales (3) I Principles of selling technical and scientific products. Preparing future/benefit analyses and government bids and contracts. Use of computer

490. Case Studies for Agricultural Systems Management (3) I Builds upon concepts developed in 195 and 300. Students utilize knowledge and solve “real life” management problems using cases from agricultural systems settings. P, MATH 263 or consent of instructor; A ME 195, A ME 300.

493. Internship (3-6) [Rpt.]

494. Practicum

a. Agri-biosystems Engineering Design (3) [Rpt./] I II, 6L. 3ED. P, ABE 320, 6 units of ABE 400-level courses, Writing-Emphasis Course.

b. Advanced Agri-biosystems Engineering Design (3) [Rpt./] I II, 6L. 3ED. P, ABE 494A.

498. Senior Capstone (1-3) I II

498A. Agriculture-Biosystems Engineering Design (3)

498B. Agriculture-Biosystems Engineering Design (3)

498H. Honors Thesis (3) [Rpt./] 1 II

499. Independent Study (1-5) [Rpt.]

499H. Honors Independent Study (3) [Rpt./] I II

504. Irrigation Principles and Management (3) I For a description of course topics see ABE 404. Graduate-level requirements include a special project on a current irrigation topic. (Identical with WS M 504). Not open to ABE majors. May be convened with ABE 404.

506. Applied Hydraulics (3) I For a description of course topics see ABE 406. Graduate-level requirements include a special project on current hydraulic topics. (Identical with WS M 506). May be convened with ABE 406.

508. Environmental Simulation (3) I For a description of course topics see ABE 408. Graduate-level requirements include a special project on a current environmental topic. May be convened with ABE 408.

512. Agri-biosystems Machinery Design (3) I For a description of course topics see ABE 412. Graduate-level requirements include an additional design project. May be convened with ABE 412.

515. Agri-biosystems Process Engineering (3) II For a description of course topics see ABE 415. Graduate-level requirements include a special project. May be convened with ABE 415.

516. Simulation of Biological Systems (3) S For a description of course topics see ABE 416. Graduate-level requirements include a special project. P, Knowledge of computer programming. May be convened with ABE 416.

523. Agricultural Systems Analysis and Design (3) II For a description of course topics see ABE 423. Graduate-level requirements include a simulation project. May be convened with ABE 423.

526. Soil and Water Conservation Engineering (3) S For a description of course topics see ABE 426. Graduate-level requirements include a special project. (Identical with C E 526 and WS M 526). May be convened with ABE 426.

547. Sensors and Controls (3) I For a description of course topics see ABE 447. Graduate-level requirements include a special project. May be convened with ABE 447.

550. Small Scale Water Management Systems (3) I Design, construction, testing and operation of water management systems for small-scale operators; water harvesting; runoff farming. P, 6 units of hydrology, hydraulics, or irrigation; Field trips.

555. Irrigation Engineering (3) II For a description of course topics see ABE 455. Graduate-level requirements include a special project on a current irrigation topic. (Identical with C E 555). May be convened with ABE 455.

556. Irrigation Systems Design (3) I For a description of course topics see ABE 456. Graduate-level requirements include a special project. May be convened with ABE 456.

557. Irrigation Engineering Laboratory (1) I For a description of course topics see ABE 457. Graduate-level requirements include a special report. May be convened with ABE 457.

558. Drainage of Irrigated Lands (3) II For a description of course topics see ABE 458. Graduate-level requirements include a special project. (Identical with C E 558). May be convened with ABE 458.

563. Energy from Biomass (3) II For a description of course topics see ABE 463. Graduate-level requirements include a special project. (Identical with N EE 563). May be convened with ABE 463.

567. Advanced Watershed Hydrology (3) I (Identical with WS M 567, which is home). May be convened with ABE 463.

568. Advanced Irrigation Management (3) II Irrigation scheduling using Jensen-Haise and Penman equations for predicting evapotranspiration, determination of crop coefficients, production functions, economics, and energy considerations. P, SWES 520 or ABE 455; ABE 404.

569. Advanced Irrigation Management (3) II Irrigation scheduling using Jensen-Haise and Penman equations for predicting evapotranspiration, determination of crop coefficients, production functions, economics, and energy considerations. P, SWES 520 or ABE 455; ABE 404.

565. Surface Irrigation Analysis (3) I Analysis of design and operating criteria for basin, border and furrow irrigation systems, effect of field parameters on system design. Evaluation criteria for existing systems. P, ABE 456.

655. Pressurized Irrigation Systems (3) II Analysis of design and operating criteria for sprinkler and trickle or drip irrigation systems, hydraulics of sprinklers and emitters, hydraulics of pipe systems. P, ABE 456.

693. Internship (1-6) [Rpt./] I II

696. Seminar

a. Agricultural and Biosystems Engineering (1) [Rpt./] I II

699. Independent Study (1-5) [Rpt./] I II

900. Research (1-1) [Rpt./]
in the US; application of microeconomic, market performance and international trade analysis. P. ECON 200 or ECON 201A.

215. Agribusiness Economics and Management (3) II Essential economic concepts and analytical tools for agribusiness managers are developed and applied to current business challenges and opportunities. Emphasis placed on decision tools, budgeting, forecasting, strategy, organization and relationship management. P. ECON 200 or ECON 201A. (Identical with ECON 217).

242. World Food Economy (3) I II World resources of agriculture; population and food supply; economics of hunger, world trade and agricultural policies. P. ECON 200 or ECON 201A. (Identical with RCS 310).

313. Economics of Futures Markets (3) I II Commodity and financial futures market participants, evolution, functions, performance, price determination, and regulation with hedging and speculative applications of futures and futures-options contracts. P. ECON 200 or ECON 201A. (Identical with ECON 313, FIN 313).

339. Economic Statistics (3) II Application and interpretation of statistical measures to problems in economics. P. MATH 123. Credit allowed for one of these courses: AREC 339, ECON 376, MAP 376, MKTG 376. (Identical with ECON 339).

500. Financial Management for Agribusiness (3) I II Application of the financial management principles and tools to challenges and opportunities facing agribusiness firms. Emphasis is placed on the acquisition, allocation, control and transfer of capital resources. P. ECON 300 or ECON 361; 3 units of accounting. May be convened with AREC 550.

464. Economics of Policy Analysis (3) II Applied economic theory and method of policy analysis and public choice. Emphasis is on policies impacting agriculture and rural America—especially historical and continuing government intervention in agricultural markets. P. ECON 300 or ECON 361; MATH 123, Writing Emphasis Course.

471. Problems in Regional Development (3) I II (Identical with GEOG 471, which is home). May be convened with AREC 571.

476. Environmental Law and Economics (3) II A complex set of laws has developed to control the environmental risks posed by potentially polluting activities. In this course, a survey and an economic evaluation are presented of major environmental legislation designed to protect air, land, and water resource quality. P. ECON 300 or ECON 361. (Identical with HWR 476, RNR 476).

493. Internship (1-8) I II

499H. Honors Independent Study (1-3) [Rpt./]

310. Consumer Economics (3) II The economics of consumer behavior and choice with implications for consumer demand. Application to nutrition and food consumption, clothing and textiles, and consumer durables. P. ECON 200 or ECON 201A. (Identical with RCS 310).

361. Microeconomic Analysis (3) I II Theory and application of economic concepts needed to evaluate resource laws and policies; including welfare economics, externalities, public goods and valuation methodologies. Case studies focus on the American West and include federal and state environmental, water, and land policies. P. ECON 300 or ECON 361. (Identical with ARL 575, ECON 575, RNR 575).

506. Production Economics (3) I II Theory of the firm and industry; single and multiple products; risk and uncertainty. P. ECON 300 or ECON 361; MATH 123. (Identical with ECON 504).

512. Economic Policy in Developing Countries (3) I II The role of policies in economic growth and development. The impact of commodity factor market and macroeconomic policies on economic incentives. (Identical with ARL 512, ECON 512).


516. Agricultural Development (3) I II Microeconomic analysis of agriculture in developing economies, focusing on factors affecting production decisions of small farmers, including adoption of new technologies. Interrelationships between agricultural activities and household consumption patterns also discussed. P. ECON 300 or ECON 360. (Identical with ECON 516).

549. Applied Econometric Analysis (3) II (Identical with ECON 549, which is home).

550. Financial Management for Agribusiness (3) I II Theory and application of economic concepts needed to evaluate resource laws and policies; including welfare economics, externalities, public goods and valuation methodologies. Case studies focus on the American West and include federal and state environmental, water, and land policies. P. ECON 300 or ECON 361. (Identical with AREC 549, which is home).


580. Mathematics for Economists (2) I Intensive course in essential mathematics for entering graduate students in the M.S. and Ph.D. programs in Economics and Agricultural and Resource Economics. Topics covered include matrix algebra, functions, limits, differentiation, comparative statistics, and constrained and
For graduate interface/minors.
For undergraduate academic requirements consult the
Graduate Catalog and the departmental office
listed above.
To learn more about majors, minors, and other
departmental information consult the on-line
catalog or contact the department at one of the
addresses above.

Agricultural Education (A ED)

195. Colloquium
a. Introduction to Teaching Agriculture and Related Sciences (1) I II
293. Internship (1-6) [Rpt.]
299. Independent Study (1-3) [Rpt.]
301. Youth Leadership Development (3) I
Characteristics of effective advisors, leadership styles, strategies for the management and organization of youth groups in agriculture, practice in leadership development techniques.
393. Internship (1-6)
394. Practicum (1-6) [Rpt.]
396. Proseminar
h. Honors Proseminar (3) I II
399. Independent Study (3) [Rpt.]
300H. Honors Independent Study (1-3) [Rpt.] I II
401. Leadership Concepts and Context (3) I II
Personal leadership development through experiential learning, philosophical exploration, examination of the literature, and reflective writing. May be convened with A ED 501.
407. Principles of Vocational Education (2) II
Social and economic values of vocational education, federal laws, state policies and administration; theories and principles with special reference to programs in the secondary school. (Identical with TTE 407). May be convened with A ED 507.
422. Communicating Knowledge in Agriculture and the Life Sciences (3) I
Principles and processes of knowledge diffusion and methods of transferring appropriate technology to user/clientele groups. Communicating effectively within organizations. (Identical with AGTM 422). May be convened with A ED 522.
438. The Teaching of Secondary School Agricultural Science (4) I
Specific methods, objectives, organization of subject matter, and evaluation in the various subjects. (Identical with TTE 438). May be convened with A ED 538.
439. Non-Formal Education (3) I
Characteristics and scope of non-formal education. Principles and application of non-formal education methods to diffuse knowledge in extension, adult and continuing education settings. (Identical with FS 439). May be convened with A ED 539.
442. Transformation of Agrarian Societies in the Middle East (3) II (Identical with NES 442, which is home). May be convened with A ED 542.
460. Instructional Materials Development (4) I
Analysis and construction of resources and materials used in instructional delivery. Analysis and development of competencies and behavioral objectives used in preparing instructional materials. 3R, 3L. CR, A ME 493. May be convened with A ED 560.
462. Curriculum Development (2-3) II
Analysis, design, construction and evaluation of resources appropriate for a competency-based agriculture education curriculum. May be convened with A ED 562.
485. Teaching Psychomotor Skills in Laboratory Sciences (1-2) I II
Methods and procedures in teaching psychomotor operational skills, conducting demonstrations, providing for student and teacher safety, sequencing skills activities, providing and organizing facilities, including micro-teaching demonstrations. 1R, 3L. May be convened with A ED 585.
493. Internship (1-3) I II
494. Practicum
r. Research (3) [Rpt.] I II P, ENGL 101, MATH 117, ABE 120, consent of the instructor.
496. Seminar
c. Ambassador Orientation (1-2) [Rpt. 4 units] I II, open to COA Ambassadors only.
498. Senior Capstone (1-3) I II
500H. Honors Thesis (3) [Rpt.] I II
500H. Honors Independent Study (1-5) [Rpt.]
500H. Honors Independent Study (3) [Rpt.] I II
501. Leadership Concepts and Context (3) I
For a description of course topics see A ED 401. Graduate-level requirements include additional writings, assignments, and an expanded issue paper. May be convened with A ED 401.
507. Principles of Vocational Education (2) II
For a description of course topics see A ED 407. Graduate-level requirements include developing a philosophy statement for a secondary-level school. (Identical with TTE 507). May be convened with A ED 407.
522. Communicating knowledge in Agriculture and the Life Sciences (3) I
For a description of course topics see A ED 422. Graduate-level requirements include an additional report. (Identical with AGTM 522). May be convened with A ED 422.
538. The Teaching of Secondary School Agricultural Science (4) I
For a description of course topics see A ED 438. Graduate-level requirements include an entire year's secondary curriculum plan. (Identical with TTE 538). May be convened with A ED 438.
539. Non-Formal Education (3) I
For a description of course topics see A ED 439. Graduate-level requirements include an additional research report. (Identical with FS 539). May be convened with A ED 439.
540. International Extension Education (3) I
Critical evaluation of case histories of international extension education models, and integration of successful components into composite models based on cultural, political and educational situations typically encountered in developing countries.
542. Transformation of Agrarian Societies in
the Middle East (3) II (Identical with NES 542, which is home).

560. Instructional Materials Development (4) I
For a description of course topics see A ED 460. Graduate-level requirements include an
additional assignment. May be convened with
A ED 460.

562. Curriculum Development (2-3) II S For a description
of course topics see A ED 462. Graduate-level requirements include an
additional report. May be convened with
A ED 462.

585. Teaching Psychomotor Skills in Laboratory
Sciences (1-2) I II For a description of
course topics see A ED 485. Graduate-level requirements include additional assigned
readings, demonstrations, lesson presentations,
and a position paper. May be convened with
A ED 485.

593. Internship (1-3) I II

597. Workshop
a. Instructional Advances in Experiential
Education (1-3) [Rpt./ 12 units]
b. Advances in Youth Leadership Development
(1-3) [Rpt./ 12 units]
d. Instructional advances Applied Biological
Systems (1-3) [Rpt./ 12 units]
e. Continuing Education in Agriculture (1-3)
[Rpt./ 12 units] I II
f. Program Development in Vocational/
Technical Education (1-3) [Rpt./ 12 units]
g. Instructional Advances in Vocational/
Technical Education (1-3) [Rpt./ 12 units]
(Identical with PS 597G).
h. Instructional Advances in Environmental
Education (1-3) [Rpt./ 12 units]
i. Instructional Advances in Non-Formal
Education (1-3) [Rpt./ 12 units] (Identical with
FS 597T).

599. Independent Study (1-5) [Rpt./]

601. Philosophy and Practices (3) [Rpt./ 3]
Problems in organizing and conducting
programs of instruction in vocational and
extension education.

615. Investigations and Studies in Applied
Research (3) I Study and analysis of research
literature, methods, techniques and procedures
for conducting investigations, selecting a
problem and developing plans for a study.

616. Research Project Design and Implementa-
tion (3) II Principles and practices of selecting,
developing and analyzing research instruments,
analyzing and interpreting both quantitative and
qualitative data research in agricultural and
extension education, including the use of the
computer. P, A ED 615.

621. Program Planning and Evaluation (3)
II Developing and evaluating programs in
teaching and extension; situation analysis,
objectives, policies, content, procedures, and
evaluative criteria.

693. Internship (1-3) I II

695. Colloquium

a. Teaching College Level Agriculture and Life
Sciences (1-3) II

699. Independent Study (1-3) [Rpt./] I II

900. Research (2-4) [Rpt./]

909. Master’s Report (1-3) [Rpt./] I II

910. Thesis (2-6) [Rpt./]

920. Dissertation (1-9)

930. Supplementary Registration (1-9) [Rpt./]

Agricultural Technology Management (AGTM)

100. Principles and Practices of Agricultural
Mechanization (3) I Basic principles and
operative skills in construction and maintenance
which are part of agricultural operations in
production and urban agriculture systems.

120. Microcomputing Applications (3) I II 1R,
6L. (Identical with ABE 120, which is home).

195. Colloquium
a. Agriculture Technology and Public
Policy (1) I

293. Internship (1-6) [Rpt./]

298. Senior Capstone (1-3) I II

320. Farm Nutrition and Management (1)
II The fundamentals of agricultural nutrition
and management for production of crops, livestock
and poultry. Emphasis is placed on safety in the
laboratory. 1R, 6L.

350. Applications in Agricultural Mechanics (3)
The fundamentals of agricultural power, electric
equipment may also be included. 1R, 6L.

399. Independent Study (1-5) I II

393. Internship (1-6)

498. Senior Capstone (1-3) I II

499. Independent Study (3) [Rpt./]

502. Agriculture and the environment:
Focus on Pesticides (3) II For a description of
course topics see AGTM 402. Graduate-level
requirements include an additional report. P, 6
units of agricultural education. (Identical with
ENTO 402, PL P 502). May be convened with
AGTM 532.

522. Communicating Knowledge in Agriculture
and the Life Sciences (3) I (Identical with A
ED 422, which is home). May be convened with
AGTM 522.

532. Technology Management (3) II Using the
latest computer and technological advances to
communicate effectively. Understanding the
capacity and limitations of computers, software
and technology, P, AGTM 122, AGTM 422. May
be convened with AGTM 532.

593. Internship (2-8) [Rpt./]

494. Practicum
r. Research (3) [Rpt./] I II P, ENGL 101,
MATH 117, ABE 120, consent of instructor.

498. Senior Capstone (1-3) I II

499. Independent Study (3) [Rpt./]

502. Agriculture and the environment:
Focus on Pesticides (3) II For a description of
course topics see AGTM 402. Graduate-level
requirements include an additional report. P, 6
units of agricultural education. (Identical with
ENTO 402, PL P 502). May be convened with
AGTM 532.

522. Communicating Knowledge in Agriculture
and the Life Sciences (3) I (Identical with A
ED 522, which is home). May be convened with
AGTM 522.

532. Technology Management (3) II For a
description of course topics see AGTM 432.
Graduate-level requirements include completion
and maintenance of a personal portfolio utilizing
all of the course's technologies. May be convened
with AGTM 432.

930. Independent Study (1-5) [Rpt./] I II

693. Internship (1-3)

699. Independent Study (1-3) [Rpt./]

COLLEGE OF AGRICULTURE

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The University of Arizona
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E-mail: kohn@ag.arizona.edu
URL: http://ag.arizona.edu/

The College of Agriculture provides professional
education for a wide range of career opportuni-


ties in agriculture, natural resources, and in family and consumer resources. Its responsibilities include instruction, research, and extension.

Baccalaureate Degrees
Bachelor of Science (B.S.)
Bachelor of Science in Agriculture (B.S.A.)
Bachelor of Science in Agriculture & Biosystems Engineering (B.S.A.B.E.)*
Bachelor of Science in Environmental Science (B.S.E.)
Bachelor of Science in Family and Consumer Resources (B.S.F.)
Bachelor of Science in Renewable Natural Resources (B.S.R.)

Graduate Degrees
Master of Science (M.S.)
Master of Agricultural Education (M.A.Ed.)
Master of Landscape Architecture (M.L.A.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Agricultural and Biosystems Engineering (B.S.A.B.E., M.S., Ph.D.)*
Agricultural and Resource Economics (B.S.A., M.S., Ph.D.**)
Agricultural Education (B.S.A., M.S., M.A.Ed.)
Agricultural Technology Management (B.S.A.)
Animal Sciences (B.S.A., M.S., Ph.D.)
Biochemistry (B.S.A.***)
Entomology (M.S., Ph.D.)
Environmental Science (B.E.S.)
Family and Consumer Resources (M.S., Ph.D.)
Family and Consumer Sciences Education (B.S.F.)
Family Studies (B.S.F.)
Landscape Architecture (M.L.A.)
Microbiology (B.S., B.S.A.)
Nutritional Sciences (B.S.A., M.S.)
Pathobiology (M.S., Ph.D.)
Plant Pathology (M.S., Ph.D.)
Plant Sciences (B.S.A., M.S., Ph.D.)
Range Management (M.S., Ph.D.)
Renewable Natural Resources Studies (M.S., Ph.D.)
Retailing & Consumer Studies (B.S.F.)
Soil and Water Science (B.S.A., M.S., Ph.D.)
Veterinary Science (B.S.A.)
Watershed Management (M.S., Ph.D.)
Wildlife and Fisheries Science (M.S., Ph.D.)
Wildlife, Watershed, & Rangeland Resources (B.S.R.)

Undergraduate Minors
Completion of a minor is not required for graduation in the College of Agriculture. For information about optional minors, contact the college at the office listed above.

General Education Program
All undergraduate students are required to complete the university-wide general education program. Designed to provide a foundation for university learning, the program develops students' creative and analytical skills and integrates knowledge across university disciplines.

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs are available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

American Indian Studies (AIS)
102. Linguistics for Native American Communities (3) S (Identical with LING 102, which is home).

104A. Beginning Navajo (3) I (Identical with LING 104A, which is home).

104B. Beginning Navajo (3) I (Identical with LING 104B, which is home).

199. Independent Study (1-3) [Rpt./]

204A. Intermediate Navajo (3) I (Identical with LING 204A, which is home).

204B. Intermediate Navajo (3) II (Identical with LING 204B, which is home).

205. Prehistoric Peoples of the Southwest (3) I II (Identical with ANTH 205, which is home).

206. Native Peoples of the Southwest (3) I II (Identical with ANTH 206, which is home).

210. Native Languages of North America (3) I II (Identical with LING 210, which is home).

248A. Introduction to Folklore (3) I (Identical with ENGL 248A, which is home).

248B. Introduction to Folklore (3) II (Identical with ENGL 248B, which is home).

270. Colonization and Native People (3) I II (Identical with POL 270, which is home).

278. American Indian Literature (3) I II (Identical with ENGL 278, which is home).

279. Oral Tradition (3) I II (Identical with ENGL 279, which is home).

299. Independent Study (2-4) [Rpt./]

307A. Elementary O’odham (3) I (Identical with LING 307A, which is home).

307B. Elementary O’odham (3) II (Identical with LING 307B, which is home).

334. Politics and American Indians (3) II (Identical with POL 334, which is home).

344. Native Americans in Film (3) I Survey of images of American Indians in cinema, particularly commercial films. Examines differences between the “western” and the “Indian” film and how imagery affects attitudes and policy-making.

396. Proseminar
h. Honors Proseminar (3) I II

399H. Honors Independent Study (1-3) [Rpt./]

413. Ethnology of the Southwest (3) II (Identical with ANTH 413, which is home). May be convened with AIS 513.

416. Contemporary Indian America (3) (Identical with ANTH 416, which is home). May be convened with AIS 516.
423. Anthropology of Rural Mexico (3) II
(Identical with ANTH 423, which is home). May be convened with AIS 523.

424. Studies in Southwest Literature (3) I II
(Identical with ENGL 424, which is home). May be convened with AIS 524.

430. The Anthropology of Visual Art (3) II
(Identical with ANTH 430, which is home). May be convened with AIS 530.

445A. Structure of Non-Western Language (3)
[Rept./ 2] I (Identical with LING 445A, which is home).

445B. Structure of Non-Western Language (3)
[Rept./ 2] II (Identical with LING 445B, which home). May be convened with AIS 545B.

449. Folklore (3) I II (Identical with ENGL 449, which is home).

450. American Indian Women (3) II Interdisciplinary exploration of new information available on American Indian women, especially materials written by Indian women and investigation of the status, experience, and contributions of American Indian women from pre-contact to contemporary times. P, upper-division standing or consent of instructor. (Identical with W S 450).

467. Race and Ethnic Relations (3) I II
(Identical with SOC 467, which is home).

477. Studies of Native American Literature (3) II
(Identical with ENGL 477, which is home).

478. American Indians and the Supreme Court (3)
(Identical with POL 478, which is home). May be convened with AIS 578.

482. Hopi Language in Culture (3) II (Identical with ANTH 482, which is home). May be convened with AIS 582.

487A. Race and Public Policy (3) I (Identical with POL 487A, which is home). May be convened with AIS 587A.

487B. Race and Public Policy (3) II (Identical with POL 487B, which is home). May be convened with AIS 587B.

489. Areal Survey of Native North American Languages (3) I II (Identical with ANTH 489, which is home). May be convened with AIS 589.

490. Indian Religions and Spirituality (3)
Examines the problems of Native American religions and spirituality. May be convened with AIS 496.

493. Internship (1-6) (Rpt./)

493. Internship
I. Legislative Internship (1-1) (Rpt./) I II

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ 2] I II

499. Independent Study (1-6) (Rpt./)

499H. Honors Independent Study (1-5) [Rpt./] I II

502. Dynamics of Indian Societies (3) I Historic overview of philosophies, institutions, and characteristics of Indian societies, and indigenous constructions of historic knowledge. (Identical with ANTH 502).

513. Ethnohistory of the Southwest (3) II
(Identical with ANTH 513, which is home). May be convened with AIS 413.

516. Contemporary Indian America (3)
(Identical with ANTH 516, which is home). May be convened with AIS 416.

523. Anthropology of Rural Mexico (3) II
(Identical with ANTH 523, which is home). May be convened with AIS 423.

524. Studies in Southwest Literature (3) I II
(Identical with ENGL 524, which is home). May be convened with AIS 424.

530. The Anthropology of Visual Art (3) II
(Identical with ANTH 530, which is home). May be convened with AIS 430.

545A. Structures of Non-Western Languages
[Rept./ 2] I (Identical with LING 445A, which is home).

545B. Structure of Non-Western Language (3)
[Rept./ 2] II (Identical with LING 445B, which is home). May be convened with AIS 445B.

549A. Folklore (3) I (Identical with ENGL 549A, which is home).

549B. Folklore (3) II (Identical with ENGL 549B, which is home).

576. Creative Writing for Native American Communities (3) I S For members of Native American communities and individuals working within such communities who are interested in producing new and authentic works in various genre including biography, autobiography, poetry, essay and translation and interpretation of collected tribal texts. Writing in the Native language will be strongly encouraged.

577. Studies in American Indian Literature (3) I II (Identical with ENGL 577, which is home).

578. American Indians and the Supreme Court (3)
(Identical with POL 578, which is home). May be convened with AIS 578.

582. Hopi Language in Culture (3) II (Identical with ANTH 482, which is home). May be convened with AIS 582.

587A. Race and Public Policy (3) I (Identical with POL 487A, which is home). May be convened with AIS 587A.

587B. Race and Public Policy (3) II (Identical with POL 487B, which is home). May be convened with AIS 587B.

589. Areal Survey of Native North American Languages (3) I II (Identical with ANTH 489, which is home). May be convened with AIS 589.

590. Indian Religions and Spirituality (3)
Examines the problems of Native American religions and spirituality. May be convened with AIS 496.

593. Internship (1-6) (Rpt./)

596. Seminar
f. American Indian Studies (1-2) [Rpt/ 8 units] I II
h. American Indian Law and Policy (3) I II
(Identical with POL 596H, which is home).

599. Independent Study (1-5) (Rpt./)

602. Interdisciplinary Research: Theory and Methods (3) I II Survey of important theoretical perspectives and their associated qualitative methodologies in American Indian studies. Overview of selected disciplinary frameworks of inquiry, discussions of case studies, and student exercises in choosing and implementing appropriate qualitative research methods.

631A. Federal Indian Law I (3) I II (Identical with LAW 631A, which is home).

631B. Federal Indian Law II (3) I II (Identical with LAW 631B, which is home).

646. Ancient and Contemporary Voices (3) I II The connections between ancient and contemporary native literature of North and South America. (Identical with ENGL 646).

660. Ecology, Demography, and Disease (3) I II Linked issues of environmental change, demographic change, epidemic/endemic diseases, and health in the Americas after 1492.

670. Colonization and Native Peoples (3) I II Examination of colonialism as theoretical model and as political-economic phenomenon. Case studies of indigenous groups' reactions to colonizing agents from the Americas, the Pacific Rim, and other countries. (Identical with POL 670).

677. History of American Indian Education (3) I II Educational philosophies, policies, and practices of native people, European missions, and federal schools. Historic overview of Indian education to early 1900s. (Identical with LRC 677).

678. Contemporary American Indian Education and Research (3) I II Development of higher education for American Indians/Alaskan natives from the earliest efforts to contemporary times. Issues and their implications for the education of American Indians in institutions and agencies of higher education. Emphasis on tribal controlled colleges and universities, and the development of American Indian studies programs in higher education institutions.

688. Energy and Natural Resources (3) I I (Identical with W S 688, which is home).

696. Seminar
a. American Indian Policy (3) [Rpt/ 1] I II
102. Animal Industry (3) III A comprehensive view of the livestock and poultry industries, including the way the science of biology is used in modern livestock practice. P, open to students with no more than 7 units of animal science.

142. Introduction to Animal Racing Industry (2) I Overview of the history, terminology, personnel, equipment and breeds of animals utilized in the racing industry.

197. Workshop

a. Health and Biology of Animals (1) S P, Horizons Unlimited summer program participants only; Field trips.

205. Live Animal and Carcass Evaluation (3) II A comprehensive view of meat animal, dairy and horse selection techniques, including the evaluation of meat animals and their carcasses as related to economic importance; the selection of breeding animals based upon visual appraisal and performance records. 1R, 6L.


215. Physiology and Anatomy of Domestic Animals (3) III Systemic physiology and functional anatomy of domestic animals with emphasis on physiological systems of importance to animal production. P, 3 units of biology.

234. Feeds and Feeding (3) III Selection, evaluation, and use of feeds for specific purposes; balancing rations for livestock and poultry. P, not open to students with credit or CR in AN 5330.

250. Companion Animal Biology (3) I Principles of anatomy, physiology and behavior of companion animals and their interrelationship to humans.

270. Introductory Horse Science (3) I An introduction to the fundamental aspects of horse science; ownership responsibilities, economics, anatomy, physiological systems and careers in the horse industry. Field trips.


295. Colloquium

a. Career Orientation (1) II

297. Workshop

a. Cattle Management (1) I Field trips.

299. Independent Study (1-3) [Rpt.]

299H. Honors Independent Study (1-3) [Rpt.]

313. Principles of Animal Breeding (3) II Basic concepts involved in the improvement of economically important traits of livestock through application of genetic principles. P, MATH 117R or MATH 117S; AN S 213. Writing-Emphasis Course; Field trips.

315L. Physiology of Reproduction Laboratory (1) I Practice in semen collection and storage, artificial insemination, and hormone assay. P, AN S 315R or CR, AN S 315R. (Identical with V SC 315L).

315R. Physiology of Reproduction (3) I Study of the organs of reproduction and their functions, with emphasis on domestic animals. P, AN S 315R.

ANESTHESIOLOGY (ANES)

For information about anesthesiology courses, see the College of Medicine section of this manual.

ANIMAL SCIENCES (AN S)

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The University of Arizona
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FAX: (520) 621-9435
E-mail: lgsmith@ag.arizona.edu
URL: http://ag.arizona.edu/ANS/anshome.html

Baccalaureate Degree
Bachelor of Science in Agriculture (B.S.A.)

Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Animal Sciences (B.S.A., M.S., Ph.D.)

B.S.A. Options:
animal industry
racertrack industry
science and pre-professional

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs are available in the On Course! Academic Catalog (available on line at: http://www.arizona.edu/academic/oncourse/data/index.html). Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/index/minors.html.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Animal Sciences (AN S)

102. Animal Industry (3) III A comprehensive view of the livestock and poultry industries, including the way the science of biology is used in modern livestock practice. P, open to students with no more than 7 units of animal science.

142. Introduction to Animal Racing Industry (2) I Overview of the history, terminology, personnel, equipment and breeds of animals utilized in the racing industry.

197. Workshop

a. Health and Biology of Animals (1) S P, Horizons Unlimited summer program participants only; Field trips.

205. Live Animal and Carcass Evaluation (3) II A comprehensive view of meat animal, dairy and horse selection techniques, including the evaluation of meat animals and their carcasses as related to economic importance; the selection of breeding animals based upon visual appraisal and performance records. 1R, 6L.


215. Physiology and Anatomy of Domestic Animals (3) III Systemic physiology and functional anatomy of domestic animals with emphasis on physiological systems of importance to animal production. P, 3 units of biology.

234. Feeds and Feeding (3) III Selection, evaluation, and use of feeds for specific purposes; balancing rations for livestock and poultry. P, not open to students with credit or CR in AN 5330.

250. Companion Animal Biology (3) I Principles of anatomy, physiology and behavior of companion animals and their interrelationship to humans.

270. Introductory Horse Science (3) I An introduction to the fundamental aspects of horse science; ownership responsibilities, economics, anatomy, physiological systems and careers in the horse industry. Field trips.


295. Colloquium

a. Professional Development in Animal Agriculture (1) I

297. Workshop

a. Cattle Management (1) I Field trips.

299. Independent Study (1-3) [Rpt.]

299H. Honors Independent Study (1-3) [Rpt.]

313. Principles of Animal Breeding (3) II Basic concepts involved in the improvement of economically important traits of livestock through application of genetic principles. P, MATH 117R or MATH 117S; AN S 213. Writing-Emphasis Course; Field trips.

315L. Physiology of Reproduction Laboratory (1) I Practice in semen collection and storage, artificial insemination, and hormone assay. P, AN S 315R or CR, AN S 315R. (Identical with V SC 315L).

315R. Physiology of Reproduction (3) I Study of the organs of reproduction and their function, with emphasis on domestic animals. P, AN S 315R.
472. Dairy Herd Management (3) I Proper milking, efficient housing, and health management of dairy cattle; marketing milk from the farm; milk production costs. P, AN S 330; Field trips.

473. Swine Production (2) I The production, feeding, and management of swine in intensive production systems. P, AN S 330; Field trips.

474. Sheep Production (2) II The production, feeding, and management of sheep on the farm and ranch. 1R, 3L. P, AN S 330.

476. Horse Production (3) II Production, feeding, management, reproduction, and business aspects of modern horse management. 2R, 3L. P, AN S 330, AN S 315R; Field trips.

477. Beef Resource Management (2) II Integration of beef production resources into a comprehensive beef production system; including breeding, feeding and marketing strategies. Field trips.

478. Feedlot Beef Production (3) I Feeding and management systems of beef cattle in the feedlot. P, AN S 280, AN S 336; All day field trips.

493. Internship (3) [Rpt./]

499. Independent Study (1-3) [Rpt./] 609. Nutritional Biochemistry Techniques (3) II (Identical with N SC 609, which is home).

615. Chemistry and Metabolism of Lipids (3) II (Identical with N SC 615, which is home).

622. Mineral Metabolism (2) II (Identical with N SC 622, which is home).

635. Ruminant Nutrition (3) I Recent findings in ruminant nutrition; the physiochemical processes of digestion and absorption; importance and metabolism of rumin microflora; normal metabolism and abnormal metabolic disorders; modes of action of feed stimulants. P, AN S 330, AN S 336, CHEM 241A, CHEM 243A.

636. Ruminant Protein Metabolism (2) II Digestion, absorption and metabolism of protein and ruminants. Importance of factors influencing protein degradation and microbial synthesis. P, AN S 635.


665. Analysis and Purification of Proteins (3) II Principles and procedures for analyzing, purifying, and characterizing proteins and amino acids from cells or from CDNA expression systems. P, BIOC 462A; BIOC 460. (Identical with BIOC 665, N SC 665).

684. Animal Physiology Research Techniques (2) I Introduction to selected physiological and biochemical techniques used in animal research. P, BIOC 460 accepted or BIOC 462A preferred.

685. Domestic Animals Endocrinology (3) I Endocrine regulation of growth, metabolism and reproduction of domestic farm animals. P, 3 units of biochemistry.

593. Internship (3) [Rpt./]

596. Seminar

a. Animal Sciences (1) [Rpt./ 3] I II

599. Independent Study (1-3) [Rpt./]

609. Nutritional Biochemistry Techniques (3) II (Identical with N SC 609, which is home).

615. Chemistry and Metabolism of Lipids (3) II (Identical with N SC 615, which is home).

622. Mineral Metabolism (2) II (Identical with N SC 622, which is home).

635. Ruminant Nutrition (3) I Recent findings in ruminant nutrition; the physiochemical processes of digestion and absorption; importance and metabolism of rumin microflora; normal metabolism and abnormal metabolic disorders; modes of action of feed stimulants. P, AN S 330, AN S 336, CHEM 241A, CHEM 243A.

636. Ruminant Protein Metabolism (2) II Digestion, absorption and metabolism of protein and ruminants. Importance of factors influencing protein degradation and microbial synthesis. P, AN S 635.


665. Analysis and Purification of Proteins (3) II Principles and procedures for analyzing, purifying, and characterizing proteins and amino acids from cells or from CDNA expression systems. P, BIOC 462A; BIOC 460. (Identical with BIOC 665, N SC 665).

684. Animal Physiology Research Techniques (2) I Introduction to selected physiological and biochemical techniques used in animal research. P, BIOC 460 accepted or BIOC 462A preferred. Open to majors only.

685. Domestic Animals Endocrinology (3) I Endocrine regulation of growth, metabolism and reproduction of domestic farm animals. P, 3 units of biochemistry.

593. Internship (3) [Rpt./]

596. Seminar

a. Animal Sciences (1) [Rpt./ 3] I II

609. Nutritional Biochemistry Techniques (3) II (Identical with N SC 609, which is home).

615. Chemistry and Metabolism of Lipids (3) II (Identical with N SC 615, which is home).

622. Mineral Metabolism (2) II (Identical with N SC 622, which is home).

635. Ruminant Nutrition (3) I Recent findings in ruminant nutrition; the physiochemical processes of digestion and absorption; importance and metabolism of rumin microflora; normal metabolism and abnormal metabolic disorders; modes of action of feed stimulants. P, AN S 330, AN S 336, CHEM 241A, CHEM 243A.

636. Ruminant Protein Metabolism (2) II Digestion, absorption and metabolism of protein and ruminants. Importance of factors influencing protein degradation and microbial synthesis. P, AN S 635.
302. Educational Applications in Museum Anthropology (3) I II Introduction to museum education and anthropology of the Southwest which examines cultural diversity of the region. Students conduct museum tours for public school students. (Identical with TTE 302).


304. Introduction to Archaeological Fieldwork (3) I II Practical excavation, class discussion, mapping and the preliminary stages of artifact analysis. 3R, 6L. Field trips.

305. Cultural Change (3) I A review of theories of cultural and social change with case studies. P, 6 units of cultural anthropology courses or consent of instructor.

307. Ecological Anthropology (3) I Cultural adaptation with emphasis on the systematic interaction of environment, technology, and social organization among hunter-gatherers, nomadic herders, and peasant farmers.

308. Family, Household and Society (3) I Introduction to the cross-cultural analysis of family and kinship systems. P, Writing-Emphasis Course.


311. Urban Adaptation of Ethnic Groups (3) I A survey of adaptations of ethnic and social groups to urban areas, focusing on a different group or region each semester. P, 6 units of cultural anthropology courses or consent of instructor.

313. Anthropology and Public Policy (3) I II Examines the development, goals, techniques, and practices of anthropology as a policy science. P, consent of instructor or 6 units of cultural anthropology courses.

315. World Ethnography (3) I The comparative study of selected societies of the world through extensive use of the media. P, Writing-Emphasis course.


321. Anthropology and Development (3) I The role of anthropology in interdisciplinary projects involving economic development and planned change on the national and international levels. P, 3 units of anthropology. P, 3 units of anthropology. (Identical with LA S 331).

323. Introduction to Archaeological Analysis (3) I Introduction to analysis of major classes of archaeological materials, including chipped and ground stone, ceramics, fauna, flora, and architecture. Uses lectures and hands-on exercises.

334. Art and Archaeology of Ancient Egypt (3) I II (Identical with CLAS 334, which is home).

335. Archaeological Interpretation (3) I I Survey of modern methods and theories in archaeology, with emphasis on current archaeological problems being investigated throughout the world. P, ANTH 235.

337. Studies in Modern Material Culture (3) I Studies relating contemporary behavior and material culture will be planned, implemented, and evaluated to test methods of archaeological interpretation in modern societies and to develop new nonreactive methods of social science research. P, 3 units of social science.

338. Introduction to Zooarcheology (3) I Animals in relation to man, with emphasis on past cultures, especially in the Southwest; morphology of animal skeletons; identification and interpretation of fragmentary remains.


340A. Introduction to Classical Art and Archaeology (3) I (Identical with CLAS 340A, which is home).

340B. Introduction to Classical Art and Archaeology (3) II (Identical with CLAS 340B, which is home).

344. African American Religion (3) I II GRD (Identical with AFAS 344, which is home).

364. Primatology (3) I Comparative primate biology, behavior, ecology and evolution. P, ANTH 111 or ANTH 265; Writing-Emphasis Course.

365. The Primate Skeleton (3) I Comparative primate skeletal anatomy from an anthropologi-
cal viewpoint including study of function, behavior, ecology, and evolution. P, ANTH 265 or consent of department.

367. Human Population Variation (3) II Conceptual differences between the cultural typological concept of "race" and the genetic evolutionary concept of the population. Examines population differences, the process that may have established them, and interpretations of their significance. P, ANTH 101 or ANTH 111.

374. Processes of Culture Change (3) II Intensive investigation of specific theories and varieties of culture change. P, consent of instructor or 6 units of cultural anthropology courses.

375. Ethnography of the Middle East (3) II Introduction to and critical examination of the ethnographic literature on the peoples/cultures of the Middle East. Focus on social organization, cultural meanings, and regional political economy. (Identical with NES 375).

380. Global Agricultural and International Relations (3) (Identical with AGTM 380, which is home).

384. Sociology of Latin American Societies (3) II (Identical with SOC 384, which is home).

393. Internship e. Congressional Internship (1-3) S (Identical with POL 393E, which is home).

396. Proseminar h. Honors Proseminar (3) I II
399. Independent Study (1-5) [Rpt./]
399H. Honors Independent Study (3) [Rpt./] I II
402. Gender and Language in Japan (3) II (Identical with JPN 402, which is home).

403. Anthropology of Conflict Resolution (3) II Decision making, conflict, and violence from a cross-cultural perspective, aiming to build both understanding of conflict processes and skills for managing and resolving them. May be convened with ANTH 503.

406. Gender and Social Identity (3) II An analysis of the social and cultural construction of gender across cultures. Emphasis will be on pre-industrial societies, using data to test theories of gender. P, Writing-Emphasis Course. (Identical with W S 406). May be convened with ANTH 506.

409. Economic Anthropology (3) II Analysis of production, exchange, distribution, consumption, property, economic surplus, inheritance, and types of economic structure. P, ANTH 200 or 12 units of economics. (Identical with LA S 409). May be convened with ANTH 509.

410. Ceramic Ethnoarchaeology (3) II Using ethnarchaeological and ethnographic case studies from diverse geographical areas, the course examines relationships between ceramics and a range of matters traditionally of interest to archaeologists. May be convened with ANTH 510.

411. Anthropology of Religion (3) I Comparative approaches to the study of religion, systems of ritual and symbolism in the primitive world, shamanism and possession, religious movements, and religion in the modern world. (Identical with RELI 411). May be convened with ANTH 511.

412. Peasants and Peasant Societies (3) II Comparison of approaches to analyzing the peasantry. Special concerns with peasant political mobilization and consciousness. P, Writing Emphasis course for research. (Identical with SOC 412). May be convened with ANTH 512.

413. Ethnology of the Southwest (3) II Culture, history and economic, social, and religious institutions of the living people of the Southwest. P, ANTH 200, Writing-Emphasis Course. (Identical with AIS 413). May be convened with ANTH 513.

414A. Indians of the Southwest (3) S History, arts and crafts, economics, social institutions, religions, and mythology of the present-day Indians of the Southwest.

414B. Indians of the Southwest (3) S History, arts and crafts, economics, social institutions, religions, and mythology of the present-day Indians of the Southwest.

416. Contemporary Indian America (3) The historical development and contemporary significance of the life of the Native American of the United States. (Identical with AIS 416). May be convened with ANTH 516.

417. Cultures of Ancient Mexico (3) S Archaeological and ethnohistorical survey of the civilizations of ancient Mexico from earliest times to the period of the Spanish Conquest. Field trips. (Identical with LA S 417). May be convened with ANTH 517.

419. Psychological Anthropology (3) II Cultural emphasis and experiences as basic shaping forces in personal development and emotion. Topics include psychoanalysis and anthropology, gender and sexuality, childhood, grief and mourning, dreaming, psychopathology. P, ANTH 102 or ANTH 200. May be convened with ANTH 519.

420. Contemporary American Culture (3) I Diverse perspectives on American values as expressed in organization of kinship, space, bureaucracies, media, social classes, ethnic groups, religious sects and movements. May be convened with ANTH 520.


422A. Pre-Hispanic Art (3) I (Identical with ARH 422A, which is home). May be convened with ANTH 522A.

422B. Pre-Hispanic Art (3) II (Identical with ARH 422B, which is home). May be convened with ANTH 522B.

422C. Pre-Hispanic Art (3) I II (Identical with ARH 422C, which is home). May be convened with ANTH 522C.

423. Anthropology of Rural Mexico (3) II Historical and cultural background, and contemporary economic; political and social organization of indigenous and non-indigenous groups in rural Mexico. Primarily concerned with the people of the countryside, and the Mexican revolution. (Identical with AIS 423, LA S 423). May be convened with ANTH 523.

424. Theoretical Population Genetics (3) I (Identical with ECOL 424, which is home). May be convened with ANTH 524.

425. Language Variation (3) II (Identical with ECOL 425, which is home). May be convened with ANTH 525.

426. Archaeology of Africa (3) I II Survey of the prehistory and early history of Africa, with emphasis on sub-Saharan Africa and on the last ten thousand years. P, 3 units of archaeology. (Identical with ASAP 426). May be convened with ANTH 526.

427A. The Prehistory of East Asia (3) I The origins and subsequent development of prehistoric cultures in China, Japan, Korea, Mongolia, Siberia and Southeast Asia. Broad concepts such as cultural change and environmental adaptation are stressed in order to draw parallels among these geographically and culturally diverse regions. P, ANTH 101, ANTH 427A is not prerequisite to ANTH 427B. (Identical with CHN 427A). May be convened with ANTH 527A.

427B. The Archaeology of Pre-Han China (3) I II The origin and florescence of Chinese culture and civilization from an archaeological perspective. An in-depth survey of Chinese prehistory and early history from the early Pleistocene to the third century BC. P, ANTH 101, consent of department, ANTH 427A is not prerequisite to ANTH 427B. (Identical with CHN 427B). May be convened with ANTH 527B.

430. Anthropology of Visual Art (3) II An introduction to the anthropology of visual art and the interdisciplinary methodologies and techniques of studying art and aesthetics cross-culturally as sociocultural phenomena. P, ANTH 200. (Identical with AIS 430). May be convened with ANTH 530.

432. Peoples of the Pacific (3) I Populations and cultures of Polynesia, Micronesia, and Melanesia; variability of these "natural laboratory" settings in an ecological framework. May be convened with ANTH 532.


435. Principles of Archaeological Fieldwork (3) II Introduction to the principles of archaeological fieldwork, with emphasis on method and theory of survey and excavation. 2R, 3L, P, ANTH 235. May be convened with ANTH 535.

436. Japanese Sociolinguistics (3) II (Identical with JPN 436, which is home).

437. Ethnographic Film and Video (3) I II (Identical with EAS 437A). May be convened with ANTH 537.

440. Engendering the Past (3) I II Primatological, ethnographic, archaeological, and historical
453A. Mesoamerican Archaeology (3) I Development of culture in Mexico and Central America from the origins of agriculture through the Spanish Conquest. Course focuses on Maya culture. P, ANTH 453A is not prerequisite to ANTH 453B, Writing-Emphasis Course. (Identical with LA S 453A, MAS 453A). May be convened with ANTH 553A.

453B. Mesoamerican Archaeology (3) II Development of culture in Mexico and Central America from the origins of agriculture through the Spanish Conquest. Course focuses on the culture of Mexico north of the Maya area. P, ANTH 453A is not prerequisite to ANTH 453B, Writing-Emphasis Course. (Identical with LA S 453B, MAS 453B). May be convened with ANTH 553B.

454. Andean Archaeology (3) I Development of culture in the Andean countries of South America from hunters and gatherers of the terminal Pleistocene through Inca civilization. (Identical with LA S 454). May be convened with ANTH 554.

455. Ethnoarchaeology (3) II History, method, and theory of ethnoarchaeology with case studies of the use of ethnography in archaeological interpretation and theory-building. May be convened with ANTH 555.

456A. Old World Prehistory (3) I A survey and interpretation of archaeological evidence for human cultural development of the Old World prior to the appearance of anatomically modern humans. Course covers the Paleolithic; from earliest tools to the cave artists at the end of the Ice Age. May be convened with ANTH 556A.

456B. Old World Prehistory (3) II A survey and interpretation of archaeological evidence for human cultural development of the Old World prior to the appearance of cultural development of the Old World prior to the appearance of anatomically modern humans. Course covers hunting and gathering to the roots of urban society following the Ice Age. May be convened with ANTH 556B.

457. Prehistoric Mesopotamia (3) I Theories of the rise of civilization tested against archaeological data from Mesopotamia with comparative material from other areas. Time period: end of the Paleolithic to historic (Sumerian) civilization. (Identical with NES 457). May be convened with ANTH 557.

458. Historical Archaeology (3) II Survey of the basic data and methods of research in the material culture of modern history. The New World from first European contacts to the 20th century. May be convened with ANTH 558.

460. Historical Archaeological Theory (3) II Explores the relationship between method and theory in anthropological archaeology over the past 100 years. The intimate relationship between general theory and the development of methods and research interests in archaeology will be demonstrated through case studies. May be convened with ANTH 560.

462. Introduction to Quaternary Ecology (3) I II (Identical with GEOS 462, which is home).

463. Classical Field Archaeology (6) [Rpt/ 1] S (Identical with CLAS 463, which is home).

464. Introduction to Dendrochronology (4) I (Identical with GEOS 464, which is home). May be convened with ANTH 564.

465. Women in International Development (3) I II The impact of international development on women as agricultural producers, householders, migrants, workers in formal/informal labor markets and participants in planned change. (Identical with FCR 465, LA S 465, W S 465). May be convened with ANTH 565.

466. Paleoanthropology (3) I Evidence for human and nonhuman primate evolution including laboratory study of fossil casts and modern skeletal biology. P, ANTH 265 or consent of department, Writing-Emphasis Course. May be convened with ANTH 566.

467. Race and Ethnic Relations (3) I II (Identical with SOC 467, which is home).

468. Human Osteology (4) I Comparative study of the bones of living and fossil primates. May be convened with ANTH 568.

470A. Human Adaptability (3) I Study of the means by which humans adjust to their environments through the processes of growth and development. Focus is on physiological, nutritional, and epidemiological factors. Includes discussion of the biology of human aging. P, ANTH 265 or consent of department, ANTH 470A is not prerequisite to ANTH 470B. (Identical with GERO 470A). May be convened with ANTH 570A.

470B. Human Adaptability (3) II Study of the means by which humans adjust to their environments through the processes of growth and development. Focus is on physiological, nutritional, and epidemiological factors. P, ANTH 265 or consent of department, ANTH 470A is not prerequisite to ANTH 470B. May be convened with ANTH 570B.

472. Zooarchaeology and Taphonomy: Laboratory Methods (3) I II Identification and classification of faunal remains from prehistoric and historic sites; investigation of the circumstances of faunal assemblage formation; introduction to quantitative and qualitative analysis of faunal data. Course work emphasizes hands-on experience in laboratory methods, analysis exercises and short research paper assignments. May be convened with ANTH 572.

473. Primate Anatomy (4) I Comparative primate functional anatomy from an anthropological viewpoint including extensive laboratory dissection and study of behavior, ecology, and evolution. P, ANTH 265 or consent of department. May be convened with ANTH 573.

474. Archaeometry: Scientific Methods in Art and Archaeology (3) II Critical survey of scientific methods used in archaeology and art history. Emphasis on the potential and limitations of these techniques for reconstructing human behavior. P, ANTH 304 or equivalent to ANTH 304. (Identical with CLAS 474, NES 474). May be convened with ANTH 574.

476. Language in Culture (3) I II Survey of the
nature of the interrelationships between language and other cultural phenomena. P, ANTH 276 or LING 101; Writing-Emphasis Course. (Identical with LING 476). May be convened with ANTH 576.

477. Discourse and Text (3) II Analysis and cross-cultural comparison of patterns of communication in discourse; modern approaches to discourse and text. P, LING 101 or ANTH 276. (Identical with LING 477). May be convened with ANTH 577.

478. Design, Production and Performance of Ceramics and Metals (3) II (Identical with MSE 478, which is home). May be convened with ANTH 578.

479. Culture and Materials Technology (3) I Investigates the ways in which systems of technology are embedded in a cultural context and the resulting impacts on invention, innovation and conservation, technology transfer, and cultural change. (Identical with ENGR 479, MSE 479). May be convened with ANTH 579.

480. Historical Comparative Linguistics (3) I Types and mechanisms of linguistic change; language and dialect formation; determination of prehistoric connections; reconstruction of proto-languages and cultures, and their origins in time and space. P, ANTH 276 or LING 101; Writing-Emphasis Course. (Identical with LING 480). May be convened with ANTH 580.

481. Quaternary Palynology and Plant Macrofossils (2-4) II (Identical with GEOS 481, which is home). May be convened with ANTH 581.

482. Hopi Language in Culture (3) II A conversational introduction to Third Mesa dialect of Hopi, with emphasis on cultural context and covering essentials of Hopi language structure. (Identical with AIS 482). May be convened with ANTH 582.

487. Interpretations of Women's Health (3) I (Identical with W S 487, which is home).

488. Governing Science and Technology (3) II (Identical with GEOG 488, which is home).

489. Areal Survey of Native North American Languages (3) I II The field of native North American linguistics; areal and genetic classifications; how the study of particular languages provides insights into theories of linguistic anthropology and general linguistics. P, ANTH 276 or LING 101. (Identical with AIS 489, LING 489). May be convened with ANTH 589.

490. Women in Middle Eastern Society (3) I Middle Eastern society viewed from the perspective of women. Examines the extent to which formal definitions of women's nature and roles coincide with women's self-images and activities. (Identical with NES 490, W S 490). May be convened with ANTH 590.

493. Internship I Legislative Internship (1-12) [Rpt./] II

496. Seminar f. Ceramic Analysis (3) I May be convened with ANTH 596F.

h. Experimental Archaeology (3) I May be convened with ANTH 596H.

497. Workshop c. Dendrochronology (1-4) II (Identical with GEOS 497C, which is home). May be convened with ANTH 597C.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./] II

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (3) [Rpt./] I

502. Dynamics of Indian Societies (3) I (Identical with AIS 502, which is home).

503. Anthropology of Conflict Resolution (3) II For a description of course topics see ANTH 403. Graduate-level requirements include a major term paper. May be convened with ANTH 403.

506. Gender and Social Identity (3) II For a description of course topics see ANTH 406. Graduate-level requirements include additional readings and a detailed research paper. May be convened with ANTH 406.

508. The Mexican American: Cultural Perspectives (3) I (Identical with MAS 508, which is home).

509. Economic Anthropology (3) II For a description of course topics see ANTH 409. Graduate-level requirements include an in-depth research paper. (Identical with LA S 509). May be convened with ANTH 409.

510. Ceramic Ethnoarchaeology (3) II For a description of course topics see ANTH 410. For a description of course topics see ANTH 410. Graduate-level requirements include a research paper. May be convened with ANTH 410.

511. Anthropology of Religion (3) I For a description of course topics see ANTH 411. Graduate-level requirements include a major term paper. May be convened with ANTH 411.

512. Peasants and Peasant Societies (3) For a description of course topics see ANTH 412. Graduate-level requirements include an additional research paper. May be convened with ANTH 412.

513. Ethnology of the Southwest (3) II For a description of course topics see ANTH 413. Graduate-level requirements include a research paper. (Identical with AIS 513). May be convened with ANTH 413.

514. Late Quaternary Geology (3) I (Identical with GEOS 514, which is home).

515. Cultural Ecology of Agrarian Societies in the Middle East (3) II Emphasis is on land tenure, Islamic law, irrigation and agricultural development in the central Middle East, Nile valley, North Africa, and the Sahel from the Middle Ages to the present.

516. Contemporary Indian America (3) For a description of course topics see ANTH 416. Graduate-level requirements include a term paper based on original archival or field research. (Identical with AIS 516). May be convened with ANTH 416.

517. Cultures of Ancient Mexico (3) S For a description of course topics see ANTH 432. Graduate-level requirements include an oral presentation and a research paper. May be convened with ANTH 421.

521. Ethnology North America (3) I For a description of course topics see ANTH 421. Graduate-level requirements include an oral presentation and a research paper. May be convened with ANTH 421.

522A. Pre-Hispanic Art (3) I (Identical with ARH 522A, which is home). May be convened with ANTH 422A.

522B. Pre-Hispanic Art (3) II (Identical with ARH 522B, which is home). May be convened with ANTH 422B.

522C. Pre-Hispanic Art (3) II (Identical with ARH 522C, which is home). May be convened with ANTH 422C.

523. Anthropology of Rural Mexico (3) II For a description of course topics see ANTH 423. Graduate-level requirements include a term paper based on original library, archival or field research. (Identical with AIS 523, LA S 523). May be convened with ANTH 423.

524. Theoretical Population Genetics (3) I (Identical with ECOL 524, which is home). May be convened with ANTH 424.

525. Language Variation (3) II (Identical with LING 525, which is home). May be convened with ANTH 425.

526. Archaeology of Africa (3) II For a description of course topics see ANTH 426. Graduate-level requirements include a 30 page term paper. (Identical with AFAS 526). May be convened with ANTH 426.

527A. The Prehistory of East Asia (3) I For a description of course topics see ANTH 427A. Graduate-level requirements include a 20 to 30 page research paper. (Identical with EAS 527A). May be convened with ANTH 427A.

527B. The Archaeology of Pre-Han China (3) II For a description of course topics see ANTH 427B. Graduate-level requirements include a 20 to 30 page research paper. (Identical with CHN 527B). May be convened with ANTH 427B.

528. Near East Pastoral Nomads and Arid Lands Hunter-Gatherers (3) I A rigorous introduction to pastoral nomads and hunter-gatherers with a focus on arid lands.

530. The Anthropology of Visual Art (3) II For a description of course topics see ANTH 430. Graduate-level requirements include a research paper or project. (Identical with AIS 530). May be convened with ANTH 430.

532. Peoples of the Pacific (3) I For a description of course topics see ANTH 432. Graduate-
534. Kinship and Social Organizations (3) II For a description of course topics see ANTH 434. Graduate-level requirements include additional readings and a detailed term paper. May be convened with ANTH 434.

535. Principles of Archaeological Fieldwork (3) II For a description of course topics see ANTH 435. Graduate students are expected to perform at a higher level of sophistication. May be convened with ANTH 435.

536A. Medical Anthropology (3) II Anthropology of illness and health. Lay perceptions of health, ethnophysiology and pathology; pluralistic ideas about illness experiences; indigenous ideas about preventative and promotive health; folk dietetics; social labeling; and illness responsibility attribution. Emphasis on the study of health culture and how the subjective experience of illness and health is influenced by cultural variables. Draws upon cross-cultural ethnographic research and consideration of American health culture. P, ANTH 536A is not prerequisite to ANTH 536B.

536B. Ethnomedicine (3) II Comparative medical systems and healing traditions, regional health arenas, and health care seeking. Topics include folk medicine, traditional medical systems, distinctive illness and public health problems, patterns of resort in the use of pluralistic medical resources, and the way in which the practice of biomedicine has been adapted to regional culture. Explores the medical cultures of Mexico and Latin America, Native America, Africa and Asia. P, ANTH 536A is not prerequisite to ANTH 536B.

540. Engendering The Past (3) I II Graduate-level requirements include more advanced coursework and a book review. (Identical with W S 540).

541. Organization of Museums (3) For a description of course topics see ANTH 441. Graduate-level requirements include a volunteer project in a local museum providing practical, hands-on experience in museum work. May be convened with ANTH 441.

543A. Archaeology of Neolithic and Bronze Age Greece (3) [Rpt./ 1] I (Identical with CLAS 543A, which is home). May be convened with ANTH 443A.

548. Writing Culture (3) [Rpt./ 1] I For a description of course topics see ANTH 448. Graduate-level requirements include a longer term paper. May be convened with ANTH 447.

549A. Folklore (3) I (Identical with ENGL 549A, which is home).

549B. Folklore (3) II (Identical with ENGL 549B, which is home).

551A. Eastern North America (3) I For a description of course topics see ANTH 451A. Graduate-level requirements include a research paper. May be convened with ANTH 451A.

551B. Western North America (3) I For a description of course topics see ANTH 451B. Graduate-level requirements include a research paper. May be convened with ANTH 451B.

552L. Archaeology of the Southwest (3) II The nature of archaeological data recovered in the Southwest, with emphasis on their potential for the drawing of both cultural and chronological inferences.

553A. Mesoamerican Archaeology (3) I For a description of course topics see ANTH 453A. Graduate-level requirements include an additional research paper. (Identical with LA S 553A). May be convened with ANTH 453A.

553B. Mesoamerican Archaeology (3) II For a description of course topics see ANTH 453B. Graduate-level requirements include an additional research paper. (Identical with LA S 553B). May be convened with ANTH 453B.

554. Andean Archaeology (3) II For a description of course topics see ANTH 454. Graduate-level requirements include two reviews of research monographs. (Identical with LA S 554). May be convened with ANTH 454.

555. Ethnoarchaeology (3) II For a description of course topics see ANTH 455. Graduate-level requirements include a research paper. May be convened with ANTH 455.

556A. Old World Prehistory (3) I For a description of course topics see ANTH 456A. Graduate-level requirements include a research paper. May be convened with ANTH 456A.

556B. Old World Prehistory (3) II For a description of course topics see ANTH 456B. Graduate-level requirements include a research paper. May be convened with ANTH 456B.

557. Prehistoric Mesopotamia (3) I For a description of course topics see ANTH 457. Graduate-level requirements include additional readings and a detailed research paper. (Identical with NES 557). May be convened with ANTH 457.

558. Historical Archaeology (3) II For a description of course topics see ANTH 458. Graduate-level requirements include an additional research paper. May be convened with ANTH 458.

560. Historical Archaeological Theory (3) II For a description of course topics see ANTH 460. Graduate-level requirements include a research paper. May be convened with ANTH 460.

561. Paleoindian Origins (3) I Chronological development of Paleo-Indian occupation of the New World in relation to environmental changes of the Quaternary Period; site discoveries, case studies, hypothesis on the peopling of the Americas. Field trips. (Identical with GEOS 561).

562. Archaeological Quantitative Methods (3) I Intensive review of the theory and application of statistical and mathematical methods to archaeological data.

563. Evolution of Ancient States and Civilization (3) II Classical and modern theories used to explain the rise of ancient states and civilizations are evaluated as systems of anthropological logic and for their ability to elucidate the archaeological record. Major topics include the nature of growth trajectories, variability in ancient states, the collapse of states, and constraints of growth in selected areas of the world. P, consent of department.

564. Introduction to Dendrochronology (4) I (Identical with GEOS 564, which is home). May be convened with ANTH 464.

565. Women in International Development (3) II For a description of course topics see ANTH 465. Graduate-level requirements include additional readings and a research paper. (Identical with FCR 565, LA S 565). May be convened with ANTH 465.

566. Paleonthropology (3) I For a description of course topics see ANTH 466. For a description of course topics see 466. Graduate-level requirements include a comprehensive research paper or project, an annotated bibliography, or specialized examinations. May be convened with ANTH 466.

568. Human Osteology (4) I For a description of course topics see ANTH 468. Graduate-level requirements include an additional research paper. May be convened with ANTH 468.

570A. Human Adaptability (3) I For a description of course topics see ANTH 470A. Graduate-level requirements include a substantial research paper on a topic appropriate to the subject matter. (Identical with GERO 570A). May be convened with ANTH 470A.

570B. Human Adaptability (3) II For a description of course topics see ANTH 470B. Graduate-level requirements include a substantial research paper on a topic appropriate to the subject matter. May be convened with ANTH 470B.

571A. Applied Medical Anthropology in Western Contexts (3) I Investigations of the illness experience; symbolic interpretations of medicines and medical procedures; doctor-patient communications and illness narratives. Course demonstrates the applicability of major social science theories in the related study of health-related behavior. P, ANTH 536A.

571B. Applied Medical Anthropology in Western Contexts (3) II Investigations of the illness experience; symbolic interpretations of medicines and medical procedures; doctor-patient communications and illness narratives.
Focuses on methods of data collection and presents case studies illustrating the application of methods in the study of designated health problem areas, interviewer transference and issues of reflexivity. P, ANTH 536A.

572. Zoarchaeology and Taphonomy: Laboratory Methods (3) I II For a description of course topics see ANTH 472. Graduate-level requirements include an additional long research paper and/or annotated bibliography. May be convened with ANTH 472.

573. Primate Anatomy (4) I For a description of course topics see ANTH 473. Graduate-level requirements include a comprehensive research paper or project, an annotated bibliography, or specialized examinations. May be convened with ANTH 473.

574. Archaeometry: Scientific Methods in Art and Archaeology (3) II For a description of course topics see ANTH 476. Graduate-level requirements include one substantial critical review of the literature on some archaeological application of archaeometry. (Identical with CLAS 574, NES 574). May be convened with ANTH 474.

575. Anthropology and Education (3) I (Identical with LRC 575, which is home).

576. Language in Culture (3) II For a description of course topics see ANTH 477. Graduate-level requirements include a research paper and a journal-style review of a major monograph. (Identical with LING 576). May be convened with ANTH 476.

577. Discourse and Text (3) II For a description of course topics see ANTH 477. Graduate-level requirements include a research paper involving both an in-depth analysis and a critical survey of appropriate literature. (Identical with LING 577). May be convened with ANTH 477.

578. Design, Production and Performance of Ceramics and Metals (3) II (Identical with MSE 578, which is home). May be convened with ANTH 478.

579. Culture and Materials Technology (3) I For a description of course topics see ANTH 479. Graduate-level requirements include an additional research paper. (Identical with MSE 579). May be convened with ANTH 479.

580. Historical Comparative Linguistics (3) II For a description of course topics see ANTH 480. Graduate-level requirements include a research paper. (Identical with LING 580). May be convened with ANTH 480.

581. Quaternary Palynology and Plant Macrofossils (2-4) II (Identical with GEOS 581, which is home). May be convened with ANTH 481.

582. Hopi Language in Culture (3) II For a description of course topics see ANTH 482. Graduate-level requirements include a research paper. (Identical with AIS 582). May be convened with ANTH 482.

583. Sociolinguistics (3) I Contributions of the ethnography of communication, language variation studies, and conversation/discourse analysis to the interdisciplinary development of sociolinguistics. (Identical with LING 583).

588. Healing Systems in the Southwest (3) I II (Identical with NURS 588, which is home).

589. Areal Survey of Native North American Languages (3) I II For a description of course topics see ANTH 489. Graduate-level requirements include additional readings and longer term papers. P, ANTH 276 or LING 101. (Identical with AIS 589, LING 589). May be convened with ANTH 489.

590. Women in Middle Eastern Society (3) I For a description of course topics see ANTH 490. Graduate-level requirements include an additional paper. (Identical with NES 590, W S 590). May be convened with ANTH 490.

595. Colloquium f. Special Topics in Applied Anthropology (3) I II

596. Seminar a. Paleonthropology and Paleolithic Archaeology of Africa (3) II P, introductory or upper-division archaeology and biological anthropology courses.

b. The Dynamics of Human Subsistence (3) II P, consent of department.

c. Pre-Colombian Art (3) [Rpt./ 4] I (Identical with ARH 596E, which is home).

d. Ceramic Analysis (3) I For a description of course topics see ANTH 496E. May be convened with ANTH 496F.

e. Experimental Archaeology (3) I For a description of course topics see ANTH 496H. May be convened with ANTH 496F.

f. Issues in African Art History (3) [Rpt./ 3] II (Identical with ARH 596J, which is home).

k. Risk and Society (3) I (Identical with GEOG 596K, which is home).

q. Near Eastern Archaeology (3) [Rpt./ 1] II (Identical with NES 596Q, which is home).


b. Biological and Forensic Anthropology (2) II P, consent of department.

c. Dendrochronology (1-4) II (Identical with GEOG 597C, which is home). May be convened with ANTH 497C.

599. Independent Study (1-3) [Rpt./]

600. Survey of Cultural Anthropology (3) I Intensive introduction, overview, and synthesis of cultural anthropology.

605. Professional Ethics and Skills (3) II Treatment of a series of ethical issues that can arise in acquisition and dissemination of anthropological data; design and implementation of research through the construction of fundable research proposals; professional self-presentation. Course materials will represent the four subdisciplines of anthropology.

606. Women's Health in the United States (3) II An examination of social, cultural and political-economic factors affecting women's health in historical and contemporary contexts in the U.S. Focus on anthropological and feminist perspectives. (Identical with W S 606).

607. Anthropological Research Methods and Design (3) I Survey of research designs, data collection methods, and data analysis used in ethnographic field research by sociocultural and medical anthropologists. Focus on practical skill acquisition.

608. History of Anthropological Theory (3) I Survey of the foundations of contemporary theory in the field of cultural anthropology.

613. Policy Making and Organizational Culture (3) II Examines the development, goals, techniques and practices of anthropology as a policy science.

620. Linguistic Field Techniques (3) I II Practice in asking linguistically informed and ethnographically sensitive questions in face-to-face interaction with a linguistic consultant; techniques of language data analysis and description.

631. Anthropology and Development (3) II The role of anthropology in interdisciplinary projects involving economic development and planned change on the national and international levels. (Identical with ARL 631, LA S 631).

636. Foundations of Archaeological Interpretation (3) I Surveys the history of archaeological interpretation. Central concepts in archaeological method and theory are presented.

637. Archaeological Methodology (3) II Surveys the fundamental principles, methods, and techniques of archaeological analysis and inference from a multidisciplinary perspective.

642A. Advanced Field Course in Archaeology (3) S Archaeological methods, theory, and field techniques. Three-week field excavation and survey. P, Application returned to department no later than April 1st. Special fees.; Field trips.

642B. Advanced Field Course in Archaeology (3) S Archaeological methods, theory, and field techniques. Three-week laboratory processing and analysis. P, Application returned to department no later than April 1st. Special fees.

645. Early Civilizations (3) [Rpt./ 2] I Comparative analysis of early civilizations from both the Old World and the New World, with emphasis on regularities in cultural development. P, ANT H 457 or ANTH 456A or ANTH 456B; ANTH 454.

665. Survey of Biological Anthropology (3) II Modern biological anthropology including evolutionary theory, genetics, skeletal biology, primateology, paleoanthropology, human growth, adaptability and demography.


674. The Impact of Modernization on the Third World (3) II Intensive study of specific theories and varieties of culture change. P, 6 units of cultural anthropology or consent of instructor.

675A. Anthropology and International Health (3) I An intensive overview of the field of international health and anthropologists'
contribute to it. Responses to biotechnology, primary health care and child survival, diseases and development; health care utilization patterns; world systems and multinational pharmaceutical industry; health care bureaucracies; interaction between traditional medicine and public health. P, ANTH 536A. 675B. Anthropology and International Health (3) II Health transitions and the household production of health with emphasis on anthropological investigations of health within a broader development context. P, ANTH 536A. 679. Language and Ethnography (3) I Training in the use of ethnographic method in linguistic and cultural research where naturally occurring speech is data. Analysis of data from observation, tape recording and videotaping.

Survey of Linguistic Anthropology (3) II Major theoretical and methodological issues in linguistic analysis. Language as a cultural code, biological foundations, universals and typology, language and social reality, textual analysis.

690. Seminar (1-6) [Rpt./]
694. Practicum (1-4) [Rpt./]
695. Colloquium
a. Forensic Anthropology (2) [Rpt./ 2] II P, ANTH 597B and ANTH 468 or CR: ANTH 468. 696. Seminar
a. Archaeology (1-3) [Rpt./ 12 units] I II b. Cultural Anthropology (1-3) I II (Identical with ARL 696B, NES 696B).
c. Linguistic Anthropology (1-3) [Rpt./ 12 units] I II d. Biological Anthropology (1-3) [Rpt./ 12 units] I II e. Nutritional Biocultural Context (3) I II (Identical with F CM 696G, which is home).

699. Independent Study (1-5) [Rpt./]
900. Research (1-4) [Rpt./]
909. Master's Report (1-6) [Rpt./]
910. Thesis (1-6) [Rpt./]
920. Dissertation (1-9) [Rpt./]
930. Supplementary Registration (1-9) [Rpt./]

Applied Mathematics (APPL)
Mathematics Bldg.
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FAX: (520) 621-8322
E-mail: applmath@ccit.arizona.edu
URL: http://www.math.arizona.edu/applmath/

Baccalaureate Degree
The committee does not offer a baccalaureate degree.

Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Major and Degrees
Applied Mathematics (M.S., Ph.D.)

Program Requirements
For graduate program requirements consult the Graduate Catalog and the departmental office listed above.
To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

ARABIC (ARB)
For more information about Arabic courses, see the entry for Near Eastern Studies in this manual.

College of Architecture
Architecture Building, Room 104
The University of Arizona
PO Box 210075
Tucson AZ 85721-0075
Phone: (520) 621-6751
FAX: (520) 621-8700
E-mail: skemoody@ccit.arizona.edu
URL: http://www.arizona.edu/arch/

The College of Architecture prepares students to participate in the shaping of our built environment through an NAAB-accredited five-year program. Organized with the design studio as the focus of the program, the program is a meeting place for the arts and sciences. Students investigate both the relationships between human and natural forces and the relationships between materials and technologies.

Baccalaureate Degree
Bachelor of Architecture (B.Arch.)

Graduate Degrees
Master of Architecture (M.Arch.)
Master of Science (M.S.)

Majors and Degrees
Architecture (B.Arch., M.Arch.)
Planning (M.S.)

Undergraduate Minor
No minor is required for the undergraduate program. For information about optional minors, contact the college at the office listed above.

General Education Program
All undergraduate students are required to complete the university-wide general education program. Designed to provide a foundation for university learning, the program develops students’ creative and analytical skills and integrates knowledge across university disciplines.

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/
climate and social/physical context. P; admission to professional phase. Open to majors only.

227. Architectural Programming (2) I
Introduction to theory and methods of architectural programming including influences of users, economics, time, technology, safety, and aesthetics. P; admission to professional phase. Open to majors only.

235. Fundamentals of Building Construction Systems (3) I Systems of building construction with emphasis on materials and methods. P; admission to professional phase, non-majors may petition to enroll.

236. Fundamentals of Environmental Control Systems (3) II Systems and means of environmental control with emphasis on passive and active methods and principles, energy conservation, and satisfying basic human needs with respect to heat, light and sound. P, ARCH 235.

270. Introduction to Architectural Computing (3) II Microcomputer presentation techniques in architecture, including CAD, desktop publishing, and computer presentation. P, experience with word processing, spreadsheets, DOS and MAC operating systems, admission to professional phase.

294. Practicum (1-4) [Rpt.]

299. Independent Study (1-4) [Rpt.]

299H. Honors Independent Study (1-3) [Rpt.] I II


302. Architectural Design (6) I II Design of built form with emphasis on theoretical issues, meaning, principles of order; alternative means of enclosing architectural space; synthesis of space, light, structure, materials, and environmental control systems. P, ARCH 301. Special fees.


324. History of Architecture and Western Civilization: Ancient through Medieval (4) I History of architecture as a reflection of the western heritage of ideas, values and artistic expression and economic, social, and political conditions. P, consent of instructor or upper-division status; open to non-majors.

328. Wood and Steel Structural Systems (3) II Analysis and design of structural components and systems constructed of wood and steel including joists, beams, and columns. Analysis and design of members under single and combined loads. Examination of the behavior of individual elements and the total system. P, ARCH 318.

334. History of Architecture and Western Civilization: Renaissance to Present (4) II History of architecture as a reflection of the western heritage of ideas, values and artistic expression and economic, social, and political conditions. P, upper-division status or consent of instructor; open to non-majors, ARCH 324 recommended.

335. Construction Systems (3) II Analysis of contemporary systems of building construction with emphasis on assembly and integration of components, construction procedures and sequences, understanding how buildings go together, introduction to codes and regulations. P, ARCH 235.

336. Environmental Control Systems (3) I Analysis of contemporary systems of environmental control including heating, ventilation, air conditioning, lighting, power distribution, plumbing and hygiene. Emphasis on integration of these systems into buildings and understanding the impact of systems upon architectural design and each other. P, ARCH 236.

343. Watercolor Techniques for Architects (2) I II Techniques of watercolor communication utilized in architecture.

344. The Art and Architecture of the Islamic World (3) I II (Identical with NES 344, which is home).

394. Practicum (3) [Rpt.]

399. Independent Study (1-3) [Rpt.]

399H. Honors Independent Study (1-3) [Rpt.] I II


402. Topics in Architectural Design (6) I II Studio work emphasizing design of large buildings or building complexes in one of the following: building design, urban design, campus design, design competitions, computer-aided design. Offerings are determined by faculty availability, and all topics may not be offered each year. Other topics may be introduced. P, ARCH 401. Special fees. May be convened with ARCH 502.

403. Solar Utilization in the Built Environment (3) I Survey of solar energy utilization principles, methods and case studies focused upon building and site planning design. May be convened with ARCH 503.

404. Archaeology and Planning in Mexico (3) I Study of architectural development in Mexico during the pre-Hispanic, Spanish colonial and contemporary periods, with emphasis on design ideas from each period. (Identical with LA 404). May be convened with ARCH 504.

412. Publication Graphics (3) [Rpt./ I II Designing compositions of text and graphics, and preparing them for publication. Class produces annual Archalendar and other publications. P, ARCH 222, ARCH 301. May be convened with ARCH 512.

413. Architecture and the Arid Region (2) I Studies of the relationship between architecture and the climatic characteristics of arid regions with emphasis on passive cooling techniques. P, ARCH 302. May be convened with ARCH 513.

414. History of American Architecture (3) II Developments in American architecture from the colonial to the early modern period. P, ARCH 334 or consent of instructor; open to non-majors. May be convened with ARCH 514.

418. Concrete and Masonry Structural Systems (3) I Analysis and design of structural components and systems constructed of concrete and masonry including slabs, joists, beams, columns, retaining walls, and foundations. Analysis and design of members under single and combined loads using working stress and ultimate strength procedures. Examination of the behavior of individual elements and the total system.

422. Urban Open Space (3) [Rpt. I II] The study of urban open space, its use as a path, meeting place, amphitheater or plaza. Analysis of how fountains, sculpture and way finding systems may enhance public space. May be convened with ARCH 522.

424. Modern Architecture (3) II Study of recent architectural developments throughout the world, focusing on the personalities, theories and issues influencing built form since 1945. P, ARCH 334 or consent of instructor; upper-division status. May be convened with ARCH 524.


432. Video and Media in Design Communications (3) [Rpt. I II] Introduction to video and other media in architectural design communication with emphasis on photographic reproduction, graphic design, desktop publishing, slide photography, slide presentations, and video production. Personal presentations based upon communication psychology and theory. May be convened with ARCH 532.

433. Lightweight Construction Techniques (3) II Survey of lightweight construction techniques including pneumatics, tensile membranes, three-dimensional cable nets, grid shells and flexible stiff plates. May be convened with ARCH 533.

434. History of the American House (3) II Survey of American domestic buildings from European settlement to the present including social, political, and economic forces affecting architectural change. P, ARCH 334, consent of instructor, open to non-majors. (Identical with ARH 434). May be convened with ARCH 534.


442. Architectural Photography (3) [Rpt. I Theory

443. Architectural Photography (3) II}
and practical techniques for the varied uses of photography in the field. Emphasis on the "daily use" of 35mm equipment and color slide films for self-expression, documentation (exteriors/interiors), copywork, slide shows, and slide evaluation. Introductory hands-on exploration of large format photography with Polaroid film. May be convened with ARCH 542.

443. Architecture in the Mediterranean (3) S Summer study tour of the Mediterranean focusing on architecture. Includes Greece and the Greek islands. Seminars and graphic and written projects and assignments. Emphasis on field investigation. May be convened with ARCH 543.

444. Site Planning (3) I (Identical with PLAN 444, which is home). May be convened with ARCH 544.

451. Emphasis Areas in Architecture (6) I II Studio work emphasizing one of the following: desert architecture, community design, historic preservation, design communication, computer aided design, entrepreneurial design, architectural programming and evaluation. Offerings are limited by faculty availability and all topics may not be offered each year. Other topics may be introduced. P, ARCH 334, ARCH 335, ARCH 336, ARCH 402, ARCH 428. Special fees. May be convened with ARCH 551.

452. Senior Project (6) I II Studio-based project demonstrating a synthesis of knowledge or development of theoretical concepts. P, ARCH 451. Special fees.

452H. Honors Senior Project (6) Studio-based honors project demonstrating a synthesis of knowledge or development of theoretical concepts. P, ARCH 451, ARCH 451, admission to Honors Program.

459. Ethics and Practice (3) I Standards and values of architectural services and professional project and practice management. P, ARCH 270, ARCH 402. May be convened with ARCH 559.

462. Readings and Research in Design Communication (3) I Reading and discussion of design communication theory and research. Generating, developing and defending a research proposal in design communication. P, ARCH 402. May be convened with ARCH 562.


473. Introduction to Conservation of Cultural Resources (3) I An overview of the Historic Preservation movement in America, including discussion of concepts, rationale for and methods of resource utilization, implementation of plans, legislation, etc. Field trips. May be convened with ARCH 573.

474. Field Methods in Environmental Psychology (3) II (Identical with PSYC 474, which is home). May be convened with ARCH 574.

480. Computer Presentations in Architecture (3) I Introduction to the theory, techniques, and applications of computer-based presentations. Focusing on generating realistic architectural images and fly-throughs that are assembled in a finished multimedia presentation. In-class experience on computers. P, ARCH 470. May be convened with ARCH 580.


484. Planning the Built Environment (2) I A lecture survey dealing with the origins and implications of the physical manifestations of communal ordering systems. Analytic vocabulary is developed with which current and historic settlement patterns are visually compared to discover spatial attributes as a dimension of human experience. P, ARCH 302, ARCH 334, Writing-Emphasis Course for architecture majors. (Identical with PLAN 484). May be convened with ARCH 584.

487. Space: A Social Cultural View (3) [Rpt./1] I Human, sociocultural use of space including processes of symbolic expression. Investigation of the role of space through ethnographic readings describing both ritual and architectural examples. P, consent of department. May be convened with ARCH 587.

491. Preceptorship (1-3) [Rpt./] I

493. Internship (3) [Rpt./]

493. Internship

493. Internship (3) [Rpt./] II

494. Practicum (3) [Rpt./]

496. Seminar

a. Readings in Architectural Theory (2-4) [Rpt./ 8 units] I II Open to majors only. May be convened with ARCH 596A.

b. Research Methods in Architecture (3) I May be convened with ARCH 596B.

d. Mediterranean Cities in the 15th-16th Centuries: Cairo, Istanbul, Florence and (3) II (Identical with NSES 496D, which is home). May be convened with ARCH 596D.

497. Workshop

b. Special Projects in Architecture (1-3) [Rpt./6 units] I P, consult college before enrolling, consent of department. May be convened with ARCH 597B.


i. Interdisciplinary Studio for Community Design (3-6) I Open to non-majors only. Field trips. (Identical with LAR 497I, PLAN 497I). May be convened with ARCH 497I.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./]

499. Independent Study (1-4) [Rpt./]

499H. Honors Independent Study (1-4) [Rpt./] I II

501. Systems Approach in Architectural Design (6) I II For a description of course topics see ARCH 401. Graduate-level requirements include additional documentation demonstrating theoretical understanding. Special fees. May be convened with ARCH 401.

502. Topics in Architectural Design (6) I II For a description of course topics see ARCH 402. Graduate-level requirements include additional documentation of the understanding of the impact of complex buildings on human experience. Special fees. May be convened with ARCH 402.

503. Solar Utilization in the Built Environment (3) I For a description of course topics see ARCH 403. Graduate-level requirements include an in-depth research paper focusing on appropriate design applications of a particular solar strategy. May be convened with ARCH 403.

504. Archaeology and Planning in Mexico (3) I For a description of course topics see ARCH 404. Graduate-level requirements include an additional research paper on a particular aspect of Mexican architecture. (Identical with LA S 504). May be convened with ARCH 404.

512. Publication Graphics (3) [Rpt./2 I II For a description of course topics see ARCH 412. Graduate-level requirements include a research paper on one aspect of state-of-the-art design communication techniques. May be convened with ARCH 412.

513. Architecture and the Arid Region (2) I For a description of course topics see ARCH 413. Graduate-level requirements include a research paper focusing on a particular passive cooling strategy. May be convened with ARCH 413.

514. History of American Architecture (3) I For a description of course topics see ARCH 414. Graduate-level requirements include an additional research project that focuses on and develops one of the major topics of the course. May be convened with ARCH 414.

522. Urban Communications (3) [Rpt./1] II For a description of course topics see ARCH 422. Graduate-level requirements include an in-depth research paper or project. May be convened with ARCH 422.
ARID LANDS RESOURCE SCIENCES (ARL)

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Phone: (520) 626-9111
FAX: (520) 621-3618
E-mail: economou@ag.arizona.edu
URL: http://ag.arizona.edu/OALS/oals/oals.html

Baccalaureate Degree
The committee offers no baccalaureate degree.

Graduate Degree
Doctor of Philosophy (Ph.D.)

Major and Degree
Arid Lands Resource Sciences (Ph.D.)

Program Requirements
For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Arid Lands Resource Sciences (ARL)

299. Independent Study (1-3) [Rpt./] I II

393. Internship (1-6) [Rpt./]

399. Independent Study (1-3) [Rpt./] I II

442. Transformation of Agrarian Societies in

524. Modern Architecture (3) II For a description of course topics see ARCH 424. Graduate-level requirements include an additional in-depth research paper. May be convened with ARCH 424.

532. Video and Media in Design Communications (3) [Rpt./ 1] II For a description of course topics see ARCH 432. Graduate-level requirements include an in-depth research paper or project. May be convened with ARCH 432.

533. Lightweight Construction Techniques (3) II For a description of course topics see ARCH 433. Graduate-level requirements include an additional project demonstrating a comprehensive grasp of one lightweight construction technique. May be convened with ARCH 433.

534. History of the American House (3) I For a description of course topics see ARCH 434. Graduate-level requirements include an additional research project. P, Open to non-majors. (Identical with ARH 534). May be convened with ARCH 434.

539. Construction Documents (3) I For a description of course topics see ARCH 439. Graduate-level requirements include an additional in-depth research paper focusing on one particular aspect of developing new techniques in the field. May be convened with ARCH 439.

542. Architectural Photography (3) I II For a description of course topics see ARCH 442. Graduate-level requirements include a research project. May be convened with ARCH 442.

543. Architecture in the Mediterranean (3) S For a description of course topics see ARCH 443. Graduate-level requirements include a research paper. May be convened with ARCH 443.

544. Site Planning (3) I (Identical with PLAN 544, which is home). May be convened with ARCH 444.

550. Introduction to Architecture Graduate Computing (3) I II [Rpt./] Study and use of computing applied to the architecture graduate program including architectural graphics, desktop publishing, CAD, and computer presentations. Previous experience required with word processing, spreadsheets and the DOS and Macintosh operating systems. P, Graduate admission.

551. Emphasis Areas in Architecture (6) I II For a description of course topics see ARCH 451. Graduate-level requirements include an additional project development focusing on a particular aspect of the topic under study. May be convened with ARCH 451.

553. Ethics and Practice (3) I For a description of course topics see ARCH 453. Graduate-level requirements include an in-depth research paper focusing on a particular aspect of contemporary professional practice. May be convened with ARCH 459.

560. Introduction to Architecture Graduate Computing (3) I II For a description of course topics see ARCH 462. Graduatel-level requirements include an in-depth research paper or project. May be convened with ARCH 462.

562. Readings and Research in Design Communication (3) I For a description of course topics see ARCH 463. Graduate-level requirements include an in-depth research paper or project. May be convened with ARCH 463.

564. Women in American Architecture (3) I For a description of course topics see ARCH 464. Graduate-level requirements include an in-depth project. P, Permission of instructor. Not open to non-majors. (Identical with ARCH 566). May be convened with ARCH 464.

566. Art and Archaeology of Le Corbusier (3) [Rpt./ 6 units] I For a description of course topics see ARCH 466. Graduate-level requirements include an additional research paper or project. (Identical with ARCH 566). May be convened with ARCH 466.

570. Computer Graphics in Architecture (3) I II For a description of course topics see ARCH 470. Graduate-level requirements include a special project demonstrating an in-depth understanding of one particular theory or technique covered in the course. May be convened with ARCH 470.

573. Introduction to Conservation of Cultural Resources (3) I For a description of course topics see ARCH 473. Graduate-level requirements include an additional research project focusing on a particular concept or methodology utilized in preservation practice. May be convened with ARCH 473.

574. Field Methods in Environmental Psychology (3) II (Identical with ARCH 574, which is home). May be convened with ARCH 474.

580. Computer Presentations in Architecture (3) I For a description of course topics see ARCH 480. Graduate-level requirements include an additional project development demonstrating an in-depth comprehension of the potential of the application under study. May be convened with ARCH 480.

583. Advanced Computer Energy Analysis (3) I For a description of course topics see ARCH 483. Graduate-level requirements include an additional research paper that focuses on and develops one of the major themes of the course. (Identical with ARCH 584). May be convened with ARCH 483.

584. Planning the Built Environment (2) I For a description of course topics see ARCH 484. Graduate-level requirements include an additional research paper that focuses on and develops one of the major topics of the course. May be convened with ARCH 487.

587. Space: A Social Cultural View (3) I For a description of course topics see ARCH 487. Graduate-level requirements include an additional research paper that focuses on and develops one of the major topics of the course. May be convened with ARCH 487.

591. Preceptorship (1-3) [Rpt./]

593. Internship (1-4) [Rpt./]

596. Seminar

a. Readings in Architectural Theory (2-4) [Rpt./] I For a description of course topics see ARCH 496A. Open to non-majors. May be convened with ARCH 496A.

b. Research Methods in Architecture (3) I For a description of course topics see ARCH 496B. P, May be convened with ARCH 496B.

d. Mediterranean Cities in 15th-16th Centuries: Cairo, Istanbul, Florence & Venice (3) (Identical with NES 596D). May be convened with ARCH 496D.

i. Interdisciplinary Environment-Behavior-Design (3) [Rpt./ 6 units] II (Identical with PSYC 596U, which is home).

957. Workshop

a. Issues in Architecture (3-8) [Rpt./] I II Open to majors only. (Identical with PLAN 597A).

b. Special Projects in Architecture (1-3) [Rpt./ 6 units] For a description of course topics see ARCH 497B. P, Consult college before enrolling. May be convened with ARCH 497B.

959. Independent Study (1-5) [Rpt./]

969. Seminar

b. Financing Public Services (3) I (Identical with PLAN 696B, which is home).

990. Research (1-8) [Rpt./]

999. Master's Report (1-8) [Rpt./]

109. Thesis (1-8) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]
the Middle East (3) II (Identical with NES 442, which is home). May be convened with ARL 542.
467. Population and Development in the Middle East (3) I (Identical with NES 467, which is home). May be convened with ARL 567.
493. Internship (1-3) [Rpt./] I II
498. Senior Capstone (1-3) [Rpt./]
499. Independent Study (1-5) [Rpt./]
512. Economic Policy in Developing Countries (3) II (Identical with AREC 512, which is home).
521. Physical Climatology (3) II (Identical with ATM 521, which is home).
523. Hydrology (3) I (Identical with C E 523, which is home).
530. The Climate System (3) I (Identical with GEOG 530, which is home).
535. Water Management in Dryland Ecosystems (3) I (Identical with WS M 535, which is home).
541. Economic Botany of Arid Lands (3) II (Identical with PL S 541, which is home).
542. Transformation of Agrarian Societies in the Middle East (3) II (Identical with NES 542, which is home). May be convened with ARL 442.
550. Geomorphology (4) I (Identical with GEOS 550, which is home).
554. The Arid and Semi-arid Lands (3) I (Identical with GEOG 554, which is home).
556. Physical Aspects of Arid Lands (3) II (Identical with GEOG 565, which is home).
557. Population and Development in the Middle East (3) I (Identical with NES 567, which is home). May be convened with ARL 467.
575. Economics of Natural Resource Policy (3) II (Identical with AREC 575, which is home).
580. Medicinal Plants (3) I (Identical with PL S 580, which is home).
590. Remote Sensing for the Study of Planet Earth (3) II (Identical with REM 590, which is home).
593. Internship (1-3) [Rpt./] I II
595. Colloquium a. Current Research (1) I II
599. Independent Study (1-6) [Rpt./]
631. Anthropology and Development (3) II (Identical with ANTH 631, which is home).
641. Natural and Human Impacts on Arid Lands (3) I The influence of nature and humans on arid lands sustainability and the role of locally-adaptable technologies. Various aspects of measuring, monitoring and describing natural and human impacts on arid lands. Focuses on occurrences such as El Niño, population growth, and utilization of limited resources in relation to their economic and environmental significance.
642. Use and Management of Arid Lands (3) II Major issues surrounding land uses in the world’s arid and semi-arid zones. Examination of issues which will determine the future of land management in much of the arid and semi-arid lands of the western United States. The debate over the management of lands in relation to ownership, tenure, and access; intergenerational transfers, and the economic, environmental, and social consequences of proposed changes in current arrangements.
643. Cultures and Institutions of Arid Lands (3) I Social-sciences aspects of arid lands studies through exposure to approaches and analyses rooted in various disciplines. Examines arid lands cultures, societies, and institutions and highlights distinctive adaptations to prevailing climatic and physical conditions. Objectives are to develop skills that will improve students’ ability to understand, critique and synthesize oral presentations; review and analyze written materials; discuss and debate interpretations of scholarly work; and prepare critical essays.
644. Biodiversity and Sustainability in Arid Lands (3) II Feasibility of these concepts are studied thoroughly with the aim to explore the changing global community. Multi-media presentations, video, selected readings and textbook material will be used to explore the political, economic, and ecological impacts on the environment and the health of our entire ecosystem.
693. Internship (1-3) [Rpt./] I II
696. Seminar b. Cultural Anthropology (1-3) I II (Identical with ANTH 696B, which is home).
699. Independent Study (1-3) [Rpt./] I II
700. Research (1-4) [Rpt./]
709. Master’s Report (1-3) [Rpt./] I II
710. Thesis (1-8) [Rpt./]
920. Dissertation (1-9) [Rpt./]
930. Supplementary Registration (1-6) [Rpt./]

**ART (ART/ARH/ARE)**

Art Bldg., Rm.108
The University of Arizona
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Fax: (520) 621-2955
URL: http://arts.music.arizona.edu/

**Baccalaureate Degrees**

Bachelor of Arts (B.A.)
Bachelor of Fine Arts (B.F.A.)

**Graduate Degrees**

Master of Arts (M.A.)
Master of Fine Arts (M.F.A.)

**Majors and Degrees**

Art (M.F.A.)
Art Education (B.F.A., M.A.)
Art History (B.A., M.A.)
Studio Art (B.F.A.)

**B.F.A. Options**

- combining media
- new genre
- photography
- visual communication
- two-dimensional
- three-dimensional

**Program Requirements**

For undergraduate academic program requirements, consult the [On Course! Academic Program Requirements Reports](http://www.arizona.edu/academic/oncourse/data/). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: [http://www.arizona.edu/academic/oncourse/data/](http://www.arizona.edu/academic/oncourse/data/). Minor requirements are available on line at [http://www.arizona.edu/academic/oncourse/data/](http://www.arizona.edu/academic/oncourse/data/).

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

**Art Education (ARE)**

130. Appreciating the Visual Arts (3) I II Introduction to techniques for describing and analyzing works of art utilizing relevant material from history and aesthetics.
299. Independent Study (3) [Rpt./]
299H. Honors Independent Study (3) [Rpt./]
330. Foundations of Art Education (3) I II The development of objectives for art education based upon the visual arts, philosophy, aesthetics, and the behavioral sciences; a critical examination of current art education texts and theories.
338L. Secondary School Art (3) II Carries credit in Education only. (Identical with TTE 338L, which is home).
361. Creative Arts Methods (3) I II Prepares elementary education students to teach art in the self-contained classroom. Various art education methodologies through participating in classroom activities; planning art lessons; presenting art lesson to the class. Class is meant to build on the theoretical base each student has already acquired in previous art classes. P, ARE 130.
393. Internship (1-6) [Rpt./]
394. Practicum (1-4) [Rpt./]
399. Independent Study (1-5) [Rpt./]
399H. Honors Independent Study’ (1-3) [Rpt./] I II
400. Art for Exceptional Learners (3) Adaptation of structured art curricula to exceptional learner populations. P, previous course work in Art and/or special education. May be convened with ARE 500.
431. The Teaching of Art (3) II Exploration of art education curricula and instructional methodology in the elementary school. P, TTE 300, EDUC 350; CR, ARE 338L, ARE 400. May be convened with ARE 531.
434. Cross-Cultural Issues in Art Education (3) I Multicultural and cross-cultural issues within visual arts education (e.g., in studio art, art criticism, art history, and aesthetics). May be convened with ARE 534.
493. Internship (1-6) [Rpt./]
level; examination of related research with possible implications for practice. P, course is repeatable with consent of the instructor.

693. Internship (1-6) [Rpt./]
694. Practicum (1-4) [Rpt./]
699. Independent Study (1-5) [Rpt./]
900. Research (1-4) [Rpt./]
909. Master's Report (1-5) [Rpt./]
910. Thesis (1-6) [Rpt./]
920. Dissertation (1-9) II
930. Supplementary Registration (1-9) [Rpt./]
414B. Northern Renaissance Art (3) II 16th century art production in Germany, France, England, and the Netherlands. P. 6 units of art history. May be convened with ARH 514B.

415A. Southern Baroque Art (3) II The painting, sculpture, and architecture of 17th century Italy and Spain. May be convened with ARH 515A.

415B. Northern Baroque Art (3) I The art and architecture of 17th century Holland, France, and England. May be convened with ARH 515B.

416A. Eighteenth Century Art (3) I Survey of art and architecture of 18th-century England and Italy within the context of the grand tour. May be convened with ARH 516A.

416B. Eighteenth Century Art II (3) I II Course will examine the art and architecture of 18th-century France and Germany. May be convened with ARH 516B.

417. 19th Century European Art (3) I II Painting and sculpture from the French Revolution through Impressionism. P. 6 units of history or art history. May be convened with ARH 517.

418A. 20th-Century Art (3) I Painting and sculpture in Europe - 1886 to World War I. P. 6 units of history or art history, ARH 418A is not prerequisite to ARH 418B. May be convened with ARH 518A.

418B. 20th-Century Art (3) II Painting and sculpture in Europe - Between the World Wars. P. 6 units of history or art history, ARH 418A is not prerequisite to ARH 418B. May be convened with ARH 518B.

421A. Pre-Hispanic Art (3) I Art of the high cultures of Mesoamerica, with the focus on architecture, sculpture, painting and crafts prior to European contact. P. ARH 422A is not prerequisite to ARH 422B, etc. (Identical with ANDH 422A, LA S 422A). May be convened with ARH 522A.

422B. Pre-Hispanic Art (3) II Pre-Colombian art of Central and South America with particular attention to the Andean area. P. ARH 422A is not prerequisite to ARH 422B, etc. (Identical with ANDH 422B, LA S 422B). May be convened with ARH 522B.

422C. Pre-Hispanic Art (3) I II Social history of art in pre-Hispanic Mesoamerica from the pre-classic through the post-classic period. P. ARH 422A is not prerequisite to ARH 422B, etc. (Identical with ANDH 422C, LA S 422C). May be convened with ARH 522C.

423A. The Art of Mexico (3) I The art of Colonial Mexico, from the early 16th century to the late 18th century. The effects of the Spanish conquest on native traditions; public, private and sacred patronage; the effects of the Bourbon reforms. Painting, sculpture, architecture, graphic and minor arts. P. ARH 423A is not prerequisite to ARH 423B. May be convened with ARH 523A.

423B. The Art of Mexico (3) II The art of Modern Mexico, from the late 18th century to the early 20th century. The Independence Period, the National Period, and the Revolutionary Period. Painting, sculpture, architecture, graphic and minor arts. P. ARH 423A is not prerequisite to ARH 423B. May be convened with ARH 523B.

424A. History of Photography (3) I From its invention to 1895; impact of photography on the art and culture of the 19th century. P. ARH 424A is not prerequisite to ARH 424B, 6 units of art history. May be convened with ARH 524A.

424B. History of Photography (3) II As an art medium from 1895 to 1965. P. 6 units of art history, ARH 424A is not prerequisite to ARH 424B. May be convened with ARH 524B.

429A. American Art (3) I II Art in the United States: Colonial art. P. 6 units of history or art history, ARH 429A is not prerequisite to ARH 429B, etc. May be convened with ARH 529A.

429B. American Art (3) I II Art in the United States: 19th century art. P. 6 units of history or art history, ARH 429A is not prerequisite to ARH 429B, etc. May be convened with ARH 529B.

429C. American Art (3) I II Art in the United States from 1900 through 1940. P. 6 units of history or art history, ARH 429A is not prerequisite to ARH 429B, etc. May be convened with ARH 529C.

430. American Art (3) I II Art in the United States: Twentieth century American art from the 1930s to recent times. P. 6 units of history or art history, ARH 429A is not prerequisite to ARH 429B, etc. May be convened with ARH 529D.

431. Studio Introduction to Contemporary Art (3) I Introduction to contemporary art, theory, criticism, and cultural politics circa 1945 to the present. Emphasis on movements and themes. May be convened with ARH 531.

434. History of the American House (3) II (Identical with ARCH 434, which is home). May be convened with ARH 534.

435. History of Prints (3) I II Discussion of the theory and criticism of printmaking media from their inception in the 15th century to the 19th century. P. ARH 117 or ARH 118. May be convened with ARH 535.

439A. African Art (3) I African art in context through chronological, interdisciplinary focus; the art of Northeast Africa, Nigeria and Yoruba Diaspora. P. ARH 339, ARH 439A is not prerequisite to ARH 439B; Field trips. May be convened with ARH 539A.

439B. African Art (3) II African art in context through chronological, interdisciplinary focus; the main traditions of the Southern Savannah, Equatorial Africa and the Eastern Sudan. P. ARH 339, ARH 439A is not prerequisite to ARH 439B; Field trips. May be convened with ARH 539B.

456. Greek and Roman Painting (3) I II (Identical with CLAS 456, which is home). May be convened with ARH 556.

457. Greek Architecture (3) I (Identical with CLAS 457, which is home). May be convened with ARH 557.

461. Greek Pottery 1200-400 B.C. (3) I II (Identical with CLAS 461, which is home). May be convened with ARH 561.

464. Women in American Architecture (3) I (Identical with ARH 464, which is home). May be convened with ARH 564.

466. The Art and Architecture of LeCorbusier (3) [Rpt./] I (Identical with ARH 466, which is home). May be convened with ARH 566.

481. Contemporary Theory and Criticism (3) I II Discussion of the theory and criticism of contemporary art since 1960 based on assigned readings and slide presentations. Field trips. May be convened with ARH 581.

484. Roman Art and Architecture (3) I II (Identical with CLAS 484, which is home). Field trips. May be convened with ARH 584.

493. Internship (1-6) [Rpt./]

494. Practicum (1-4) [Rpt./]

496. Seminar
a. Issues in Art History (3) I S P, senior status, open to majors only.

b. Mediterranean Cities in the 15th-16th Centuries: Cairo, Istanbul, Florence and (3) II (Identical with NES 496D, which is home).

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ 2]

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (3) [Rpt./]

511. Methods of Art History (3) I Major intellectual approaches to the visual arts developed within the past 150 years. Field trips.

512A. Medieval Art: Early Christian and Byzantine Art (3) II For a description of course topics see ARH 412A. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 412A.

512B. Medieval Art: Early Medieval Art (3) I For a description of course topics see ARH 412B. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 412B.

512C. Medieval Art: Romanesque Art (3) II For a description of course topics see ARH 412C. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 412C.

512D. Medieval Art: Gothic Art (3) I II For a description of course topics see ARH 412D. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 412D.

513B. Renaissance Art in Italy: 15th Century (3) II For a description of course topics see ARH 412B. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 412B.
413B. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 413B.

513C. Renaissance Art in Italy: 16th Century (3) For a description of course topics see ARH 413C. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 413C.

514A. Northern Renaissance Art (3) I II For a description of course topics see ARH 414A. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 414A.

514B. Northern Renaissance Art (3) I II For a description of course topics see ARH 414B. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 414B.

515A. Southern Baroque Art (3) I II For a description of course topics see ARH 415A. Graduate-level requirements include supplemental readings, additional assignments, and an oral presentation. May be convened with ARH 415A.

515B. Northern Baroque Art (3) I For a description of course topics see ARH 415B. Graduate-level requirements include supplemental readings, additional assignments, and an oral presentation. May be convened with ARH 415B.

516A. Eighteenth Century Art (3) I For a description of course topics see ARH 416A. Graduate-level requirements include supplemental reading, discussion; additional writing assignments and oral presentations. May be convened with ARH 416A.

516B. Eighteenth Century Art II (3) I II For a description of course topics see ARH 416B. Graduate students will do supplemental reading, discussion; additional writing assignments and oral presentations. May be convened with ARH 416B.

517. 19th Century European Art (3) I II For a description of course topics see ARH 417. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 417.

518A. 20th-Century Art (3) I For a description of course topics see ARH 418A. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 418A.

518B. 20th-Century Art (3) II For a description of course topics see ARH 418B. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 418B.

522A. Pre-Hispanic Art (3) I For a description of course topics see ARH 422A. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. (Identical with ANTH 522A, LA S 522A). May be convened with ARH 422A.

522B. Pre-Hispanic Art (3) II For a description of course topics see ARH 422B. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. (Identical with ANTH 522B, LA S 522B). May be convened with ARH 422B.

522C. Pre-Hispanic Art (3) I II For a description of course topics see ARH 422C. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. (Identical with ANTH 522C, LA S 522C). May be convened with ARH 422C.

523A. The Art of Mexico (3) I For a description of course topics see ARH 423A. Graduate-level requirements include a critical bibliography as well as a research paper. May be convened with ARH 423A.

523B. The Art of Mexico (3) I II For a description of course topics see ARH 423B. Graduate-level requirements include a critical bibliography as well as a research paper. May be convened with ARH 423B.

524A. History of Photography (3) I For a description of course topics see ARH 424A. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 424A.

524B. History of Photography (3) I II For a description of course topics see ARH 424B. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 424B.

529A. American Art (3) I For a description of course topics see ARH 429A. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 429A.

529B. American Art (3) I II For a description of course topics see ARH 429B. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with ARH 429B.

532A. Pre-Columbian Art (3) I For a description of course topics see ARH 431. Graduate students will lead discussions, write two artists' statements, have a critique with the professor, as well as midterm, final and an extended paper. May be convened with ARH 431.

534. History of the American House (3) I (Identical with ARCH 534, which is home). May be convened with ARH 434.

535. History of Prints (3) I II For a description of course topics see ARH 435. Graduate students will have additional reading assignments and must submit a paper of at least 10 pages, the topic of which must first be cleared with the instructor. May be convened with ARH 435.

539A. African Art (3) I For a description of course topics see ARH 439A. Graduate-level requirements include a research paper on approved topic. May be convened with ARH 439A.

539B. African Art (3) I II For a description of course topics see ARH 439B. Graduate-level requirements include a critical review/report from a primary source book on library reserve. May be convened with ARH 439B.

552. Etruscan Art and Archaeology (3) I (Identical with CLAS 552, which is home). May be convened with ARH 452.

554. Greek and Roman Sculpture (3) I (Identical with CLAS 554, which is home). May be convened with ARH 454.

556. Greek and Roman Painting (3) I II (Identical with CLAS 556, which is home). May be convened with ARH 456.

557. Greek Architecture (3) I (Identical with CLAS 557, which is home). May be convened with ARH 457.

561. Greek Pottery 1200-400 B.C. (3) I II (Identical with CLAS 561, which is home). May be convened with ARH 461.

564. Women in American Architecture (3) I (Identical with ARCH 564, which is home). May be convened with ARH 464.

566. Art and Archaeology of Le Corbusier (3) [Rpt./ 6 units] I (Identical with ARCH 566, which is home). May be convened with ARH 466.

581. Contemporary Theory and Criticism (3) I II For a description of course topics see ARH 481. Graduate-level requirements include an in-depth research project on a single aspect of current scholarly interest. May be convened with ARH 481.

584. Roman Art and Architecture (3) I II (Identical with CLAS 584, which is home). May be convened with ARH 484.

593. Internship (1-6) [Rpt./]

596. Seminar

b. Problems in Renaissance-Baroque (3) [Rpt./ 2] I II
c. Studies in Medieval Art (3) [Rpt./ 2] I II
d. Topics in Early Modern European Art (3) I II
e. Pre-Columbian Art (3) [Rpt./ 4] I P, consent of instructor. (Identical with ANTH 596E).
f. History of Photography (3) [Rpt./ 4] I II P, ARH 424A, ARH 424B.
g. Colonial and 19th-century American Art (3) [Rpt./ 3] I Field trips.
i. Issues in Contemporary Theory and Criticism (3) I II P, consent of department.
j. Issues in African Art History (3) [Rpt./ 3] I II (Identical with AFAS 596J, ANTH 596J).
### Art History—Studio Art

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
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<tbody>
<tr>
<td>101. Drawing</td>
<td>(3) Visual perception and the principles of composition presented through various drawing problems and materials. 6S. Special fees.</td>
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<tr>
<td>102. Color and Design</td>
<td>(3) Elements and principles of two-dimensional composition, with emphasis on color mixing, interaction and control. 6S. Special fees.</td>
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<tr>
<td>103. Vision, Voice, and Ideology</td>
<td>(3) Overview of current visual studio practices and issues manifest in contemporary art forms (2-D, 3-D, and time-based media). Studio projects assigned relate to lecture topics and readings.</td>
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<tr>
<td>104. Three-Dimensional Design</td>
<td>(3) I II Study of volume, mass, and space relationships through modeling, casting, carving, and construction.</td>
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<tr>
<td>205. Figure Drawing</td>
<td>(3) I II Drawing from the model and other subjects to develop pictorial and perceptual skills. 6S. P, ART 101. Special fees.</td>
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<tr>
<td>223. New Genre I</td>
<td>(3) I III Video used creatively to work through ideas in an improvisational manner. In-class, collaborative projects combine video with creative writing, performance art and audio experiments.</td>
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<tr>
<td>241. Beginning Photography</td>
<td>(3) I I I Introduction to the fundamental techniques and aesthetics of intaglio printmaking with emphasis on etching. 6S. P, ART 101, ART 102, or consent of department. Special fees.</td>
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<tr>
<td>253. Alternative Methods in Printmaking</td>
<td>(3) I I I Introductory course in the nontraditional approaches to printmaking. Monotype, industrial techniques, and handmade paper. 6S. P, ART 101, ART 102, or consent of department; Special fees.</td>
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<tr>
<td>255. Lithography</td>
<td>(3) I II Introductory course in the fundamental techniques and aesthetics of black and white, and color lithography. Stone and metal plate processes are covered. 6S. P, ART 101, ART 102, or consent of department. Special fees.</td>
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<tr>
<td>260. Beginning Illustrated Anatomy</td>
<td>(3-4) I II Anatomical study from cadaver and body parts collection in anatomy lab at the medical center. Drawing from live models and cadavers. P, ART 205, portfolio. Special fees.</td>
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<tr>
<td>261. Computer Graphics</td>
<td>(3) I II Integration of visual design principles with 2-D computer graphic applications. 2L. 2S. P, ART 265 or equivalent. Special fees.</td>
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<tr>
<td>265. Beginning Graphic Design</td>
<td>(3) I II Introductory study of principles, tools, and techniques of advertising layout. 6S. P, ART 101, ART 102. Special fees.</td>
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<tr>
<td>266. Beginning Illustration</td>
<td>(3) I I II Exploration of techniques, styles and media for illustration. 6S. P, ART 102, ART 205, ART 265. Special fees.</td>
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<tr>
<td>271. Beginning Jewelry and Metal-smithing</td>
<td>(3) I II Introduction to the fundamentals of jewelry and metalwork processes. 6S. P, ART 104. Special fees.</td>
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<tr>
<td>273. Beginning Art Practices in Ceramics</td>
<td>(3) I II Introduction to clay as a fine art medium with main emphasis on historical and contemporary ceramics and art as sources of inspiration. Basic process of hand building, surface treatments, kiln firing, and wheel-throwing basics. Critiques, readings, lectures, tests on ceramic terminology and safety. Some writing required. Sketchbook, textbook. 2R, 4S. P, ART 101, ART 104, or consent of ceramic faculty. Special fees.</td>
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<tr>
<td>280. Painting</td>
<td>(3) I I I Elementary course in the methods and techniques of painting with oils and/or acrylics. 6S. P, ART 101, ART 202, ART 205. Special fees.</td>
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<tr>
<td>285. Watercolor Painting</td>
<td>(3) I I I Introductory course in watercolor painting exploring basic materials and techniques. 6S. P, ART 101, ART 102; Field trips.</td>
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<tr>
<td>287. Beginning Sculpture</td>
<td>(3) I I II Introduction to fundamentals of sculpture process through carving, fabrication and casting, to develop personal approaches to dimensional composition. 6S. P, ART 104. Special fees.</td>
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<td>289. Beginning Modeling Emphasizing the</td>
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<tr>
<td>305. Figure Drawing II</td>
<td>(3) I II Intermediate course in drawing problems using the model. P, ART 205. Special fees.</td>
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<tr>
<td>312. Video Art in America</td>
<td>(3) II (Identical with M AR 312, which is home).</td>
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<tr>
<td>316. New Genre Studio and Therapy</td>
<td>(3) I II Exploration of a range of contemporary art practice and theory. Projects in a variety of media including performance, installation, and in-class video work.</td>
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<tr>
<td>329. Art History of the Cinema</td>
<td>(3) I (Identical with CLAS 329, which is home).</td>
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<tr>
<td>341A. Intermediate Photography</td>
<td>(3) I II Principles and processes of photography. Introduction for artists to the principles and nature of black-and-white documentary photography. Principles and processes of photography. Creating untrue narratives, students are challenged to deconstruct the familiar photo essay and create new ways of telling stories. P, ART 241, acceptance of portfolio ART 341A is not prerequisite to ART 341B, etc. Special fees.</td>
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<tr>
<td>341B. Intermediate Photography</td>
<td>(3) I II Principles and processes of photography. Introduction for artists to the principles and nature of black-and-white documentary photography. P, ART 241, acceptance of portfolio ART 341A is not prerequisite to ART 341B, etc. Special fees.</td>
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<tr>
<td>341C. Intermediate Photography</td>
<td>(3) I II Principles and processes of photography. Introduction to principles of synchronized color slide-audio tape production for artists. P, ART 241, acceptance of portfolio ART 341A is not prerequisite to ART 341B, etc. Special fees.</td>
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<tr>
<td>341D. Intermediate Photography</td>
<td>(3) I II Principles and processes of photography. Principles and processes of photography. Methods to alter the meaning and surface of the photograph. Painting, sculpture, and any other forms that might alter, disfigure or reinvent the concept of art. P, ART 241, acceptance of portfolio ART 341A is not prerequisite to ART 341B, etc. Special fees.</td>
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<tr>
<td>342. Photography Since 1950</td>
<td>(3) I III Slide presentations and discussions of major photographers since 1950.</td>
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<tr>
<td>343A. Photographic Techniques</td>
<td>(3) I Fundamentals of exposure and development control,</td>
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</table>
print control, studio and portrait lighting, slide copying and view camera operation. P, ART 241 ART 343A is not prerequisite to ART 343B. Special fees.

343B. Photographic Techniques (3) II Manipulation and extension of boundaries of traditional photography using polarization, appropriation, montage, toning and bleaching. P, ART 241 ART 343A is not prerequisite to ART 343B. Special fees.


349. Intermediate Artists' Video (3) I Students will produce individual projects using video as a creative, self-expressive tool. The class will take an exploratory approach to experimental, fictional and documentary genres. P, M AR 200, M AR 314, acceptance of portfolio. (Identical with M AR 349).


356. Intermediate Printmaking (3) I II Intermediate course in printmaking with emphasis on format aesthetics and personal expression. P, ART 253 or ART 255; ART 250, ART 251. Special fees.

360. Intermediate Illustrated Anatomy (3) [Rpt./ 3] S Anatomic art studies from cadaver and body parts collection in anatomy lab at the medical center. Drawing from live models and cadavers. P, ART 205, upper division status and acceptance of portfolio. Special fees.

361. Computer Graphics (3) I II Intermediate level technology applied to graphic design, illustration, as well as other aspects of visual communication. 2L 2S. P, ART 261 or equivalent, acceptance of portfolio. Special fees.

363. Typography (3) I II GRD The study of letterforms and their appropriate and effective use in visual communications from a historic as well as from a contemporary perspective. P, ART 265, acceptance of portfolio. Special fees.

364. Production Problems in Graphic Design (3) [Rpt./ 1] I II Preparation of visual material for reproduction by various printing processes. P, ART 265, ART 266, acceptance of portfolio. Special fees.

365. Intermediate Graphic Design (3) [Rpt./ 1] I II Further exploration of design as a communications tool. Solutions to realistic promotional programs are executed from rough to comprehensive stage. P, ART 102, ART 205, acceptance of portfolio. Special fees.

366. Rendering Techniques (3) [Rpt./ 1] I Drawing and rendering techniques with various media in the creation of editorial and advertising illustration. P, ART 265, ART 266, acceptance of portfolio. Special fees.

367. Advertising Illustration (3) [Rpt./ 1] II P, ART 266, ART 265, acceptance of portfolio. Special fees.

373A-373B. Art Practices in Handbuilding (3-3) [Rpt./ 2] I II Continuation of clay as a fine art medium with major emphasis on contemporary ceramics and art as sources of inspiration and on in-depth development of handbuilding, surface treatment, and kiln firing techniques, with minor emphasis on wheel throwing and historical ceramics; studio problems in clay and glaze formulation; critiques, readings, lectures, and tests on ceramic terminology, technology, and safety; some writing required. Sketchbook. Textbook. ART 373A: P, ART 273 or consent of ceramic faculty. Special fees.; ART 373B: P, ART 273 or consent of ceramic faculty. Special fees.

374. Ceramic Surface and Color (3) [Rpt./ 1] II Surface possibilities and color interactions specific to ceramic fired techniques investigated by making class test tiles, relief pieces, and simple forms on which to conduct experiments with slips, engobes, stains, and glazes. Emphasis on creative explanation of ceramic materials such as commercial ceramic pigments, metallic oxides, fluxes, clays, organic additives, and diverse firing methods. P, ART 273. Special fees.; Field trips.

376. Intermediate Fibers I (3) [Rpt./ 3] I Two-dimensional fiber techniques including 4-harness loom weaving (loom and weaver-controlled weaves) and tapestry weaving (cartoon as well as spontaneous methods). Emphasis on individual interpretation of traditional woven techniques. P, ART 276.


380. Painting II (3) [Rpt./ 2] I II Intermediate course in developing expressive and pictorial skills in oil and/or acrylic media. P, ART 280. Special fees.


387B. Intermediate Sculpture/Metal and Wood Fabrication (3) I II In-depth exploration of the media and concepts of sculpture through metal and wood fabrication processes. P, ART 287. Special fees.

387C. Intermediate Sculpture/Carving (3) I II In-depth exploration of the subtractive process with direct carving versus specific imagery. P, ART 287. Special fees.

387E. Intermediate Sculpture/Experimental and Combined Media (3) I II In-depth exploration of the techniques and concepts of experimental and combined media as applied to individual directions. P, ART 287.

387G. Intermediate Sculpture/Kinetic (3) I II In-depth exploration of the techniques and concepts of kinetic sculpture and applied to individual directions. P, ART 287.

389. Intermediate Modeling Emphasizing the Figure (3) I II Intermediate modeling techniques in clay emphasizing the figure. Scale, composition, gesture, surface and anatomical structure will be studied to develop creative solutions. P, ART 104. Special fees.

393. Internship (1-6) [Rpt./]

394. Practicum (1-4) [Rpt./]

399. Independent Study (1-5) [Rpt./]

399I. Honors Independent Study (1-5) [Rpt./] I II

401. Drawing: Non-Figurative Approach (3) I II May be convened with ART 501.

405. Figure Drawing III (3) [Rpt./ 5] I II Advanced drawing with emphasis on personal expressive development. P, 6 units of ART 305. Special fees.

409. Drawing Critique (3) [Rpt./ 5] I II Individual exploration and development of visual concepts through drawing, accompanied by individual and class critiques. P, 6 units of ART 405.

415B. Northern Baroque Art I (3) II May be convened with ART 515B.

416A. Eighteenth Century Art I (3) I May be convened with ART 516A.

422. Performance: Live/Photo/Video (3) I II An overview of diverse approaches within performance art in an interdisciplinary context. Combines live performance with video and photography. May be convened with ART 522.

423. New Genre Concept Development (3) [Rpt./ 1] I II Studio course to assist students with defining intentions, refining project ideas and clarifying the content of their art-making. Open to students working in any medium. May be convened with ART 523.

446. Experimental Color Photography (3) I II
Nontraditional approaches to color photography including the use of black-and-white and color negatives, manipulation of the negative, dyes and paints added to the print. Development of regional vision encouraged. P, ART 341B or ART 341C; ART 241, ART 341A, ART 346, acceptance of portfolio. Special fees.. May be convened with ART 546.

447. Mixed Media Book (3) [Rpt./ 1] I II
Investigation of the book as a format for presenting visual material; the process of making single books. Contemporary bookmakers will be presented. P, 12 units of upper-division studio art courses; Field trips. May be convened with ART 547.

448. Video For Artists (3) I II
Seniors and graduate students utilize small format video camera and editing to extend/amplify concepts that have developed in their artistic inquiry. P, acceptance of portfolio; Field trips. May be convened with ART 548.

449. Advanced Artists' Video (3) [Rpt./ 1] I II
Students will produce individual video projects with an experimental, self-expressive orientation. There is also an option to combine video with performance or to incorporate it within an installation context. P, ART 349 or M AR 314; acceptance of portfolio. (Identical with M AR 449). May be convened with ART 549.

450. Advanced Printmaking (3) [Rpt./ 2] I II
Advanced course in printmaking with emphasis on formal aesthetics and personal expression. P, ART 356 Open to majors only. Special fees.


452. Graphic Design Studio (3) [Rpt./ 1] I II
Classroom experience in a professional designer capacity with studio solutions to graphic design problems submitted from campus and community. P, consent of department, 9 units of graphic design courses. Special fees.; Field trips. May be convened with ART 565.

453. Editorial Illustration (3) [Rpt./ 1] I II
Problems in editorial and book illustration. P, acceptance of portfolio, 9 units of illustration courses. Special fees.. May be convened with ART 565.

454. Experimental Illustration (3) [Rpt./ 2] I II

455. Portfolio Preparation (3) [Rpt./ 1] I II
Final approach to completion of portfolio. Student's portfolio is critiqued in areas of order, style, and degree of presentation to bring it to a professional level. P, acceptance of portfolio, 9 units of graphic design courses. Special fees.. May be convened with ART 569.

456. Advanced Practices in Ceramics (3) I II
Individual studio research and instruction with emphasis on personal creative development. P, ART 473, acceptance of portfolio. Special fees. May be convened with ART 573.

457. Ceramic Surface and Color (3) [Rpt./ 1] I II
Further sophistication and complex investigation of surface possibilities and color interactions specific to ceramic fired techniques by making class test tiles, relief pieces, and simple and complex forms on which to conduct experiments with slips, engobes, stains, and glazes. Emphasis on experimentation and creative explanation of ceramic materials; commercial ceramic pigments, metallic oxides, fluxes, clays and organic additives, and diverse firing methods. Students will be required to write a paper on surface and color related to the use of ceramics. Sketchbook required. P, acceptance of portfolio or consent of instructor, ART 373. Special fees.; Field trips. May be convened with ART 574.

458. Ceramics Within a Public Art Context (3) [Rpt./ 1] I II
For students who are interested in exploring original ceramic art work in a public art context. Students will be expected to work both individually and in groups to identify public art sites, research and design public art works, seek approval, make scale drawings and models for the sites, and when feasible complete actual public art works. Includes all aspects of working with clay, visiting artist lectures, field trips, discussions, critiques and sketchbooks. P, ART 373A, ART 373B, acceptance of portfolio, consent of instructor. Special fees.; Field trips. May be convened with ART 575.

459. Advanced Fibers (3) [Rpt./ 5] I II
Individual interpretations of concept into finished fiber works. P, 9 units of fiber courses. May be convened with ART 576.

460. Painting III (3) [Rpt./ 5] I II
Advanced painting concepts with emphasis on personal expressive development and change. P, 6 units of ART 380. Special fees.

461. Combining Media (3) [Rpt./ 1] I II
Individual and group projects, including collages, constructions, image sequences, and elements from other art forms (sound, language, movement, etc.). Special fees. May be convened with ART 583.

462. Watercolor Painting III (3) [Rpt./ 5] I II

463. Advanced Sculpture/ Casting Principles (3) I II
An in-depth exploration of the techniques and concepts of casting. Advanced process of mold making as applied to individual directions. P, ART 387. Special fees.

464. Advanced Sculpture/ Carving (3) I II

465. Advanced Sculpture/ Glass Casting and Slumping (3) I II

466. Advanced Sculpture/ Experimental and Combined Media (3) I II
In-depth exploration of personal directions through combining media and experimental sculpture processes. P, ART 387. Special fees.

467. Advanced Sculpture/ Specific Concepts (3) I II
The exploration and research of specific sites and the ramification of sculptural placements within these sites. Models will be constructed. P, ART 387. Special fees.

468. Advanced Modeling with Emphasis on the Figure (3) [Rpt./ 3]
Advanced modeling techniques in clay and casting wax emphasizing figure modeling. Work primarily from the model, perfecting modeling techniques, utilizing figure proportions, muscle and skeletal structures, gesture, texture, scale, and composition in creating sculptural ideas. P, ART 101, ART 102, ART 104, ART 287, ART 289, ART 389. Special fees.. May be convened with ART 589.

469. Internship (1-6) [Rpt./ 1]

470. Practicum (1-4) [Rpt./ 1]

471. Seminar
a. Senior Seminar for Artists (3)

f. Critical Issues in Design (3) I P, senior or graduate standing, consent of instructor. May be convened with ART 596.

j. Writing Art Criticism (3) I Field trips. May be convened with ART 596.

472. Workshop
a. Gallery Management (1-3) I II P, 12 units of studio or art history. May be convened with ART 597A.

b. Professional Experiences in Art (3) P, 12 units of studio or art history. May be convened with ART 597B.

473. Senior Capstone (1-3) I II

474. Honors Thesis (3) [Rpt./ 2]

475. Independent Study (1-5) [Rpt./ 1]

476. Honors Independent Study (3) [Rpt./ 1]

501. Drawing: Non-Figurative Approach (3) I II
GRD For a description of course topics see ART 401. For a description of course topics see ART 501. Graduate-level requirements include additional arrangements with emphasis on research and personal direction. P, ART 305. May be convened with ART 401.

505. Graduate Figure Drawing (3) [Rpt./ 5] I II
Special problems in drawing, using the
509. Graduate Drawing Critique (3) [Rpt./5] I II Individual exploration in drawing media and visual concepts. Classroom and individual critiques.

515B. Northern Baroque Art (3) I I For a description of course topics see ART 415B. May be convened with ART 415B.

516A. Eighteenth Century Art I (3) I I For a description of course topics see ART 416A. May be convened with ART 416A.

522. Performance: Live/Photo/Video (3) I II For a description of course topics see ART 422. Graduate students are required to produce projects which are qualitatively superior in terms of or, concept and technique. May be convened with ART 422.

523. New Genre Concept Development (3) [Rpt./1] I II For a description of course topics see ART 423. Graduate students are required to produce projects which are qualitatively superior in terms of form, concept and technique. May be convened with ART 423.

537. Art Therapy Techniques I (3) I

541. Advanced Photography (3) [Rpt./1] I I For a description of course topics see ART 441. Graduate-level requirements include an in-depth research project on a single aspect of a current scholarly interest. May be convened with ART 441.

546. Experimental Color Photography (3) [Rpt./1] I I For a description of course topics see ART 446. Graduate-level requirements include more rigorous grading and expectation. May be convened with ART 446.

547. Mixed Media Book (3) [Rpt./1] I I For a description of course topics see ART 447. Graduate-level requirements include an in-depth research project on a single aspect of a current scholarly interest. May be convened with ART 447.

548. Video For Artists (3) I II For a description of course topics see ART 448. Graduate-level requirements include an in-depth research project on a single aspect of a current scholarly interest. May be convened with ART 448.

549. Advanced Artists' Video (3) I I For a description of course topics see ART 449. Graduate-level requirements include projects that demonstrate conceptual and technical accomplishment. May be convened with ART 449.

550. Graduate Relief Printmaking (3) I I Relief printmaking with emphasis on individual research, personal direction and professional standards. Special fees.

551. Graduate Intaglio (3) I I Intaglio printmaking with emphasis on individual research, personal direction and professional standards. Special fees.

553. Graduate Alternative Methods in Printmaking (3) I II Nontraditional approaches to printmaking with emphasis on individual research, personal direction and professional standards. Special fees.

554. Graduate Lithography (3) I II Lithography with emphasis on individual research, personal aesthetic, and professional standards. Special fees.

556. Advanced Illustrated Anatomy (3) [Rpt./3] I S Anatomically art studies from cadaver and body parts collection in anatomy lab at the medical center. Drawing from live models and cadavers. P, ART 205, upper-division status, acceptance of portfolio. Special fees.

557. Graduate Graphic Design Problems (3) [Rpt./1] I II For a description of course topics see ART 465. Two- and three-dimensional design considerations with emphasis on conceptualization and presentation. 6S. P, acceptance of portfolio. Special fees.; Field trips. May be convened with ART 465.

558. Editorial Illustration (3) [Rpt./1] I I For a description of course topics see ART 466. Graduate-level requirements include an in-depth research project on a single aspect of a current scholarly interest. P, 9 units of illustration courses and approval of portfolio. Special fees. May be convened with ART 466.

559. Portfolio Preparation (3) [Rpt./1] I II For a description of course topics see ART 469. Graduate-level requirements include an in-depth research project on a single aspect of a current scholarly interest. P, 9 units of graphic design courses and approval of portfolio by the portfolio committee. Special fees. May be convened with ART 469.

560. Advanced Jewelry and Metal-smithing I (3) [Rpt./4] I I Graduate-level requirements include an in-depth studio research project. P, 9 units of metalwork. Special fees.

561. Advanced Jewelry and Metal-smithing II (3) [Rpt./1] I II Graduate-level requirements include an in-depth studio research project. P, ART 571. Special fees.

562. Advanced Practices in Ceramics (3) I I For a description of course topics see ART 473. Graduate-level requirements include an in-depth studio research project. P, ART 373. Special fees. May be convened with ART 473.

563. Advanced Ceramics Surface and Color (3) [Rpt./1] I I For a description of course topics see ART 474. Graduate-level investigation of surface possibilities and color interactions specific to ceramic fired techniques by making class test tile, relief pieces, and simple and complex forms on which to conduct experiments with slips, engobes, stains, and glazes. Emphasis on experimentation and creative exploration of ceramic materials; commercial ceramic pigments, metallic oxides, clays and organic additives and diverse firing methods. Students will be required to write a paper on surface and color related to the use of ceramics. Sketchbook required. 6S. P, ART 373 and portfolio or consent of instructor. Special fees.; Field trips. May be convened with ART 474.

564. Advanced Practices in Ceramics (3) [Rpt./12 units] I II Advanced high level experimentation in personal expression with watercolor and related media. Demonstration and critique.

565. Combining Media (3) [Rpt./1] I II For a description of course topics see ART 483. Graduate-level requirements include an in-depth studio research project. Special fees. May be convened with ART 483.

566. Graduate Watercolor Painting (3) [Rpt./5] I II High level experimentation in personal expression with watercolor and related media. Demonstration and critique.

567. Sculpture/Casting Materials (3) [Rpt./12 units] I II An in-depth exploration of the techniques and concepts of casting. Advanced processes and personal direction as applied to individual to individual directions. 6S. Special fees.

568. Sculpture Materials/Wood Fabrication (3) [Rpt./12 units] I II Advanced study in wood through direct carving versus false imagery. 6S. Special fees.

569. Sculpture Materials/Carving (3) [Rpt./12 units] I II Advanced processes of subtractive thinking through direct carving versus false imagery. 6S. Special fees.

570. Sculpture Materials/Casting (3) [Rpt./12 units] I II Advanced processes of casting through personal direction and casting processes. 6S. Special fees.

571. Sculpture Materials/Experimental and Combined Media (3) [Rpt./12 units] I II Advanced study in wood and personal direction through combining media and experimental sculpture processes. 6S. Special fees.

572. Sculpture Materials/Experimental and Combined Media (3) [Rpt./12 units] I II The development of a personal imagery and body of work. 6S. Special fees.
Astronomy (ASTR)

Steward Observatory Rm. N204
The University of Arizona
PO Box 210081
Tucson AZ 85721-0081
Phone: (520) 621-2288
FAX: (520) 621-1532
E-mail: director@as.arizona.edu
URL: http://www.as.arizona.edu/tim/www/so_main.html

Baccalaureate Degree
Bachelor of Science (B.S.)
Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)
Major and Degrees
Astronomy (B.S., M.S., Ph.D.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/minors/.

ASTRONOMY (ASTR)

100. Essentials of Astronomy (3) Survey of astronomy, with attention to its interdisciplinary aspects and its relationships to other sciences. Planetarium work and some nighttime observing sessions and field trips supplement class lectures. Primarily for non-science majors.

101L. Astronomy Laboratory (1) Projects, telescope observing, planetarium work, discussions. Can be taken alone or with 100. Combination is equivalent to 101A. Lab work includes frequent mathematical calculations using basic algebra.

103. Life in the Universe (4) I II Application of astronomy and other sciences to the study of the likelihood, possible nature and distribution of life in the universe. Planetarium visits, observing sessions with optical and radio telescopes and field trips. Laboratory exercises include frequent calculations using basic algebra. 3R, 3L. P, ASTR 100.

106. Survey of the Solar System (3) I II (Identical with PTYS 106, which is home).

109L. Exploration and Discovery in Planetary Science (1) I II (Identical with PTYS 109L, which is home).

296. Proseminar
a. Topics in Astronomical Research (1) II GRD P, ASTR 100 or equivalent.

299. Independent Study (1-3) [Rpt./] I II

299H. Honors Independent Study (1-3) [Rpt./]

300A-300B. Astronomy and Astrophysics (3-3) I A quantitative approach to astronomy and astrophysics. ASTR 300A: P, PHYS 251 and PHYS 252 or PHYS 241 or PHYS 242; ASTR 300B: P, PHYS 251 and PHYS 252 or PHYS 241 or PHYS 242.

302. Introduction to Observational Astronomy (3) I II Optical and radio detectors; observing preparation, data acquisition and reduction, data analysis. Observing at optical and radio wavelengths. Astrophysical applications of radio data and optical imaging. Computer software and computer-code writing to reduce astronomical data and to solve astronomical problems. Out-of-class telescope sessions are required. 2R, 3L. P, PHYS 142 or PHYS 152; PHYS 205, MATH 125A.

320. Philosophy and Historical Astronomical Thought (3) I II Historical development of astronomical concepts and the scientific method; cosmological concepts from ancient times to the present; controversies in astronomy in the recent past and at present.

396. Proseminar
b. Honors Proseminar (3) I II Honors Proseminar offered every third semester.

399H. Honors Independent Study (1-3) [Rpt./] I II

400A. Theoretical Astrophysics (3) I II Stars, interstellar matter, galaxies, radio sources, cosmology. P, MATH 254, 6 units of upper-division physics. Writing Emphasis Course.

400B. Theoretical Astrophysics (3) I II Stars, interstellar matter, galaxies, radio sources, cosmology. P, MATH 254, 6 units upper-division physics.

403. Physics of the Solar System (3) I II (Identical with PTYS 403, which is home). May be convened with ASTR 503.

418. Modern Astronomical Instrumentation and Techniques (3) I II Radiation energy; signals and noise; detectors and techniques for imaging.
photometry, polarimetry and spectroscopy. Examples from stellar and planetary astronomy in the x-ray, optical, infrared and radio.

(Identical with PTYS 418). May be convened with ASTR 518.

498. Senior Capstone (1-3) I II
498H. Honors Thesis (3) [Rpt./] 2 I II
499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (3) [Rpt./] I II

502. Astronomical Instrumentation Project (3) I Design, construction, and testing of an astronomical instrument chosen by each student under the guidance and supervision of the instructor. Regular class sessions are devoted to discussing techniques and reporting progress and problems.

503. Physics of the Solar System (3) II (Identical with PTYS 503, which is home). May be convened with ASTR 403.

515. Interstellar Medium (3) II Derivation of physical conditions from spectral data. Ionized, atomic and molecular clouds, interstellar dust and magnetic fields. Ionization equilibrium, heating and cooling, supernova shocks, dust and protostellar evolution.

518. Modern Astronomical Instrumentation and Techniques (3) I For a description of course topics see ASTR 418. Graduate-level requirements include an in-depth research paper. (Identical with PTYS 518). May be convened with ASTR 418.

522. Atomic and Molecular Astrophysics (3) I Interpretation of astronomical spectra: basic aspects of atomic and molecular spectra and processes that enable one to infer physical conditions in astronomical environments from analysis of their electromagnetic spectra. Familiarity with basic quantum mechanics is assumed.

523. Statistical Mechanical Problems in the Space Sciences (3) I (Identical with PTYS 523, which is home).

535. Stellar Structure (3) II Equations of stellar structure, virial theory, energy transport, equations of state, opacities, nuclear reactions, stellar models, evolution of low and high mass stars, observational tests, rotation and magnetic fields, binary evolution.

540. Structure and Dynamics of Galaxies (3) I Observational properties of galaxies; structure, kinematics, star and gas content. Structure of our own galaxy. Dynamics of stellar systems: equilibria, instabilities, internally and externally driven evolution.

541. Extragalactic Astronomy and Cosmology (3) II The structure, origin and evolution of the physical universe from theory and observations of systems outside our own galaxy. Relativistic cosmology; galaxy evolution and clustering; active galaxies and quasars; the microwave background; galaxy formation; the hot big bang; and physics of the early universe. P, ASTR 540.

545. Stellar Atmosphere (3) I Radiative transfer, gray atmosphere, opacity, line formation, non-LTE, curves of growth, stellar hydrodynamical, planetary applications. (Identical with PTYS 545).

553. Solar System Dynamics (3) II (Identical with PTYS 553, which is home).

555. Remote Sensing of Planetary Surfaces (3) II (Identical with PTYS 555, which is home).

556. Electrodynamics of Conducting Fluids and Plasmas (3) II (Identical with PTYS 556, which is home).

575. General Relativity and Cosmology (3) II General relativity with application to celestial mechanics, stellar structure, gravitational radiation, black holes, gravitational lensing and cosmology.

582. High Energy Astrophysics (3) II Radiation mechanisms, synchrotron radiation, charged particle acceleration, pulsars, black holes, accretion disks, X-ray binaries, gamma-ray sources, radio galaxies, active galactic nuclei. (Identical with PHYS 582, PTYS 582).

589. Topics in Theoretical Astrophysics (3) II (Identical with PHYS 589, which is home).
430. Computational Methods of Atmospheric Science (3) I Introduction to computational methods used in solving problems in the Atmospheric Sciences. Emphasis is on numerical techniques used in developing numerical weather prediction and climate models and in radiative transfer. Knowledge of FORTRAN is required. Also includes an introduction to statistical analysis of observational data and statistical prediction. One-hour discussion section scheduled each week in order for the instructor to assist students in the computer lab. P, ATMO 300A, ATMO 300B, MATH 254, and ENGR 170.

440. Air Pollution Meteorology (3) II Theoretical description and experimental practice relating to the dispersion and chemistry of gases and particulate matter in the atmosphere. Attention given to the scales of dispersion and the scales of atmospheric turbulence as related to local, regional and global pollution. P, CHEM 103A or consult department before enrolling. ATMO 300A, PHYS 142, MATH 254. May be convened with ATMO 540.

441A. Dynamic Meteorology (3) I Thermodynamics and its application to planetary atmospheres, hydrostatics, fundamental concepts and laws of dynamic meteorology. P, ATMO 300A and ATMO 300B or PHYS 325 or consent of instructor. (Identical with PTYS 441A). May be convened with ATMO 541A.

441B. Dynamic Meteorology (3) II Thermodynamics and its application to planetary atmospheres, hydrostatics, fundamental concepts and laws of dynamic meteorology. P, ATMO 300A and ATMO 300B or PHYS 325 or consent of instructor. (Identical with PTYS 441B). May be convened with ATMO 541B.

451A. Introduction to Physical Meteorology (3) I Introduction to atmospheric physics that includes the composition and chemistry of the atmosphere, kinetic theory, the mechanics of ideal and real fluids, aerosol mechanics, atmospheric acoustics, atmospheric radiation, scattering, radiative transfer, atmospheric optics, cloud physics, and atmospheric electricity. P, ATMO 300A and ATMO 300B or PHYS 325 or consent of instructor. May be convened with ATMO 551A.

451B. Introduction to Physical Meteorology (3) II Introduction to atmospheric physics that includes the composition and chemistry of the atmosphere, kinetic theory, the mechanics of ideal and real fluids, aerosol mechanics, atmospheric acoustics, atmospheric radiation, scattering, radiative transfer, atmospheric optics, cloud physics, and atmospheric electricity. P, ATMO 300A and ATMO 300B or PHYS 325 or consent of instructor. May be convened with ATMO 551B.

460. Aerosol Science and Engineering (3) I (Identical with CHEE 460, which is home). May be convened with ATMO 560.

465. Mesoscale Analysis (3) II Description, analysis, and dynamics of weather systems of the mesoscale. Topics may include fronts, thunderstorms, gravity waves, lake effect storms and sea breezes. P or CR, ATMO 441B; ATMO 471. May be convened with ATMO 565.

469A. Air Pollution I (3) I An introduction to the chemistry of air pollutants in the troposphere and stratosphere. Topics include a physical chemistry refresher; air pollution; carbon cycle; stratospheric ozone; combustion; aerosols; samplings; legislation. P, MATH 223, 469A is not prerequisite to 469B but recommended. (Identical with CHEE 469A). May be convened with ATMO 569A.

469B. Air Pollution II (3) II An introduction to the chemistry of air pollutants in the troposphere and stratosphere. Topics include a physical chemistry refresher; air pollution; carbon cycle; stratospheric ozone; combustion; aerosols; samplings; legislation. P, MATH 223, 469A is not prerequisite to 469B but recommended. (Identical with CHEE 469B). May be convened with ATMO 569B.

470. Advanced Weather Analysis Laboratory (2) (Rpt./ 1) II Exploration of dynamic and thermodynamic principles that govern the atmosphere. Use of computerized weather analysis and visualization software; interpretation of output from operational numerical weather prediction models; daily forecasting practice. P, ENGR 170; CR, ATMO 471 or ATMO 472, open to majors only. May be convened with ATMO 570.


489. Atmospheric Electricity (3) II Introduction to sources and chemistry of atmospheric ions, fair weather electricity, the global circuit, electrical structure of clouds, thunderstorm electrification, lightning, lightning electromagnetic fields, mechanisms of lightning damage and lightning protection. P, PHYS 241 or consent of instructor. MATH 322. (Identical with ECE 489). May be convened with ATMO 589.

490. Remote Sensing for the Study of Planet Earth (3) II (Identical with REM 490, which is home). May be convened with ATMO 590.

493. Internship (1-5)

498. Senior Capstone (1-3) I II

498H. Honors Thesis (1-5) (Rpt./ 9 units)

499. Independent Study (1-5) (Rpt./)

499H. Honors Independent Study (1-5) (Rpt./) I

510. Statistical Methods in Atmospheric Sciences (3) I For a description of course topics see ATMO 410. Graduate-level requirements include homework and project assignments that require a deeper understanding of the material, and more comprehensive examinations. P, MATH 125B, knowledge of FORTRAN or similar programming language. May be convened with ATMO 410.

521. Physical Climatology (3) II For a description of course topics see ATMO 421. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter. (Identical with ARL 521). May be convened with ATMO 421.

524. Hydroclimatology (3) I (Identical with HWR 524, which is home).

530. Micrometeorology (3) I Theoretical aspects of atmospheric turbulence, including discussions of laminar flow, turbulent flow, the mechanical energy equations, and the shearing stress and the wind profile. P, ATMO 541B.

535. Air/Sea Interactions (3) I Physical characteristics of the oceans; the dynamics of ocean currents and their interactions with the atmosphere; El Niño and other teleconnections between the oceans and the atmosphere. P, ATMO 300B.

540. Air Pollution Meteorology (3) II For a description of course topics see ATMO 440. Graduate-level requirements include more difficult homework and projects assignments that require a deeper understanding of the material and more comprehensive examinations. May be convened with ATMO 440.

541A. Dynamic Meteorology (3) I For a description of course topics see ATMO 441A. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter. (Identical with PTYS 541A). May be convened with ATMO 441A.

541B. Dynamic Meteorology (3) II For a description of course topics see ATMO 441B. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter. (Identical with PTYS 541B). May be convened with ATMO 441B.

544. Physics of High Atmospheres (3) II (Identical with PTYS 544, which is home).


551A. Introduction into Physical Meteorology (3) I For a description of course topics see ATMO 451A. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter. May be convened with ATMO 451A.

551B. Introduction into Physical Meteorology (3) II For a description of course topics see ATMO 451B. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter. May be convened with ATMO 451B.

560. Aerosol Science and Engineering (3) I (Identical with CHEE 560, which is home). May be convened with ATMO 460.
565. Mesoscale Analysis (3) II For a description of course topics see ATMO 465. For a description of course topics and prerequisites see 465. Graduate-level requirements include an additional quantitative and thorough understanding of the subject matter. May be convened with ATMO 465.

570. Advanced Weather Analysis Laboratory (2) [Rpt./I] II For a description of course topics see ATMO 470. Graduate-level requirements include a term paper, which may be convened with ATMO 470.

571. Synoptic Meteorology (1) II For a description of course topics see ATMO 471. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter. P, MATH 223, ATMO 541A; CR, ATMO 541B, ATMO 570. May be convened with ATMO 471.

572. Weather Forecasting Analysis (1) II For a description of course topics see ATMO 472. Graduate-level requirements include a survey paper on some aspect of weather prediction. P, ATMO 410, ATMO 471; CR, ATMO 570. May be convened with ATMO 472.

583. Remote Sensing Instrumentation and Techniques (3) II (Identical with ECE 583, which is home).

589. Atmospheric Electricity (3) II For a description of course topics see ATMO 489. Graduate-level requirements include different homework assignments and tests. (Identical with ECE 589, ECE 589). May be convened with ATMO 489.

590. Remote Sensing for the Study of Planet Earth (3) II (Identical with REM 590, which is home). May be convened with ATMO 490.

595. Colloquium

596. Advanced Weather Analysis Laboratory (2) [Rpt./I] II For a description of course topics see ATMO 541A. Graduate-level requirements include additional homework and other exercises. P, MATH 223, ATMO 569A is not prerequisite to 569B but recommended. (Identical with CHEE 569A). May be convened with ATMO 469B.

597. Inverse Problems in Geophysics (3) I II (Identical with GEOS 567, which is home).

598. Cloud and Precipitation Physics (3) II Thermodynamics of nucleation, drop growth by condensation, collection and coalescence processes, drop breakup, ice crystal growth accretion and aggregation. P, ATMO 551A.

599. Independent Study (1-5) [Rpt./]
456. Bioinformatics and Genomic Analysis (3) II (Identical with MCB 516, which is home).

516. Bioinformatics and Genomic Analysis (3) II (Identical with MCB 516, which is home). May be convecned with BIOC 416.

518. Laboratory Methods in Insect Physiology (3) II (Identical with INSC 518, which is home).

533. Teaching Biology Labs (2) II For a discussion of course topics see BIOC 433. Graduate-level requirements include an additional project. (Identical with ENTO 533). May be convened with BIOC 433.

543. Research Animal Methods (3) I (Identical with V SC 543, which is home). May be convened with BIOC 443.

545. Concepts in Genetic Analysis (3) I (Identical with MCB 545, which is home).

549. Survival Skills for Students (2) II (Identical with SP H 549, which is home).

555. Molecular Mechanisms of Development (3) II (Identical with MCB 555, which is home).

561. Introduction to Biochemical Literature (1) II Discussion of the biochemical literature aimed at helping the student evaluate and report the published literature. Primarily for first year graduate students planning a career in biochemistry and desiring to prepare themselves for continued study. CR, BIOC 462B, BIOC 462B. (Identical with CHEM 561).


566. Nucleic Acid (4) I Chemistry, structure, and function of nucleic acids; replication, transcription translation, gene organization, regulation of gene expression and organnelle nucleic acids. Both procaryotic and eucaryotic systems will be considered. P, BIOC 411 or BIOC 511; consent of instructor. (Identical with GENE 568, INSC 568, MCB 568).

569. Topics in Gene Reconfiguration (2) II Behavior of gene regulatory systems in prokaryotes and eukaryotes. Knowledge of mechanisms is assumed and discussed when needed, but emphasis is on regulatory circuitry. Most lectures will be student presentations. P, BIOC 416 or consent of instructor. (Identical with MCB 569).

572. Cell Regulation (3) II (Identical with MCB 572, which is home).

574. Advances in Mammalian Genetics (2) [Rpt./] I Student participation in the presentation and discussion of current literature covering recent advances in the molecular analysis of mammalian genetic loci. P, undergraduate courses in genetics and molecular biology. (Identical with GENE 574, MCB 574).

577. Biological Structure II (3) II Advanced study of macromolecular structure; theory, methods, and results of x-ray crystallography and NMR. P, BIOC 585 or consent of instructor.


586. Intracellular Messengers (2) I (Identical with NRSC 586, which is home).

588. Principles of Cellular and Molecular Neurobiology (4) I (Identical with NRSC 588, which is home).

593. Internship (1-6) [Rpt./] I II

594. Practicum (1-6) [Rpt./]

595. Colloquium

a. Oncogenes and Signal Transduction (1) I P, open to high school biology teachers only. (Identical with MCB 597A).

b. Current Topics for Biological Teaching (1) [Rpt./ 28] I II P, open to in-service and pre-service teachers only, 18 units of biological sciences.

599. Independent Study (1-5) [Rpt./]

621. Molecular Plant-Microbe Interactions (3) I (Identical with PL P 621, which is home).

623A-623B. Biology Update (2) S Focuses on recent advances in the understanding of basic biology and new applications. P, open to middle and high school biology teachers only. BIOC 623A is not prerequisite to BIOC 623B. (Identical with ECOL 623A, MCB 623A).

633. Secondary Biology Laboratory Curriculum (3) S Contemporary secondary science curriculum materials and teaching approaches. Course taught jointly by science and education faculty. The use of laboratories in teaching is discussed in the broad context of the national recommendations for science education. 2R, 3L. P, open to middle and high school biology teachers only, 18 units of biological sciences.

643. Biology Lesson Development (3) [Rpt./2] S Focuses on translating material learned in the biology research experience into laboratory or field experiments to be used in middle school and high school classrooms. Resource faculty will advise on experimental design, the necessary laboratory techniques, and testing the laboratory/field experiments. P, 2 units of 900 level research or 2 units of 900 level research. 2R, 3L. P, open to middle and high school biology teachers only, 18 units of biological sciences.

665. Analysis and Purification of Proteins (3) I (Identical with AN S 665, which is home).

681. Intro To Biochemical Research (1-5) [Rpt./10 units] I II

691. Preceptorship (1-3) [Rpt./] I II

691. Preceptorship

a. Workshop Development and Presentation (1-3) [Rpt./3 units] II P, BIOC 643.

693. Internship (1-6) [Rpt./] I II

795. Colloquium

a. Biochemistry I (1-3) [Rpt./9 units] I

b. Biochemistry II (1-3) [Rpt./9 units] II

699. Independent Study (1-3) [Rpt./] I II
Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.
To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Biomedical Engineering (BME)
510. Biology for Biomedical Training (3) I
Basic biological principles governing cellular processes and links to applications in medicine, engineering, and applied sciences.

511. Physiology for Biomedical Engineering (3) II
Principles of Biomedical Engineering (3)
Designed for BME students, engineering principles governing the behavior of biomedical systems including solid and fluid mechanics, mass and heat transport, system dynamics and related mathematical techniques with applications in biomedical engineering.

517. Measurement and Data Analysis in Biomedical Engineering (3) II
Biomedical instrumentation, sensors, physiological measurements, analog signal processing, digital signal conversion, digital signal processing, data acquisition, data reduction, statistical treatment of data, and safety issues.

597. Workshop
a. Research Methods in Biomedical Engineering (3) [Rpt./ 2] I II
Workshop in research methods in biomedical engineering. M.S. and Ph.D. candidates in biomedical engineering curriculum must complete at least two out of these six (or one with BME 693).

693. Internship
a. Clinical/Industrial Internship (3) I II

696. Seminar
a. Biomedical Engineering (1) [Rpt./units] I II

Baccalaureate Degrees
Bachelor of Science in Business Administration (B.S.B.A.)
Bachelor of Science in Public Administration (B.S.P.A.)
Graduate Degrees
Master of Accounting (M.Ac.)
Master of Arts (M.A.)
Master of Business Administration (M.B.A.)
Master of Public Administration (M.P.A.)
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Accounting (B.S.B.A., M.Ac.)
Business Administration (M.B.A.)
Business Economics (B.S.B.A.)
Business Management (B.S.B.A.)
Criminal Justice Administration (B.S.P.A.)
Economics (B.A.*, M.A., Ph.D.)
Entrepreneurship (B.S.B.A.)
Finance (B.S.B.A.)
General Business Administration (B.S.B.A.)*
Health and Human Services Administration (B.S.P.A.)
Management (M.S., Ph.D.)***
Management Information Systems (B.S.B.A., M.S.)
Marketing (B.S.B.A.)
Operations Management (B.S.B.A.)
Public Administration (M.P.A.)
Public Management (B.S.P.A.)

Double majors are common within the College of Business and Public Administration as many of the major requirements overlap. Consult an academic advisor for more information.

Advanced Standing
Initial admission to BPA does not guarantee entry to the professional program (advanced standing). The advanced standing policy restricts all enrollments in upper-division (300- and 400-level) courses taught by the departments in the BPA College during the fall and spring semesters to those who qualify either as BPA, non-BPA, or exempt program students or by catalog exemption.
Advanced Standing Policy
BPA students must:
1. have credit for a minimum of 56 units, including all stipulated lower-division requirements
2. have taken a minimum of 12 regularly graded units of applicable course work at The University of Arizona; transfer students with all other requirements completed will receive provisional advanced standing prior to attempting 12 graded units at UA and establishing a UA GPA
3. have a grade-point average based on overall University credit course work of not less than 2.75
4. have an approved application on file with the BPA Undergraduate Programs Office under the Advanced Standing Policy
5. attend the advanced standing orientation. Non-BPA students must have:
1. credit for a minimum of 56 units
2. a grade point average based on all University credit course work of not less than 2.75
3. an approved application on file with the BPA Undergraduate Programs Office under the Advanced Standing Policy

Exempt Programs
Exempt programs must have the approval of the Dean of the BPA College and the dean of the college offering the degree program. Students who qualify under this provision will be permitted to take only required upper-division BPA courses that have been specifically approved and designated in their major field of study. Consult the advisors in McClelland Hall 103 for more information.

Transfer Course Work
All transfer course work applicable to the B.S.P.A. or B.S.P.A. degree requirements taken while enrolled in other colleges or at other universities is subject to acceptance by the BPA College for degree certification purposes.

International Business Certificate Program
The International Business Certificate Program is a selective, senior year program that compliments the student's primary major in one of the functional areas of business. Program training combines upper-division international business courses with a full year of international business internship. Students apply for admission during the Spring semester of their junior year. Interested students should see an advisor in the freshman or sophomore year. Contact an international business advisor in McClelland Hall 203 for more information.

College-specific Academic Requirements
*minimum of 54 units of non-BPA course work
*minimum of 48 units of upper-division course work
*advanced standing is required for entry into 300- and 400-level BPA courses

Undergraduate minors
The college does not require an undergraduate minor. For information about optional minors, contact the college at the office listed above.
* jointly administered with the College of Social and Behavioral Sciences.
**For more information about this major, contact the Undergraduate Programs Office at 621-2505.

General education program
All undergraduate students are required to complete the university-wide general education program. The program develops students' creative and analytical skills and integrates knowledge across university disciplines.

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Business Administration (B AD)
100. Management Fields and Career (2) I II Management disciplines and careers, including skill development in the areas of academic planning, career research, self-assessment, communication and technology. Limited to BPA freshmen only.
498. Senior Capstone (1-3) I II
499. Independent Study (1-5) [Rpt.]
599. Independent Study (1-6) I II
699. Independent Study (1-3) [Rpt.]
900. Research (1-4) [Rpt.]
920. Dissertation (1-9) [Rpt.]
930. Supplementary Registration (1-9) [Rpt.]

CANCER BIOLOGY (CBIO)
Committee on Cancer Biology
Department of Radiation Oncology
The University of Arizona
PO Box 245024
Tucson AZ 85724-5024
Phone: (520) 626-7479
FAX: (520) 626-4480
E-mail: acione@azcc.arizona.edu
URL: http://www.azcc.arizona.edu/www/text_files/canbio/index.html

Baccalaureate Degree
The program offers a baccalaureate degree.

Graduate Degree
Doctor of Philosophy (Ph.D.)

Major and Degrees
Cancer Biology (Ph.D.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Cancer Biology (CBIO)
515. Basic Human Pathology (4) II (Identical with PATH 515, which is home).
550. Drug Disposition and Metabolism (2) II (Identical with PCOL 550, which is home).
900. Research (1-9) [Rpt./]
930. Supplementary Registration (1-6) [Rpt./]

**CELL BIOLOGY AND ANATOMY (CBA)**

Department of Cell Biology and Anatomy
Arizona Health Sciences Center, Rm. 4205
The University of Arizona
PO Box 245044
Tucson, AZ 85724-5044
Phone: (520) 626-6084
FAX: (520) 626-2097
E-mail: apallett@u.arizona.edu
URL: http://www.cba.arizona.edu

**Baccalaureate Degree**
The department offers no baccalaureate degree.

Graduate degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

**Majors and Degrees**
Cell Biology & Anatomy (M.S., Ph.D.)

**Program Requirements**
For graduate program requirements consult the Graduate Catalog and the departmental office listed above.
To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

**Cell Biology & Anatomy (CBA)**

199. Independent Study (1-6) [Rpt./] I II
199H. Honors Independent Study (1-6) [Rpt./] I II
199S. Independent Study (1-6) [Rpt./] I II
199HS. Honors Independent Study (1-6) [Rpt./] I II
199S. Independent Study (1-6) [Rpt./]
199HS. Honors Independent Study (1-3) [Rpt./] I II
401. Human Gross Anatomy (3) II Survey of the gross structure of the human body. P, Open only to pharmacy majors and selected students. (Identical with PCOL 401).
415. Human Reproduction (3) Structure and function of the human reproductive system with emphasis on physiological mechanisms which regulate reproduction. P, Consent of instructor, open to non-majors only. (Identical with MCB 512, which is home).
502. Principles of Neuroanatomy (4) II Cellular elements and recognized subsystems of the mammalian nervous system, with emphasis on general principles of neuroanatomical organization and their functional significance. P, CBA 401, PSYC 302, PSIO 480. 8 units of biological laboratories. Consent of instructor, open to non-majors only. (Identical with PSIO 502, CBA 512, which is home).
512. Biological Electron Microscopy (4) I II (Identical with MCB 512, which is home).
515. Human Reproductive Biology (3) Review of the anatomy and physiology of the human reproductive system with emphasis on current research in the areas of biological structure and physiological mechanisms involved in gamete production, puberty, fertilization, pregnancy, birth, assisted reproductive technology and reproductive senescence. Requirements include oral presentations and a comprehensive research paper on a selected topic of current interest in reproductive biology. P, Consent of instructor, one semester of biology. May be convened with CBA 415.
550. Topics in Pigment Cell Biology (2) I Selected topics on the development function and control of normal and abnormal pigment cells in various pigmentation phenomena. (Identical with MCB 550).
555. Cancer Therapeutics (3) II (Identical with MCB 555, which is home).
556. Developmental Biology (3) I (Identical with CIBIO 555, which is home).
557. Experiments in Developmental Biology (4) II For a description of course topics see CBA 457. Graduate-level requirements include a deeper understanding of the subject, through reading and discussion of original research reports. Graduate students will be examined primarily on their ability to synthesize and evaluate information and ideas in the field. (Identical with MCB 557). May be convened with CBA 457.
567R. Endocrinology (3) II (Identical with MCB 567R).
575. Special Topics In Biological Imaging (2) I II Designed for graduate students in the biological and biomedical sciences to provide an understanding of biological imaging techniques. Lecture and laboratory demonstrations/exercises. Student participation in discussion will be expected. (Identical with MCB 575, PSIO 575).
582. Topics in Neural Development (2) I (Identical with NRSC 582, which is home).
583. Topics in Neural Plasticity (2) II (Identical with MCB 583, which is home).
584. Cellular Neurobiology (2) II Readings and discussions of primary literature on the cell biology of the synapse. P, Consent of instructor, one semester of neurobiology or cell biology. (Identical with MCB 584, NRSC 584).
588. Principles of Cellular and Molecular Neurobiology (4) I (Identical with NRSC 588, which is home).

589. Principles of Systems Neurobiology (4) II (Identical with NRSC 589, which is home).

595. Colloquium

a. Journal Club (1) [Rpt./ 14] I II

596. Seminar

b. Concepts in Cellular Differentiation (2) II P. CBA 577 or Equivalent. (Identical with MCB 596C).

c. Molecular Cardiovascular Biology (3) [Rpt./ 1] I (Identical with SURG 596I, which is home).

599. Independent Study (1-6) [Rpt./]


603. Microscopic Organization (1-3) II Selected concepts of structural organization at light and electron microscopic levels of the anatomy and development of the cells, tissues, and organs of vertebrates. P. CBA 601, CBA 602.

604. Gross Human Anatomy (2-6) [Rpt./ 12 units] II Comprehensive study of the development and gross structure of the human body or of selected areas of systems. P. Consent of instructor.

625. Human Neuroscience (6) (Identical with MED 625, which is home).

696. Seminar

a. Developmental Seminar (1) [Rpt./ 13] I II P. Consent of instructor. Open to majors only.

b. Student Seminar (1) [Rpt./ 4] I II P. Consent of instructor, Open to majors only.

697. Workshop

a. Neurobiology of Motor Control (1) [Rpt./ 14] I II P. Consent of instructor.

699. Independent Study (1-9) [Rpt./]

700. Laboratory Rotation (3) [Rpt./ 1] I II Rotations in the research laboratories of faculty in the Department of Anatomy. P. Consent of instructor.

800. Research (3-6) [Rpt./] I Research project of special interest to the student. Research activities in the department include most sub-specialties of molecular, cellular, and systems biology, including biological anthropology, cancer cell biology, neurobiology, endocrinology, reproductive biology and developmental biology. P. Consent of instructor and coordinator.

801. Human Gross Anatomy (8) [Rpt./] I Comprehensive survey of the development and gross structure of the human body. No grade is given until the full 8 units are completed.


825. Human Neuroscience (6) I II (Identical with MED 825, which is home).

899. Independent Study (1-6) [Rpt./]

900. Research (1-8) [Rpt./]

910. Thesis (1-8) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

CHEMICAL AND ENVIRONMENTAL ENGINEERING (CHEE)

Harshbarger Bldg., Rm. 108
The University of Arizona
PO Box 210011
Tucson AZ 85721-0011
Phone: (520) 621-5044,
FAX: (520) 621-6048,
E-mail: jleeming@ccit.arizona.edu
URL: http://www.che.arizona.edu/

Baccalaureate Degree
Bachelor of Science in Chemical Engineering (B.S.Ch.E.)

Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Chemical Engineering (B.S.Ch.E., M.S., Ph.D.)
Environmental Engineering (M.S., Ph.D.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs are also available on line at http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Chemical & Environmental Engineering (CHEE)

199. Independent Study (1-4) [Rpt./]

201. Elements of Chemical Engineering (3) I Chemical engineering calculations and principles of energy and material behavior. 2 ES, 2 ED. P. MATH 124 or MATH 125A; CHEM 103A, CHEM 103B, CHEM 104A, CHEM 104B, ENGR 102, ENGR 170.

202. Introductory Engineering Analysis (3) II Analytical and numerical solutions of ordinary differential equations; application of mathematical and numerical procedures to solution of chemical engineering problems. 1 ED. P. MATH 223, ENGR 102, ENGR 170.

203. Chemical Engineering Heat Transfer and Fluid Flow (3) II Theory and calculations in the unit operations of fluid flow, heat transfer, and evaporation. 1.5 ES, 1.5 ED. P. CHEE 201.

299. Independent Study (1-5) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./]

303. Chemical Engineering Mass Transfer (3) I Theory and practice in the unit operations of distillation, gas absorption, extraction, drying, and filtration. 1.5 ES, 1.5 ED. P. CHEE 201, CHEE 203.

304. Chemical Engineering Operations Laboratory (3) II Laboratory investigation of process equipment. 1.5 ES, 1.5 ED. P. CHEE 201, CHEE 203, CHEE 303.

305. Chemical Engineering Transport Phenomena (3) II Theory and calculations pertaining to fundamental transport processes. 3ES. P. CHEE 201, CHEE 402.


316. General Thermodynamics (2) I Properties and equations for solids, liquids, gases and vapors; first law energy balance; second law entropy balance; heat cycles, compressors, engines. 2ES. P. CHEE 201; CR, CHEM 480A.

326. Chemical and Physical Equilibrium (3) II Applications of thermodynamics to equilibrium processes; chemical and physical equilibrium in multicomponent systems. 3ES. P. CHEM 480A, CHEE 316.

370. Water Supply and Wastewater Systems (3) I II CDT Design of water distribution and wastewater collection systems and fundamental principles of unit treatment processes. 1.5 ES, 1.5 ED, P. CHEE 203 or C E 321. (Identical with C E 370).

371. Water and Wastewater Treatment Process (3) I Analysis of processes controlling water quality and the design of water, wastewater and recycle treatment systems. 1.5 ES, 2 ED. P. CHEE 370. (Identical with C E 371).

399. Independent Study (1-3) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./]

402. Intermediate Engineering Analysis (3) I Solution of complex chemical engineering problems utilizing both analytical and numerical techniques. 1.5 ES. P. MATH 254, CHEE 202; CR, CHEE 303.

413. Process Control and Simulation (3) I Theory of automatic control as applied to elementary chemical engineering processes. Use of continuous system simulation languages for study of practical control problems in the process industries. 1.5 ES, 1.5 ED. P. CHEE 402 or CR CHEE 402.

418. Physiology for Engineers (4) I (Identical with PSIO 418, which is home).

419. Physiology Laboratory (2) I (Identical with PSIO 419, which is home).

420. Chemical Reaction Engineering (3) I Application of thermodynamic and kinetic fundamentals to the analysis and design of chemical reactors. 1.5 ES, 1.5 ED. P. CHEE 201, CHEE 326. May be convened with CHEE 520.

421. Topics in Real-Time Computing (3) I

URL: http://www.che.arizona.edu/
E-mail: jleeming@ccit.arizona.edu
FAX: (520) 621-6048
PO Box 210011
The University of Arizona
Harshbarger Bldg., Rm. 108
Chemical & Environmental Engineering (CHEE)
435. Corrosion and Degradation (3) II
422. Chemical Engineering Industrial Methods
CHEE 521.

421. Advanced Chemical Engineering Transport
Phenomena (3) I May be convened with CHEE 585.

494. Practicum

506. Advanced Chemical Engineering Thermodynamics (3) I Advanced applications of First and Second Laws, nonideal gases and liquids and their mixtures, principles of chemical equilibrium, and molecular theory. P, CHEE 326.

514. Particulate Process (3) II Dispersed-phase dynamics, population balances, particle growth kinetics, death-deaths functions, phase space particle distributions, suspended-phase reactors, crystallization, and comminution.

520. Chemical Reaction Engineering (3) I For a description of course topics see CHEE 420. Graduate-level requirements include an in-depth research paper on a current topic. May be convened with CHEE 420.

521. Topics in Real-Time Computing (3) I For a description of course topics see CHEE 421. Graduate-level requirements include a special project. May be convened with CHEE 421.


532. Solid-Fluid Reactions (3) I Characterization of solid structural properties; principles of heterogeneous reactions involving a fluid and a reacting solid. P, CHEE 326 and CHEE 420, or MSE 450R and MSE 412. (Identical with MSE 532).

535. Corrosion and Degradation (3) II (Identical with MSE 535, which is home). May be convened with CHEE 435.

548. Combustion Generated Air Pollution (3) II (Identical with A ME 548, which is home).

551. Chemical and Physical Fundamentals of Air Pollution (3) II For a description of course topics see CHEE 451. Graduate-level requirements include a special project. May be convened with CHEE 451.

553. Space Manufacturing (3) I For a description of course topics see CHEE 453. Graduate-level requirements include an additional paper. May be convened with CHEE 453.

554. Law for Engineers/Scientists (3) II For a description of course topics see CHEE 454. Graduate-level requirements include an in-depth research paper on a current topic. (Identical with ENGR 554). May be convened with CHEE 454.

560. Aerosol Science and Engineering (3) I For a description of course topics see CHEE 460. Graduate-level requirements include a special project. (Identical with ATMO 560, ECE 560). May be convened with CHEE 460.

561. Chemical Process Simulation (2) II For a description of course topics see CHEE 461. May be convened with CHEE 461.

569A. Air Pollution I (3) I (Identical with ATMO 569A, which is home). May be convened with CHEE 469A.

569B. Air Pollution II (3) II (Identical with ATMO 569B, which is home). May be convened with CHEE 469B.

570. Fundamentals of Polymeric Materials (3) II For a description of course topics see CHEE 470. May be convened with CHEE 470.

573. Biodegradation of Hazardous Waste Compounds (2-3) I Chemical and microbiological considerations which affect the thermodynamics and kinetics of transformations of hazardous organic compounds in treatment facilities and in natural settings. 1 or 2R, 1L P, CHEE 577 or Consult department before enrolling. (Identical with C E 573).

574. Environmental Transport Processes (3) I Engineering concerns in toxic and hazardous waste management with focus on aspects of chemical transport between air, water and soil systems, and microbial degradation processes in natural and engineered environment. (Identical with C E 574).

577. The Physiological Bases of Microbial Treatment Processes (3) I Principles of bacterial physiology including morphology, metabolism and genetics. Applications of importance to waste treatment and environmental quality. P, CHEE 370 or Consult department before enrolling. (Identical with C E 577).

578. Introduction to Hazardous Wastes (3) I II For a description of course topics see CHEE 478. Graduate-level requirements include a report on an in-depth review of interdisciplinary aspects of an existing project (with a non-university project engineer). (Identical with C E 578). May be convened with CHEE 478.
580. Bioprocessing Techniques for Engineers (3) II For a description of course topics see CHEE 480. Graduate-level requirements include a special project. P, CHEM 243A, CHEM 243B. May be repeated with CHEE 480.

581. Bioreactor Engineering (3) I II For a description of course topics see CHEE 481. Graduate-level requirements include a special project. May be repeated with CHEE 481.

583. Remote Sensing Instrumentation and Techniques (3) II (Identical with ECE 583; which is home).

585. Biomedical Transportation Phenomena (3) I II For a description of course topics see CHEE 485. May be repeated with CHEE 485.

586. Advanced Biomedical Engineering (3) II 696. Seminar (Identical with C E 676).


610. Wastewater Treatment (3) I Theoretical aspects of water and wastewater treatment systems; utilization of penetration, surface renewal, and boundary layer transport concepts. P, CHEE 470.

615. Wastewater Treatment (3) II Practical aspects of water and wastewater treatment systems; utilization of penetration, surface renewal, and boundary layer transport concepts. P, CHEE 470.

620. Advanced Water Treatment System Design (3) II Design and operation of water treatment plants; physical-chemical treatment processes for potable water production. (Identical with CHEE 475).

626. Seminar (1-3) [Rpt./ 6] I II

630. Seminar (1-3) [Rpt./ 6] I II


660. Seminar (1-3) [Rpt./ 6] I II

670. Experimental Thermodynamics (3) I II An introduction to chemical engineering principles designed for students with a minimal background in science and engineering. P, CHEE 470.

680. Seminar (1-3) [Rpt./ 6] I II

690. Research (1-5) [Rpt./]

700. Thesis (1-6) [Rpt./]

720. Dissertation (1-9) [Rpt./]

730. Supplementary Registration (1-9) [Rpt./]

740. Supplementary Registration (1-9) [Rpt./]

750. Supplementary Registration (1-9) [Rpt./]

760. Supplementary Registration (1-9) [Rpt./]

Chemistry (CHEM)

101A. Lectures in General Chemistry (3) I II An introduction to chemical principles designed for students with a minimal background in science and engineering. P, CHEM 102 encouraged. Credit is allowed for only one of the following lecture-lab combinations: CHEM 101A-102A, or CHEM 103A-104A, or CHEM 105B and 106B. Special Fee.

101B. Lectures in General Chemistry (3) I II Application of chemical principles presented in 101A to problems of interest to non-science majors. Course is designed for non-science students and are not prerequisites for higher level chemistry courses. P, CHEM 102 encouraged. Credit is allowed for only one of CHEM 105B or CHEM 101C. Special Fee.

101C. Lectures in General Chemistry (3) I II Application of chemical principles presented in 101A to problems of interest to non-science majors. Course is designed for non-science students and are not prerequisites for higher level chemistry courses. P, CHEM 102 encouraged. Credit is allowed for only one of CHEM 105B or CHEM 101C.

102A-102B. General Chemistry Laboratories (1) I II An introduction to the chemical laboratory with an emphasis on development of laboratory skills and techniques, observation of chemical phenomena, data collection, and the interpretation and reporting of results in formal laboratory reports. Strong emphasis on laboratory safety. Designed for students with a minimal background in science and math. The experiments are designed to complement the principles concurrently presented in the corresponding lecture class and require knowledge of the lecture material to interpret. P, CR corresponding 101 lecture class, credit is allowed for only one of the following lecture-lab combinations: CHEM 101A-102A, or CHEM 103A-104A, or CHEM 105B and 106B. Special Fee.

102C. General Chemistry Laboratories (1) I II An introduction to the chemical laboratory with an emphasis on development of laboratory skills and techniques, observation of chemical phenomena, data collection, and the interpretation and reporting of results in formal laboratory reports. Strong emphasis on laboratory safety. Designed for students with a minimal background in science and math. The experiments are designed to complement the principles concurrently presented in the corresponding lecture class and require knowledge of the lecture material to interpret. P, CR corresponding 101 lecture class, credit is allowed for only one of the following lecture-lab combinations: CHEM 101A-102A, or CHEM 103A-104A, or CHEM 105B and 106B. Special Fee.

103A. Fundamentals of Chemistry (3) I II Essential concepts and problem-solving techniques, with emphasis on chemical bonding, structure and properties, stoichiometry, kinetics, equilibria, and descriptive organic and inorganic topics. Both 103a and 103b are offered each semester. MATH 117R or MATH 117S or an equivalent level of proficiency as demonstrated by the Math Readiness Test score; CR, CHEM 104 encouraged.

103B. Fundamentals of Chemistry (3) I II Essential concepts and problem-solving techniques, with emphasis on chemical bonding, structure and properties, stoichiometry, kinetics, equilibria, and descriptive organic and inorganic topics. Both 103a and 103b are offered each semester. P, credit is allowed for only one of the following lecture-lab combinations: CHEM 101A-102A, or CHEM 103A-104A, or CHEM 105B and 106B. Special Fee.

104A-104B. Fundamental Techniques of Chemistry (1) I II An introduction to the chemical laboratory with an emphasis on development of laboratory skills and techniques, observation of chemical phenomena, data collection, and the interpretation and reporting of results in formal laboratory reports. Strong emphasis on laboratory safety. Designed for science and engineering majors. The experiments are selected to complement the principles concurrently presented in the corresponding lecture class and require knowledge of the lecture material to interpret. Both 104a and 104b
242B. Honors Lectures in Organic Chemistry

ACCT 106B.

242A. Honors Lectures in Organic Chemistry

course or sequence in each of the following: CHEM 103B and CHEM 104B or CHEM 105B

241B. Lectures in Organic Chemistry (3) I II

CHEM 103B and CHEM 104B or CHEM 105B

241A. Lectures in Organic Chemistry (3) I II

199H. Honors Independent Study (1 -3) [Rpt./] I II

199. Independent Study (1 -5) [Rpt./] I II

302. Scientific Glassblowing (1 -2) I II

Methods of design and construction of scientific glass apparatus. Special Fee.

322. Principles of Analysis I Laboratory (1) I II

Experiments in modern qualitative analysis. P, credit is allowed for only one course or sequence in each of the following groups: CHEM 101B or 241A-241B or 242A-242B; CHEM 102B or 243A-243B or 245A-245B; CHEM 325 or 322; CHEM 326 or 323; CHEM 460 or 462A-462B; CR, CHEM 323 encouraged. Open to non-majors only.

323. Principles of Analysis I Laboratory (1) I II

Experiments in modern quantitative analysis. P, credit is allowed for only one course or sequence in each of the following groups: CHEM 101B or 241A-241B or 242A-242B; CHEM 102B or 243A-243B or 245A-245B; CHEM 325 or 322; CHEM 326 or 323; CHEM 460 or 462A-462B; CR, CHEM 323 encouraged. Open to non-majors only; Special Fee.

325. Analytical Chemistry (2) I II

Principles of modern quantitative analysis, including consideration of stoichiometry, equilibrium principles, treatment of experimental data, titrimetric and spectrophotometric analysis, and analytical separation processes. P, CHEM 103B and CHEM 104B or CHEM 105B and CHEM 106B; credit is allowed for only one course or sequence in each of the following groups: CHEM 101B or 241A-241B or 242A-242B; CHEM 102B or 243A-243B or 245A-245B; CHEM 325 or 322; CHEM 326 or 323; CHEM 460 or 462A-462B; CR, CHEM 323 encouraged. Open to non-majors only; Special Fee.

326. Analytical Chemistry Laboratory (2) I II

Experiments in modern quantitative analysis. Designed for chemistry majors. P, credit is allowed for only one course or sequence in each of the following groups: CHEM 101B or 241A-241B or 242A-242B; CHEM 102B or 243A-243B or 245A-245B; CHEM 325 or 322; CHEM 326 or 323; CHEM 460 or 462A-462B; CR, CHEM 325; Special Fee.

391. Preceptorship

h. Honors Preceptorship (1 -3)

396. Proseminar

a. Reports on Current Research (1) I II

P, CHEM 241B.

399. Independent Study (1 -5) [Rpt./] I II

399H. Honors Independent Study (1 -3) [Rpt./] I II

400A. Chemical Measurements Laboratory (3) I II

Laboratory work in modern chemical measurements and instrumentation. P, CR,
462A. Biochemistry (3) I (Identical with BIOC 462A, which is home).
462B. Biochemistry (3) II (Identical with BIOC 462B, which is home).
480A-480B. Physical Chemistry (3) I II
Fundamental principles of physical chemistry. P, CHEM 103B and CHEM 104B, or CHEM 105B and CHEM 106B, MATH 125B, PHYS 103 or PHYS 132 or PHYS 241, or CR.
481. Biophysical Chemistry (3) II Topics in biophysical chemistry pertinent to the biological sciences, including chemical dynamics, transport processes, thermodynamics, binding, and spectroscopy. P, CHEM 480A.

491. Preceptorship
a. College Teaching (1) [Rpt./1] P, a combination of CHEM 491A, CHEM 491B, and CHEM 491C may be taken up to a total of 6 units. May be convened with CHEM 591A.
b. Chemistry Course Development (1) [Rpt./1] P, a combination of CHEM 491A, CHEM 491B, and CHEM 491C may be taken up to a total of 6 units. May be convened with CHEM 591B.
c. Professional Services (1) [Rpt./1] P, a combination of CHEM 491A, CHEM 491B, and CHEM 491C may be taken up to a total of 6 units. May be convened with CHEM 591C.
493. Internship (1-3) [Rpt./]
494. Practicum (1-3) [Rpt./]
495. Colloquium
b. History of Chemistry (1-2) May be convened with 595B.
498. Senior Capstone (1-3) II
498H. Honors Thesis (3) [Rpt./2] II
499. Independent Study (1-5) [Rpt./]
499H. Honors Independent Study (1-3) [Rpt./] II
501. Intermediate Analytical Chemistry (3) Survey of principles of modern analytical chemistry intended as concise review of modern chemical analysis. P, CHEM 424, CHEM 480B or consent of instructor.
502. Intermediate Organic Chemistry (3) I For a description of course topics see CHEM 402. Graduate-level requirements include an in-depth research paper focusing on current research in a major area covered by the course. May be convened with CHEM 402.
503. Intermediate Physical Chemistry (3) I General survey of physical chemistry, including thermodynamics, structure, kinetics and electrochemistry. P, CHEM 480B.
504. Inorganic Chemistry (3) I For a description of course topics see CHEM 404. Graduate-level requirements include an in-depth research paper focusing on current research in a major area covered by the course. May be convened with CHEM 404.
510. Advanced Inorganic Chemistry (3) Aspects of modern inorganic chemistry with emphasis on transition metal compounds. Structure and bonding, magnetic and spectroscopic properties, and reactions and reaction mechanisms of transition metal compounds. Catalytic properties of transition metal complexes and new directions in inorganic chemistry.
511. Advanced Inorganic Chemistry (3) Aspects of modern inorganic chemistry with emphasis on the Main Group elements. Synthesis, reactivity, and structures of main group inorganic compounds and the physical methods used in their characterization.
512. Inorganic Preparations (3) I Graduate level requirements include an individual synthesis project.
513. Current Topics in Inorganic Chemistry (1-4) [Rpt./10 units] In-depth treatment of advanced topics in inorganic chemistry. Examples include kinetics and mechanisms of inorganic reactions, bioinorganic chemistry, EPR spectroscopy, solid state materials chemistry, chemistry of particular elements or families of elements, and other topics characterized by faculty expertise. Topics will vary each semester. P, 510 or consent of instructor.
514. Organometallic Compounds (3) Compounds containing carbon-to-metal bonds, with emphasis on those of the transition elements, their reactivity, and the determination of their structures. P, 404 or 504 or consent of instructor.
515. Physical Methods in Inorganic Chemistry (3) Selected topics in the area of physical characterization of inorganic molecules and materials, with particular emphasis on ligand field theory, symmetry aspects, spectral properties and magnetic behavior of transition metal complexes. P, 510.
517. Structural Chemistry (2) II Introduction to the determination of structures of complex molecules by X-ray crystallography; the evaluation of structural information; current topics in structural chemistry. 2R.
517L. Structural Chemistry Laboratory (1) II Laboratory designed to accompany 517. Students work in the lab, solve structures and report their findings in papers. CR, CHEM 517. 3L.
518. Computational Chemistry (1-2) I II State-of-the-art computational methods in chemical research, including approximate and abinitio electronic structure methods, molecular mechanics and modeling graphics. P, consent of instructor.
518L. Computational Chemistry Laboratory (1-2) I II Laboratory designed to accompany 518. Students work in the computer lab and report their findings in papers. 6L. P, consent of instructor; CR, CHEM 518.
520. Advanced Topics in Analytical Chemistry (2-3) [Rpt./6 units] I Special topics in modern analytical chemistry. Recent offerings have included principles of bioanalytical chemistry and mass spectrometry. Students enrolled for 3 units are required to complete an additional research project including a written paper and an oral presentation. P, CHEM 424 or consent of instructor.
521A. Advanced Analytical Chemistry (3) I Principles of electronics, principles of signal
523. Advanced Topics in Equilibrium Chemistry (2-3) II Advanced topics in equilibrium chemistry including mathematical description of equilibria in aqueous and nonaqueous media, metal chelate chemistry. Students enrolled for 3 units are required to complete an additional research project including a written paper and an oral presentation. P, CHEM 424 or consent of instructor.

526A. Analytical Spectroscopy (2-3) I Principles of atomic absorption and emission spectroscopies and x-ray methods for chemical analysis. Students enrolled for 3 units are required to complete an additional research project including a written paper and an oral presentation. P, CHEM 424 or consent of instructor.

526B. Analytical Spectroscopy (2-3) II Principles of molecular absorption, emission and scattering spectroscopies for chemical analysis. Students enrolled for 3 units are required to complete an additional research project including a written paper and an oral presentation. P, CHEM 424 or consent of instructor.

527. Analytical Separations (2-3) I Fundamentals of separation processes including single and multistage analytical chromatographic methods. Students enrolled for 3 units are required to complete an additional research project including a written paper and an oral presentation. P, CHEM 424 or consent of instructor.

528. Advanced Analytical Chemistry Laboratory (2) I Advanced laboratory experiments in analytical instrumentation. P, CHEM 424, CHEM 480B; CR, CHEM 521A.

529. Methods of Surface and Materials Analysis (2-3) I Fundamentals of electron, atomic and molecular spectroscopies for surface and materials analysis. This course is suitable for enrollment by advanced undergraduates. Students enrolled for 3 units are required to complete an additional research project with paper and oral presentation. P, CHEM 424 or consent of instructor.

533. Chemistry Demonstrations (3) II S For a description of course topics see CHEM 433. Graduate-level requirements include additional demonstrations and more thorough analyses for each demonstration. In addition, secondary school chemistry teachers will be expected to offer insights and counsel to students who have never taught in a real classroom. May be convened with CHEM 433.

540. Organic Synthesis (3) I Organic reactions and the methods by which they are applied to synthetic problems in organic chemistry. P, CHEM 241B, CHEM 480B.


542A. Polymer Chemistry (3) I Synthesis, stereochemistry, and mechanisms of formation of high polymers. Condensation and ring-opening polymers. P, CHEM 241B, CHEM 480B.

542B. Polymer Chemistry (3) II Synthesis, stereochemistry, and mechanisms of formation of high polymers. Vinyl polymers. P, CHEM 542A is not prerequisite to CHEM 542B.

543. Structural Organic Chemistry (3) II Structure determination of organic molecules. P, CHEM 241B, CHEM 480B.

544. Heterocyclic Compounds (3) I The behavior of the more important heterocyclic systems.

545. Chemistry of Natural Products (3) I Survey of natural organic compounds and their biosyntheses.

546. Advanced Organic Chemistry (3) [Rpt./ 1] II Advanced topics in organic chemistry, such as peptide chemistry, computer simulations, bioorganic chemistry, and other topics characterized by faculty expertise. Topics will vary each semester. P, consult department before enrolling.

547. Organic Structural Analysis Laboratory (3) II For a description of course topics see CHEM 447. Graduate-level requirements include additional laboratory experiments. IR, NMR, and mass spectra. P, CHEM 241 or CHEM 242B, CHEM 243B or CHEM 247B and consent of instructor. Special fees. May be convened with CHEM 447.

561. Introduction to Biochemical Literature (1) I (Identical with BIOC 561, which is home). P, CHEM 580.

565. Enzymes (3) I (Identical with BIOC 565, which is home).

580. Introduction to Quantum Chemistry (3) I An introduction to quantum mechanics, with applications to atomic structure and spectra, the nature of chemical bonding and molecular structure. P, CHEM 480B.

582. Statistical Thermodynamics (3) I Introduction to classical and quantum statistical thermodynamics with application to ideal gases and simple solids; equations of state and elementary solution theory. P, CHEM 480B.

583. Chemical Kinetics (3) II Classical and modern techniques in studies of chemical reactions.

584. Practical NMR Spectroscopy (3) I Basic principles of nuclear magnetic resonance (NMR) spectroscopy; common pulse sequences for one- and two-dimensional NMR experiments; operation of modern Fourier transform NMR spectrometers; interpretation of NMR spectra. P, CHEM 480B.

584L. Practical NMR Spectroscopy Laboratory (1) I Laboratory designed to accompany 584L. Students work in the NMR lab and report their findings in papers. P, CHEM 480B; CR, CHEM 584.

585. Biological Structure (1-2) I (Identical with BIOC 585, which is home).

587. Introduction to Molecular Spectroscopy (3) II Modern molecular spectroscopy including rotational, vibrational, and electronic spectroscopy and their various combinations. P, CHEM 480A, CHEM 480B or consult department before enrolling.

591. Preceptorship
a. College Teaching (1) [Rpt./ 1] For a description of course topics see CHEM 491A. May be convened with CHEM 491A.

b. Chemistry Course Development (1) [Rpt./ 1] For a description of course topics see CHEM 491B. May be convened with CHEM 491B.

c. Professional Services (1) [Rpt./ 1] For a description of course topics see CHEM 491C. May be convened with CHEM 491C.

593. Internship (1-3) [Rpt./]

595. Colloquium
a. Current Topics in Chemical Research (1) I
b. History of Chemistry (1-2) May be convened with 495b.

599. Independent Study (1-3) [Rpt./]


680. Quantum Chemistry (3) II Principles of quantum mechanics with applications to the properties of molecules. P, CHEM 580.


693. Practicum (1-3) [Rpt./]

695. Colloquium
a. Chemical Research Opportunities (1) I
b. Exchange of Chemical Information (1-3) [Rpt./ 10 units]

696. Seminar
Civil Engineering (C E )

194. Practicum (1-3) [Rpt./]
199. Independent Study (1-3) [Rpt./]

202. Computer Programming for Civil Engineers (1) II Introduction to FORTRAN programming; basic operations, subscripting, subprograms; design of problem-solving algorithms; development of programs to solve problems in civil engineering. IR, IL. P. ENGR 102.

210. Engineering Graphics (3) GRD Representations and analysis of systems of orthogonal projection and graphical methods used in engineering design and production, correlated with technical sketching. IR. 6L. 2ES, 2ED.

214. Statics (3) GRD Equivalent force systems; equilibrium; geometric properties of areas and solids; friction; virtual work; potential energy. Honors section is available. 3ES. P. PHYS 141, MATH 125B.

217. Mechanics of Materials (3) GRD Material behavior; relationship between external forces acting on elastic and inelastic bodies and the resulting behavior; stress and deformation of bars, beams, shafts, pressure vessels; stress and strain; combined stresses; columns. Honor section is available. 3ES. P. C E 214.

251. Elementary Surveying (3) I II GRD Theory of measurements and errors; vertical and horizontal control methods; topographic, public land and construction surveys; use of surveying instruments. 2R, 3L. 3ES. P. C E 210, MATH 118.

299. Independent Study (1-3) [Rpt./]
299H. Honors Independent Study (1-3) [Rpt./] I


307. Contracts, Specifications and Engineering Ethics (2) I I Law as applied to engineering contracts and contract documents, including specifications; and ethics in engineering. P. Writing-Emphasis Course.

310. Probability Statistics in Civil Engineering (3) I I Statistical decision theory and its application in civil engineering. Identification and modeling of non-deterministic problems in civil engineering and the treatment thereof relative to engineering design and decision making. Statistical reliability concepts. ES. P. Consult department before enrolling.

320. Fluid Mechanics Laboratory (1) I II Open-channel and closed conduit studies of basic flow phenomena, with emphasis on continuity, conservation of momentum, and exchange of energy; calibration of flow-measuring devices. 3L. 1ES. CR, C E 321, A ME 250.

321. Civil Engineering Hydraulics (3) Hydrostatics, continuity, irrotational flow, pressure distributions, weirs and gates, momentum and energy, surface drag, pipe friction, form drag, pipe fitting losses. 3ED. P. C E 214, MATH 223.

322. Water Resources Engineering (3) I I Open-channel flow, natural streams and waterways, hydrologic analysis, fluid measurement apparatus, hydraulic models; economic aspects of water resources. P. C E 321, A ME 250.

330. Structural Engineering I (3) Analysis of statically determinate structures, including beams, frames and trusses; influence lines, virtual work, moment area and conjugate beam; Betti's theorem and Castigliano's theorem. 3ES. P. C E 217.

331. Structural Engineering II (3) Analysis of statically indeterminate beams, frames, and trusses; use of computer programs. 3ES. P. C E 330; CR, C E 302.

336. Structural Design in Steel (3) I II CDT Design of steel members, connections and simple structures, including tension members, laterally supported and unsupported beams, columns, beam-columns, bolted and welded connections; introduction to load and resistance factor design. 3ED. P. C E 330; CR. C E 331.

337. Structural Design in Concrete (3) Introduction to reinforced concrete design. 3ED. P. C E 330.

340. Soil Engineering (4) I I Physical and mechanical properties of soils, shear strength, consolidation, settlement, lateral earth pressures, and bearing capacity. 3R, 3L. 3ES. IED. P. C E 217, CHEM 103B.

360. Transportation Engineering (4) I II CDT Basis for planning, design, and operation of transport facilities; transport modes discussed include mass transit, passenger cars, bicycles, and pedistrian movement. 1ES, 2ED. P. C E 251, SIE 265, A ME 250.


370. Water Supply and Wastewater Systems (3) I I CDT (Identical with CHEE 370, which is home).

371. Water and Wastewater Treatment Process (3) I (Identical with CHEE 371, which is home).

380. Materials Laboratory (2) I I Mechanical properties of concrete, concrete aggregates, steel, and other metals as engineering materials. 1R, 3L. 2ES. P. C E 217, CHEM 103B.

394. Practicum
a. Junior Field Trip. (1) [Rpt./] II Field trips. Students are urged to take this trip in the junior year.

399. Independent Study (1-3) [Rpt./]
399H. Honors Independent Study (1-3) [Rpt./] I

400. Civil Engineering Design (3) I I Integration of accumulated background in civil engineering course work for application to specific design projects. Interaction with practicing engineers to develop design methodologies. 3ED. P. At least 4 of C E 322, 337, 340, 360, or 370.

410. Probability in Civil Engineering (3) II Outlines the extent of uncertainties under which civil engineering designs and decisions are made. Theory and application. Advanced topics in risk-based engineering design. System reliability concepts. Statistical decision theory and its application in civil engineering. Identifying and modeling, nondeterministic problems in engineering in understanding many recently issued engineering codes. ES. P. Consult department before enrolling. May be convened with C E 510.

417. Mechanics of Materials II (3) II Three dimensional analysis of stress and strain, Castigliano's theorems, curved beams, asymmetric bending, shear center, torsion of thin-walled sections, beams on elastic foundation, nonlinear material behavior, membrane stresses in shells. 2ES, 1ED. P, C E 217. May be convened with C E 517.

423. Hydrology (3) I Discussion and analysis of major topics of the hydrologic cycle and their interrelationship, such as rainfall, infiltration, evaporation, and runoff. Statistical and probabilistic methods in water supply and flood hydrology. 2ES, 1ED. P, C E 321. (Identical with HWR 423). May be convened with C E 523.

424. Hydraulic Engineering Design (3) II Application of principles of hydraulic analysis to the design of hydraulic systems. Applications will vary and include hydropower systems, stilling basins, open channel distribution and collection systems, pipe networks and pumping systems, drainage problems and other topics. P, C E 322. May be convened with C E 524.

426. Soil and Water Conservation Engineering (3) II S 1.5 ES. (Identical with ABE 426, which is home).

427. Computer Applications in Hydraulics (3) I Computer modeling of surface water hydrology, flood plain hydraulics and water distribution systems. Theoretical basis. Application and design studies. 1ES, 2ED. (Identical with HWR 427). May be convened with C E 527.

428. Introduction to Coastal Engineering (3) I Hydrodynamics of the coastal zone; coastal sediment processes and their interaction with structures; diffusion in coastal waters and marine outfall design; coastal zone management. 1ES, 2ED. P, C E 321. May be convened with C E 528.

432. Advanced Structural Design in Steel (3) I Advanced problems in the analysis and design of steel structures including beam columns, plate girders, composite construction, multi-story buildings; static and dynamic lateral and vertical loads; connections; computer applications. 3ED.

434. Design of Wood and Masonry Structures (3) I II Determination of gravity and lateral loads on structures. Design of wood structures for axial load and bending; structural wood panels, diaphragms and shear walls. Types of masonry construction. Design of masonry structures for gravity and lateral loads. 3ED. P, C E 331; CR, C E 337. May be convened with C E 534.

437. Advanced Structural Design in Concrete (3) II Advanced problems in the analysis and design of concrete structures, design of slender columns and one- and two-way slabs; lateral and vertical load analysis of bridges and multistory buildings; introduction to design for torsion and seismic forces; use of structural computer programs. 3ED. P, C E 337. May be convened with C E 537.

440. Foundation Engineering (3) II Settlement and bearing capacity of shallow and deep foundations; beam on elastic foundation; design of footings and pile foundations; foundations on metastable soils; the use of computer codes for foundation problems. 1ES, 2ED. P, C E 340. May be convened with C E 540.

441. Earth Structures in Geotechnical Engineering (3) I Stability analysis for earth slopes, including planar, circular piecewise-linear, and composite-surface methods: analyses for static and steady-flow conditions; earth pressure theories and calculations for generalized conditions; design of rigid and flexible retaining structures; design of braced and tie-back shoring systems; design of reinforced earth walls; computer-aided analysis and design. 1ES, 2ED. P, C E 340. May be convened with C E 541.

444. Special Topics In Geomechanics (3) I Introduction to geoenvironmental engineering; physicochemical and microstructural behavior of geomaterials, effect of pollutants, design of waste disposal systems; advanced laboratory testing, geotextiles, space geomechanics, etc. P, C E 340 or consent of instructor. May be convened with C E 544.

452. Engineering Surveys (3) I CDT Solar and Polaris observations; mineral, public, and private land surveys; route surveying, curves, and earthwork; triangulation, photogrammetry, and modern engineering surveys. 2R, C E 340. May be convened with C E 552.

455. Irrigation Engineering (3) I II 1ED. (Identical with ABE 455, which is home). May be convened with C E 555.

458. Agricultural Drainage and Effluent Treatment (3) I II 1.5 ED. (Identical with ABE 458, which is home). May be convened with C E 558.

462. Bituminous Materials (3) II Manufacture and evaluation tests for the control of bituminous materials used in highway construction and maintenance. 2R, 3L.5ES, 2.5ED. P, C E 340 or Consent of department. May be convened with C E 562.

463. Traffic Engineering (3) I Methods for the efficient and safe operation of transport facilities through analysis of capacity, safety, speed, parking, and volume data. 3ED. P, C E 360. May be convened with C E 563.

464. Airport Planning and Design (3) I II Location, analysis and design of airports and airport facilities, including aircraft characteristics, site selection, configuration, capacity, access and terminals. Field trips. 3ED. P, C E 360; Field trips. May be convened with C E 564.

465. Project Planning and Modeling (3) II Use of systems analysis in contemporary planning, including consideration of social, environmental and physical constraints; study of general and special purpose manual and computer-based simulation and gaming as an engineering and planning tool. 5ES, 2.5ED. P. Senior status in civil engineering or consult department before enrolling.

468. Urban Transportation Planning (3) II CDT Transportation planning in relation to urban development; techniques and procedures for developing long-range regional plans. P, C E 360 or consult department before enrolling. (Identical with PLAN 468). May be convened with C E 568.

478. Introduction to Hazardous Wastes (3) I II (Identical with CHEE 478, which is home). May be convened with C E 578.

484. Fundamentals of Industrial and Environmental Health (3) I (Identical with OSH 484, which is home). May be convened with C E 584.

487. Advanced Industrial and Environmental Health (3) II (Identical with OSH 487, which is home). May be convened with C E 587.

493. Internship (1-5) [Rpt./] 494. Practicum (1-3) [Rpt./]

497. Workshop

w. Advanced Cadastral Survey (1-4) II (Identical with RNR 497W, which is home). May be convened with C E 597W.

498. Senior Capstone (1-3) I II 498H. Honors Thesis (3) [Rpt./ 2]

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (1-3) [Rpt./ 1 II 502. Introduction to Finite Element Methods (3) III I For a description of course topics see C E 402. Graduate-level requirements include research on a single aspect of the finite element method. (Identical with E M 502). May be convened with C E 402.

503. Subsurface Fluid Dynamics (3) I (Identical with HWR 503, which is home).

504. Numerical Methods in Subsurface Hydrology (4) II (Identical with HWR 504, which is home).

510. Probability in Civil Engineering (3) II For a description of course topics see C E 410. Graduate-level requirements include a project paper. May be convened with C E 410.

517. Mechanics of Materials II (3) II For a description of course topics see C E 417. Graduate-level requirements include a research report on a special problem. May be convened with C E 417.
523. Hydrology (3) I For a description of course topics see C E 423. Graduate-level requirements include a project paper. (Identical with ARL 523, HWR 525). May be convened with C E 423.

524. Hydraulic Engineering Design (3) II For a description of course topics see C E 424. Graduate-level requirements include a research paper and/or a design project. May be convened with C E 424.


526. Water Quality Management (3) II (Identical with HWR 526, which is home).

527. Computer Applications in Hydraulics (3) I For a description of course topics see C E 427. Graduate-level requirements include a research paper or project. (Identical with HWR 527). May be convened with C E 427.

528. Introduction to Coastal Engineering (3) I For a description of course topics see C E 428. Graduate-level requirements include a term paper. May be convened with C E 428.

532. Advanced Structural Design in Steel (3) I For a description of course topics see C E 432. Graduate-level requirements include a comprehensive design project. May be convened with C E 432.

533. Plastic Analysis and Design (3) II Material and member behavior to full plastification; redistribution of forces; plastic design of continuous beams and frames; influence of axial and shear forces; deflections and rotations; alternating plasticity; shakedown analysis. P, C E 432 or consult department before enrolling.

534. Design of Wood and Masonry Structures (3) I II For a description of course topics see C E 434. Graduate-level requirements include a comprehensive design project. P, C E 337. May be convened with C E 434.

536. Prestressed Concrete Structures (3) II Behavior, analysis, and design of statically determinate and indeterminate prestressed concrete structures.

537. Advanced Structural Design in Concrete (3) I II For a description of course topics see C E 437. Graduate-level requirements may include a research paper or a comprehensive design project. May be convened with C E 437.

540. Foundation Engineering (3) II For a description of course topics see C E 440. Graduate-level requirements include the development of computer codes for the solution of specified foundation problems or an in-depth research paper on a specific aspect of foundation engineering. May be convened with C E 440.

541. Earth Structures in Geotechnical Engineering (3) I For a description of course topics see C E 441. Graduate-level requirements include a research paper and/or a comprehensive design project. May be convened with C E 441.

544. Special Topics In Geomechanics (3) II For a description of course topics see C E 444. Graduate-level requirements include a research paper and/or a comprehensive design project. May be convened with C E 444.

547. Seepage and Earth Dams (3) I Principles of flow in porous media; analytical and approximate solutions of confined and unconfined flow; seepage, erosion, piping and filter design; earth and rock fill dam construction and design; stability analyses. P, C E 340.

548. Numerical Methods in Geotechnical Engineering (3) I Brief statements and applications of numerical methods based on closed-form solutions, finite difference, finite element and boundary element methods for problems involving soil structure interaction such as piles, retaining walls, group piles, underground works; seepage; and consolidation. P, C E 402; C E 340.


552. Engineering Surveys (3) I II For a description of course topics see C E 452. Graduate-level requirements include a comprehensive surveying project. May be convened with C E 452.

555. Irrigation Engineering (3) II (Identical with ABE 555, which is home). May be convened with C E 455.

558. Agricultural Drainage and Effluent Treatment (3) II (Identical with ABE 558, which is home). May be convened with C E 458.

562. Bituminous Materials (3) II For a description of course topics see C E 462. Graduate-level requirements include an in-depth research paper. May be convened with C E 462.

563. Traffic Engineering (3) I For a description of course topics see C E 463. Graduate-level requirements include a research paper or project. May be convened with C E 463.

564. Airport Planning and Design (3) II For a description of course topics see C E 464. Graduate-level requirements include a research paper or project. May be convened with C E 464.

565. Project Planning and Modeling (3) II Graduate-level requirements include a research paper or project. (Identical with PLAN 565).

568. Urban Transportation Planning (3) II For a description of course topics see C E 468. Graduate-level requirements include a research paper or project. (Identical with PLAN 568). May be convened with C E 468.

571. Water Quality Control (3) II (Identical with WS M 571).

573. Biodegradation of Hazardous Waste Compounds (2-3) I (Identical with CHEE 573, which is home).

574. Environmental Transport Processes (3) I (Identical with CHEE 574, which is home).

577. The Physiological Bases of Microbial Treatment Processes (3) I (Identical with CHEE 577, which is home).

578. Introduction to Hazardous Wastes (3) II (Identical with CHEE 578, which is home). May be convened with C E 478.

584. Fundamentals of Industrial and Environmental Health (3) II (Identical with OSH 584, which is home). May be convened with C E 484.

587. Advanced Industrial and Environmental Health (3) II (Identical with OSH 587, which is home). May be convened with C E 487.

593. Internship (1-5) [Rpt.]

594. Practicum (1-3) [Rpt.]

596. Seminar a. Research Topics (1) II (Identical with E M 596A).

597. Workshop w. Advanced Cadastral Survey (1-4) II (Identical with RNR 597W, which is home). May be convened with C E 497W.

599. Independent Study (1-5) [Rpt.]

621. Sediment Transportation (3) I Erosion, transportation and deposition of sediments by flowing water; sediment properties and their measurement; bed load and suspended load movement; river behavior and control. P, C E 321.


623. Flow through Hydraulic Structures (3) II Subcritical and supercritical flow through culverts, bridges, spillways, stilling basins, transitions, bends; hydrologic effects on inflow; pumps and turbines. P, C E 322.

624. Planning and Design of Multipurpose Water Resources Projects (3) I Design of water resource systems for surface water supply; flood control, hydropower and navigation, either as single purpose or as multipurpose projects; brief review of environmental, economic and legal aspects. P, C E 321, C E 423; Field trips.

632. Infrastructure Rehabilitation (3) I Status of infrastructure and causes of deterioration of constructed facilities. Strengthening of bridges and buildings. Application of advanced modern materials such as fiber composites in new structures and for rehabilitation of existing structures. P, C E 331, C E 336, C E 337.

653. Reinforced Concrete (3) I Inelastic behavior of beams and columns; short- and long-term beam deflections; combined bending, shear, and torsion in beams; behavior under load reversals; analysis and design of beam to column connections and shear walls. P, C E 437 or consult department before enrolling.

673. Soil-Structure Interaction (3) I Definition of soil-structure interaction, static and dynamic
loading, analytic and computer solutions; two and three dimensional foundation combinations. P, C E 340 or C E 548 or consent of instructor.

640. Advanced Soil Mechanics (3) I Site investigation and in situ testing; shear strength of sands and clays; interpretation of laboratory test results; consolidation theory: one-dimensional infinitesimal and finite strain; slope stability. P, C E 340.


645. Geoenvironmental Engineering (3) II Interaction of environmental and geo-technology; physiochemical properties and mechanism of pollutant transport; effects on soil and foundation behavior and ground water, analytical and numerical modelling, design of geotechnical structures and waste contaminant systems. P, C E 340 or C E 544 or consent of instructor.

646. Soil Dynamics and Machine Foundations (3) I Soil behavior under dynamic loads, measurement of dynamic soil properties, soil liquefaction, wave propagation through soils, vibration analysis of shallow and deep foundations, machine foundation design. Case histories and rehabilitation. P, C E 640.


651. Structural Design of Flexible Pavements (3) I Analysis of loads, stresses, material characteristics, and environmental factors for the theoretical and practical design, construction and maintenance of pavements. P, C E 340, C E 361.

664. Transportation Engineering (3) I Economic analysis of transport projects, including rural and urban roadways, control systems, and mass transit; discussion of environmental and financial factors. P, C E 463 or C E 563.

665. Quick Response Transportation Planning Methods (3) I Quick response transportation tools for subarea, problem and policy analysis, and strategic planning in the urban setting. (Identical with PLAN 665).

666. Highway Geometric Design (3) I Study of geometric elements of streets and highways, with emphasis on analysis and design for safety. P, C E 563 or C E 463.

667. Traffic Operations and Safety (3) II Application of traffic control devices for street and highways, design of traffic control systems, analysis and management of highway traffic, evaluation of safety. P, C E 463 or C E 563.


673. Advances in Water and Waste Reclamation and Reuse (2) I (Identical with CHEE 673, which is home).

675. Wastewater Treatment (3) I (Identical with CHEE 675, which is home).

676. Advanced Water Treatment System Designs (3) II (Identical with CHEE 676, which is home).

900. Research (1-3) [Rpt.]

909. Master's Report (1-3) [Rpt.]

910. Thesis (1-6) [Rpt.]

920. Dissertation (1-12) [Rpt.]

930. Supplementary Registration (1-9) [Rpt.]

Engineering Mechanics (E M )

196. Proseminar

h. Honors Proseminar (1)

399. Independent Study (1-3) [Rpt.]

493. Internship (1-5) [Rpt.]

498. Senior Capstone (1-3) I II

499. Independent Study (1-5) [Rpt.]

502. Introduction to Finite Element Methods (3) I and II (Identical with C E 502, which is home).

505. Continuum Mechanics (4) I Analysis of deformation, principal stresses and strains, velocity fields, and rate of deformation; constitutive and field equations; elementary elasticity. P, C E 417 or consult department before enrolling.

508. Fracture Mechanics (3) I Modes of fracture; crack propagation; Griffith energy balance; crack tip plasticity; J-integral; fatigue cracks; analytical and numerical techniques; constitutive models for damaged materials. P, E M 505 or consult department before enrolling.

511. Advanced Finite Element Analysis (3) I Approximation functions, Lagrangian and Hermitian interpolation, isoparametric elements and numerical integration; mixed, hybrid and boundary element methods, nonlinear analysis, nonlinear problems in solids under static and dynamic loads, time integration schemes, fluid and heat flow coupled problems and mass transport. P, C E 402 or consult department before enrolling.

563. Elasticity Theory and Application (3) I General three-dimensional equations of elasticity; problems in plane stress, plane strain, extension, torsion; energy, residual and other solution methods; applications to rings, beams, plates, torsion and other problems. P, C E 217, C E 302.

604. Plasticity Theory and Application (3) I Yield conditions and flow rules for perfectly plastic and strain hardening materials; application to various elastoplastic problems such as bars, cylinders and plates; effect of volume change behavior, isotropic and anisotropic hardening plasticity with expanding/contracting yield surfaces. P, C E 417 or E M 603 or consult department before enrolling.


635. Matrix Methods in Structural Mechanics (3) I Formulation of the force and displacement methods; the finite element method, with application to bar, beam, plate, and shell structures; organization and development of computer programs; linear and nonlinear systems. P, C E 331 or A M 461.

637. Plates and Shells (3) II Theory and analysis of circular, rectangular and continuous plates by classical, numerical and approximate methods; introduction to in-plane forces and shells. P, C E 336; A M 324.


648. Constitutive Laws for engineering Materials (3) I (Identical with C E 648, which is home).

900. Research (1-3) [Rpt.]

909. Master's Report (1-3) [Rpt.]

910. Thesis (1-6) [Rpt.]

920. Dissertation (1-12) [Rpt.]

930. Supplementary Registration (1-9) [Rpt.]

CLASSICS (CLAS/GRK/LAT)

Modern Languages Bldg., Rm. 371
The University of Arizona
PO Box 21067
Tucson AZ 85721-1067
Phone: (520) 621-1689
FAX: (520) 621-3678
E-mail: naustin@u.arizona.edu
URL: http://www.coh.arizona.edu/classics/cls.html

Baccalaureate Degree
Bachelor of Arts (B.A.)
Graduate Degree
Master of Arts (M.A.)
Major and Degrees
Classics (B.A., M.A.)
B.A. concentrations:
classical civilization
Classical Literature and Civilization/Classical Art and Archaeology (CLAS)

115. The Study of English Words (3) I Vocabulary building through the systematic study of English words derived from Latin and Greek. Readings in translation.

126. Greek Mythology (3) I II The myths, legends, and folk tales of the Greeks and their origins. All readings in English. (Identical with RELI 126).

195. Colloquium a. Encounters with Greek-Roman Antiquity (1) [Rpt./] I II

199. Independent Study (1-4) [Rpt./] I II

204. Ancient History: Greek History (3) I (Identical with HIST 204, which is home).

205. Ancient History: Roman History (3) II (Identical with HIST 205, which is home).

220. Classical Tradition I (3) I Surveys western civilization from the Greco-Roman perspective, beginning before the Greeks and Romans, investigating the origins of their cultures, and proceeding through Greece and Rome to the Middle Ages. P, CLAS 220 is not prerequisite to CLAS 221.

221. Classical Tradition II (3) II Surveys western civilization from the Greco-Roman perspective, covering the classical tradition from the Middle Ages to the present. P, CLAS 220 is not prerequisite to CLAS 221.

230. Literacy and Literature in the Ancient Near East (3) II Examination of the reasons for the invention of writing c. 3,000 BC; survey of the civilizations of the ancient Near East (Sumerians, Egyptians, Hebrews, etc.) in terms of their religion, law, literature, ethics, etc.

240. Ancient Athletics (3) II Comparative study of ancient and modern athletics in their cultural contexts. Readings in English translation.

250A. Classical Literature in Translation (3) I Historical survey of the major authors and works of ancient Greece and Rome: Homer to the Greek novel. P, CLAS 250a is not prerequisite to CLAS 250b.

250B. Classical Literature in Translation (3) II Historical survey of the major authors and works of ancient Greece and Rome: From Homer to the Greek novel. P, CLAS 250a is not prerequisite to CLAS 250b.

260. Ancient Philosophy (3) I (Identical with PHIL 260, which is home).

285. Introduction to Humanities Computing (3) S (Identical with GER 285, which is home).

299. Independent Study (2-4) [Rpt./]

299H. Honors Independent Study (1-3)

305. Greek and Roman Religion (3) Religious beliefs and cult practices in ancient Greece and Rome. All readings in English. (Identical with RELI 305).

325. The Transformation of Society: Christianity in the Greco-Roman World (3) I Investigates the emergence of Christianity in the first four centuries of the Greco-Roman milieu. (Identical with RELI 306).

326. Greek Mythology II (2-4) [Rpt/ 9 units] An intermediate examination of Greco-Roman mythology which focuses on source materials or the influences of classical myths.

329. Art History of the Cinema (3) I Survey of major artistic movements, including academicism, expressionism, cubism, and surrealism, and their influence on film in Germany, Italy, America, and France. (Identical with ARH 329, ART 329).


334. Art and Archaeology of Ancient Egypt (3) II Art and archaeology of the Egyptian civilization from the beginning of the Pharaonic Period to the Alexandrian Age. (Identical with ANTH 334, ARH 334).

335. Roman Empire: Rulers and Ruled (3) II (Identical with HIST 335A, which is home).

336. Roman Empire: Rulers and Ruled (3) I II (Identical with HIST 336A, which is home).

337. Roman Empire: Rulers and Ruled (3) I III (Identical with HIST 337A, which is home).

338. Roman Empire: Rulers and Ruled (3) I IV (Identical with HIST 338A, which is home).

339. Beginnings of Animal Domestication (3) I (Identical with ANTH 339, which is home).

340A. Introduction to Classical Art and Archaeology (3) I An archaeological history of Greece and Italy through the study of major excavations and monuments, with emphasis on cultural developments and relationships. P, CLAS 340a is not prerequisite to CLAS 340b. (Identical with ANTH 340A, ARH 340A).

340B. Introduction to Classical Art and Archaeology (3) II An archaeological history of Greece and Italy through the study of major excavations and monuments, with emphasis on cultural developments and relationships. P, CLAS 340a is not prerequisite to CLAS 340b. (Identical with ANTH 340B, ARH 340B).

341. Ancient Greek Monuments (3) [Rpt./ 2] S Firsthand study of the monuments and material culture (sculpture, vase painting, minor arts, etc.) of the ancient Greeks; reading from history, philosophy and literature in English translation. Five-week tour in Greece.

342. Homer (3) I A study of the Homeric poems, the Iliad, and the Odyssey. All readings in English.

345. Ancient Cosmology (3) I II Investigation of ancient Greek concepts of the universe, with emphasis on theories regarding nature, matter, and the soul. All readings in English.


348. Myth and Archetype (3) I II An investigation of modern psychological theories and their relevance to ancient Greek and Roman myths. All readings in English. P, CLAS 348.

355. Ancient Egyptian Architecture (3) I II Architecture of ancient Egypt with special emphasis on its relationship to the social, religious, and political needs of the culture. May include a two-week study tour in Egypt following the end of the semester.

396. Proseminar I II

399. Independent Study (2-4) [Rpt./]

399H. Honors Independent Study (1-3)

403A. History of Greece: From Prehistoric Times to the Outbreak of the Peloponnesian War (3) I (Identical with HIST 403A, which is home).

403B. History of Greece: From the Outbreak of the Peloponnesian War to the End of the (3) II (Identical with HIST 403B, which is home).

404A. History of Rome: The Republic to the Fall of the Roman Empire (3) I (Identical with HIST 404A, which is home).

404B. History of Rome: The Empire through the Reign of Constantine the great (3) II (Identical with HIST 404B, which is home).

443A. Archaeology of Neolithic and Bronze Age Greece (3) I History, art and culture of prehistoric Greece through the study of archaeological excavation and artifacts emphasizing the "Minoan" culture of Crete. P, CLAS 443a is not prerequisite to CLAS 443b, Writing-Emphasis Course. (Identical with ANTH 443A). May be convened with CLAS 543A.

443B. Archaeology of Neolithic and Bronze Age Greece (3) II History, art and culture of prehistoric Greece through the study of archaeological excavation and artifacts emphasizing the Mycenaean culture of the Greek mainland. P, CLAS 443a is not prerequisite to CLAS 443b, Writing-Emphasis Course. (Identical with ANTH 443B). May be convened with CLAS 543B.
452. Etruscan Art and Archaeology (3) I II
Surveys the art and archaeology of the Etruscans between the 7th and 1st centuries BC. P. CLAS 340B or consent of instructor. (Identical with ARH 452). May be convened with CLAS 552.

453. Research Methods in Classical Archaeology
(3) [Rpt./ 1] I II Analysis of various methods of research in classical archaeology emphasizing the critical use of source material, the development of independent thought and the production of the finished, written product. P. CLAS 340B or CLAS 340A; Writing-Emphasis Course. May be convened with CLAS 553.

454. Greek and Roman Sculpture (3) I A
CLAS 340B or CLAS 340A; Writing-Emphasis the development of independent thought and the study of the development of various disciplines of classical scholarship: philology, textual criticism, paleography, papyrology, archaeology.

455. Greek and Roman Architecture (3) I II
The origins and development of Greek art and architecture from Etruscan beginnings through the Hellenistic period. P. ARH 118 or 6 units of ancient history, ARH 117. (Identical with ARH 454). May be convened with CLAS 554.

456. Greek and Roman Painting (3) I II
Greek vase painting from the Dipylon vases of the geometric period in Athens to the Orientalizing animal styles of Corinth and the black and red figured Attic style. Also, survey of ancient Roman painting and mosaics. P. CLAS 340B, CLAS 340A. (Identical with ARH 456). May be convened with CLAS 556.


458. Greek and Roman Provincial Archaeology
(3) I II Survey of classical archaeology in ancient Tunisia, Cyprus, Portugal and Turkey. P. CLAS 340A, CLAS 340B. May be convened with CLAS 558.

459. Etruscan Pottery 1200-400 BC (3) I II
The development of Greek pottery from the collapse of the Mycenaean empire to the close of the classical period. Special attention to shapes, decoration, function, and artistic and technical skills. (Identical with ARH 461). May be convened with CLAS 561.

460. Classical Field Archaeology (6) [Rpt./ 1] S Field training and lecture program for students beginning in archaeology; includes trench supervision, stratigraphy, locus theory, and oral and written reports on field techniques. Offered on several archaeological sites in the Mediterranean area. P. Consult department before enrolling. (Identical with ANTH 463). May be convened with CLAS 563.

461. Greek Philosophy (3) [Rpt./ 1] I II
(Identical with PHIL 472B, which is home). May be convened with CLAS 564.

462. Ancient Philosophy (3) [Rpt./ 1] I I
(Identical with PHIL 472A, which is home). May be convened with CLAS 572A.

463. Ancient Philosophy (3) [Rpt./ 1] I II
(Identical with PHIL 472B, which is home). May be convened with CLAS 572B.

464. Ancient Philosophy (3) [Rpt./ 1] I I
(Identical with ANTH 474, which is home). May be convened with CLAS 574.

465. Ancient Philosophy (3) [Rpt./ 1] I II
For a description of course topics see CLAS 453. Graduate-level requirements include extensive reading and an in-depth paper. May be convened with CLAS 457.

466. Greek and Roman Sculpture
(3) I A
For a description of course topics see CLAS 454. Graduate-level requirements include extensive reading and an in-depth paper. May be convened with CLAS 458.

467. Greek and Roman Sculpture
(3) I A
For a description of course topics see CLAS 455. Graduate-level requirements include extensive reading and an in-depth paper. May be convened with CLAS 459.

468. Greek and Roman Sculpture
(3) I A
For a description of course topics see CLAS 456. Graduate-level requirements include extensive reading and an in-depth paper. May be convened with CLAS 460.

469. Greek and Roman Sculpture
(3) I A
For a description of course topics see CLAS 457. Graduate-level requirements include extensive reading and an in-depth paper. May be convened with CLAS 461.

470. Greek Philosophy
(3) [Rpt./ 1] I II
(Identical with PHIL 470, which is home). May be convened with CLAS 566.

471. Greek Philosophy
(3) [Rpt./ 1] I II
(Identical with PHIL 471, which is home). May be convened with CLAS 567.

472. Greek Philosophy
(3) [Rpt./ 1] I II
(Identical with PHIL 472A, which is home). May be convened with CLAS 568.

473. Greek Philosophy
(3) [Rpt./ 1] I II
(Identical with PHIL 472B, which is home). May be convened with CLAS 569.

474. Greek Philosophy
(3) [Rpt./ 1] I II
(Identical with PHIL 473, which is home). May be convened with CLAS 570.

475. Greek and Roman Sculpture
(3) I A
For a description of course topics see CLAS 454. Graduate-level requirements include extensive reading and an in-depth paper. May be convened with CLAS 455.

476. Greek and Roman Sculpture
(3) I A
For a description of course topics see CLAS 455. Graduate-level requirements include extensive reading and an in-depth paper. May be convened with CLAS 456.

477. Greek and Roman Sculpture
(3) I A
For a description of course topics see CLAS 457. Graduate-level requirements include extensive reading and an in-depth paper. May be convened with CLAS 458.
Greek (GRK)

101. Elementary Classical Greek I (4) I II Introduction to ancient Greek for students of the Bible and of the classical authors.


103. Elementary Modern Greek I (4) I Development of skills in conversation, composition, and reading with emphasis upon audios-visual practice.

104. Elementary Modern Greek II (4) II Second semester modern Greek. P, GRK 103.

199. Independent Study (1-3) [Rpt./]

201. Intermediate Classical Greek I (4) I Selections from classical Greek chosen in accordance with the student's needs and interest. P, GRK 201.


203. Intermediate Modern Greek I (4) I Pronunciation, grammar, and vocabulary of modern Greek; development of skills in conversation, composition, and reading; emphasis on aural-oral skills. P, GRK 104.

204. Intermediate Modern Greek II (4) II Conversation, composition, and reading. P, GRK 203.

299. Independent Study (1-3) [Rpt./]

399. Independent Study (1-3) [Rpt./]

402. Greek Reading Course (3) I II Readings in major Greek authors including Homer, Plato, and the historians and dramatists. P, GRK 202, Writing-Emphasis Course. May be convened with GRK 502.

412. Readings in Greek Philosophy (3) [Rpt./] I II Extensive readings in Greek in one of the following areas of Greek philosophy: the pre-Socratics, Plato's ethics and epistemology, Aristotle's Nicomachean Ethics. P, GRK 202, Writing-Emphasis Course. (Identical with PHIL 412). May be convened with GRK 512.

421. Greek Lyric Poetry (3) [Rpt./] I II In Greek of the early Greek Lyric writers from Archilochus to Bacchylides, including Pindar. P, GRK 202, Writing-Emphasis Course. May be convened with GRK 521.

422. Readings in Greek Drama (3) [Rpt./] I II For a description of course topics see GRK 422. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Greek.

424. Homer (3) [Rpt./] I II For a description of course topics see GRK 424. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Greek.

430. Readings in Greek Historians (3) [Rpt./] I II Selections from Herodotus and Thucydides with an introduction to the critical literature. Readings in Greek. P, GRK 202, Writing-Emphasis Course. May be convened with GRK 530.

431. Greek Orators (3) I II Readings in Greek from Lysias, Isocrates and Demosthenes as sources for ancient rhetoric, politics, and private life. P, GRK 202, Writing-Emphasis Course. May be convened with GRK 531.

432. Literature of Archaic Greece (3) [Rpt./] I II Readings in Greek from Hesiod and the early lyric poets. The agricultural perspective and the antiheroic ideal. P, GRK 202, Writing-Emphasis Course. May be convened with GRK 532.

498. Senior Capstone (1-3) I II

499. Independent Study (1-3) [Rpt./]

502. Greek Reading Course (3) [Rpt./] I II For a description of course topics see GRK 402. Graduate-level requirements include extensive reading and an in-depth paper. (Identical with PHIL 512). May be convened with GRK 402. P, 3 units of 400-level Greek.

512. Readings in Greek Philosophy (3) [Rpt./] I II For a description of course topics see GRK 412. Graduate-level requirements include extensive reading and an in-depth paper. May be convened with GRK 412. P, 3 units of 400-level Greek.

524. Homer (3) [Rpt./] I II For a description of course topics see GRK 424. Graduate-level requirements include extensive reading and an in-depth paper. May be convened with GRK 424. P, 3 units of 400-level Greek.

530. Readings in Greek Historians (3) [Rpt./] I II For a description of course topics see GRK 430. Graduate-level requirements include extensive readings and an in-depth paper. May be convened with GRK 430. P, 3 units of 400-level Greek.

531. Greek Orators (3) [Rpt./] I II For a description of course topics see GRK 431. Graduate-level requirements include extensive readings and an in-depth paper. May be convened with GRK 431. P, 3 units of 400-level Greek.

596. Seminar

a. Topics in Ancient Greek Literature (3) [Rpt./] 91 II

599. Independent Study (1-3) [Rpt./]

699. Independent Study (1-3) [Rpt./]

Latin (LAT)

101. Elementary Latin I (4) I II An introduction to the basic grammar, syntax and vocabulary of Latin through reading and composition.


112. Accelerated Latin I (8) S Equivalent of LAT 101 and 102. Covers all basic grammar and syntax. P, LAT 102 or previous language experience or consult department before enrolling LAT 101 and LAT 102.

199. Independent Study (1-3) [Rpt./]


299. Independent Study (1-3) [Rpt./]

399. Independent Study (1-3) [Rpt./]

400. Prose of the Roman Republic (3) [Rpt./] I I Extensive readings from Sallust, Cicero and Caesar with some grammatical review; development of skills in rapid readings and sight-reading. P, LAT 202.

401. Latin Reading Course (3) [Rpt./] I II Readings in one of the following: epic, lyric, drama, history, oratory, satire, epistles, novel, philosophical, technical or medieval literature. P, LAT 400, Writing-Emphasis Course. May be convened with LAT 501.

403. Late Antique Literature (3) [Rpt./] I II Selections from genres and/or authors, both Christian and non-Christian, from the late antique period. P, LAT 400, Writing-Emphasis Course. May be convened with LAT 503.

405. Latin Composition (3) [Rpt./] I II Analysis of Latin prose style, review of Latin grammar, practice in composing Latin prose. P, LAT 400, Writing-Emphasis Course. May be convened with LAT 505.

413. Augustan Literature (3) [Rpt./] I II Readings from a major writer or writers of the Augustan age. P, LAT 400, Writing-Emphasis Course. May be convened with LAT 513.


415. Latin Love Elegy (3) [Rpt./] I II Reading in the Latin texts of Ovid, Tibullus and Propertius. P, LAT 400, Writing-Emphasis Course. May be convened with LAT 515.

420. Latin Paleography (3) Identification and reading of major Latin bookhands of the Middle Ages and the Renaissance. Problems in the transmission, corrections and emendation. P, 3 units of Latin at the 400 level. May be convened with LAT 520.

425. Cicero (3) [Rpt./] I II The Life of Cicero
Graduate-level requirements include extensive readings and an in-depth paper. May be convened with LAT 425. P, 3 units of 400-level Latin.

526. Roman Historians (3) [Rpt./ 1] I II For a description of course topics see LAT 426. Graduate-level requirements include extensive readings and an in-depth paper. May be convened with LAT 426. P, 3 units of 400-level Latin.

528. Silver Age Latin (3) [Rpt./ 1] I II For a description of course topics see LAT 428. Graduate-level requirements include extensive readings and an in-depth paper. May be convened with LAT 428. P, 3 units of 400-level Latin.

586. Issues in Latin Teaching Methodology (3) I For a description of course topics see LAT 486. Graduate-level requirements include a research paper. May be convened with LAT 486. Open to majors only. P, LAT 400. P, 3 units of 400-level Latin.

596. Seminar a. Topics in Latin Literature (3) [Rpt./ 9] I II
b. Independent Study (1-3) [Rpt./]
599. Independent Study (1-3) [Rpt./]

COGNITIVE SCIENCE
Psychology Bldg., Rm. 312 The University of Arizona PO Box 210068 Tucson AZ 85721-0068 Phone: (520) 621-2177 FAX: (520) 621-4300 E-mail: garrett@ccit.arizona.edu URL: http://grad.admin.arizona.edu/idps/cogn/cogn.html

Baccalaureate Degree
The program offers no baccalaureate degree.

Graduate Degrees
The program does not offer a graduate degree.

Minor
The program offers a Doctor of Philosophy minor.

Program Requirements
For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Communication (COMM)
100. Fundamentals of Communication (2) Introduces beginning students to the scope of the discipline of communication. P, COMM 106 or COMM 112; COMM 102, COMM 103, COMM 104, COMM 105.

102. Public Communication (2) Introduction to modes of public communication with an emphasis upon public speaking as a prototype. CR, COMM 100.

103. Communication in Small Groups (2) Introduction to small group communication with practice and exemplification of principles in small group discussion. CR, COMM 100.

104. Interpersonal Communication (2) Study and application of basic communication concepts to the description and analysis of interpersonal communication transactions. CR, COMM 100.

105. Introduction to Nonverbal Communication (2) Study and application of basic communication concepts to the description and analysis of nonverbal cues. CR, COMM 100.

106. Communication of Literature (2) Introduction to the performance of literature, with emphasis on the sound and gesture and the emotional and intellectual meanings of the texts of prose, poetry, and drama. CR, COMM 100.

193. Internship (1-4) [Rpt./]
194. Practicum (1-4) [Rpt./]
199. Independent Study (1-3) [Rpt./]

200. Fundamentals Analysis of Communication Behavior (3) I II Study and application of principles of analysis to communication functions operating to structure social groups and social systems.

209. Introduction to Communication Technology (3) II An overview of new communication technology and the process of adoption of new technologies in groups, organizations, and communities.
in communication research to enable students to understand communication research literature.

281. Field Methods in Communication Research (3) Introduction to field methods in communication research to enable students to understand communication research literature.

299. Independent Study (1-3) [Rpt.]  
300. Introduction to Communication Theory (3) I Origin and development of basic concepts in communication theory and research; survey and analysis of theories and models in research. P or CR, COMM 280 and COMM 281 and consent of instructor; Writing-Placement Course.

309. Introduction to Mass Media Effects (3) I  
A review of social-scientific research on the effects of mass media in American society.

312. Applied Organizational Communication (3) Analysis of organizational communication processes, and development of interpersonal, presentation, and group communication skills that are useful in business, governmental, and professional organizations.

318. Persuasion (3) Theories of audience analysis and the motivation of human conduct: the study of rhetorical devices. P or CR, COMM 280 and COMM 281, or consent of instructor.

325. Argumentation (3) Argumentation (3) Study of the philosophy, theory and practice of argumentation; analysis and comparison of classical and contemporary models of advocacy and evidence; examination of argument in public policy, legal, and debate settings. P or CR, COMM 280 and COMM 281 or consent of instructor.

393. Internship (1-5) [Rpt.]  
394. Practicum (1-5) [Rpt.]  
396. Proseminar  

h. Honors Proseminar (3) I II  
399. Independent Study (1-3) [Rpt.]  
399H. Honors Independent Study (1-3) [Rpt.] I II  
408. Theories of Small Group Presentation (3) I II Theory and research on social control and deviance in groups from the perspective of communication behavior. P or CR, COMM 300 and COMM 318 or consent of instructor. May be convened with COMM 503.

409. Theories of Mass Communication (3) II  
An in-depth analysis of theories of the social effects of various mass media sources on society. P or CR, COMM 300 and COMM 318 or consent of instructor. May be convened with COMM 509.

410. Struggle for the Presidency (3) I  
Examination of the campaign strategies and tactics of those seeking the nation's most powerful office from 1960 to the present. [Identical with POL 410]. May be convened with COMM 510.

411. Communication and Conflict Management (3) I II Consideration of theory and research pertaining to the handling of conflict across diverse contexts. P or CR, COMM 300 and COMM 325, or consent of instructor. May be convened with COMM 511.

414. Verbal Communication (3) I II Theory and research on verbal messages. Topics include patterns of conversational interaction, processes of message construction and interpretation, functions and contexts of messages. P, COMM 325 or consent of instructor. May be convened with COMM 514.

415. Nonverbal Communication (3) I II Theory and research on nonverbal communication codes (kinetics, touch, voice, appearance, use of space, time and artifacts) and social functions (expression formation and management, relational communication, emotional expressions, regulation of interaction, social influence). P or CR, COMM 300 and COMM 318 and COMM 325, or consent of instructor. May be convened with COMM 515.

417A. Relational Communication (3) I II The relational communication process and messages people use to define interpersonal relationships, including dominance-submissiveness, affection, involvement and similarity in close relationships. P or CR, COMM 325 or consent of instructor. May be convened with COMM 517A.

417B. Relational Communication (3) I II The relational communication process and messages people use to define interpersonal relationships, including dominance-submissiveness, affection, involvement and similarity in work and professional relationships. P or CR, COMM 325 or consent of instructor. May be convened with COMM 517B.

418. Advanced Persuasion Theory (3) I II Examination of philosophical and theoretical assumptions in persuasion in individual, institutional and societal contexts. P or CR, COMM 300 and COMM 318 and COMM 325, or consent of instructor.

420. Communication and the Legal Process (3) I I Present a number of accomplishments and challenges in the social-scientific study of law, with special emphasis on the effects of communication and social structure on the legal processes. P or CR, COMM 300 and COMM 318 and COMM 325, or consent of instructor. May be convened with COMM 420.

421. Political Campaign Communication (3) I II Investigation and analysis of communication principles and practices in contemporary campaigns for elective office. P or CR, COMM 300 and COMM 318 and COMM 325, or consent of instructor. May be convened with COMM 521.

422. Presidential Leadership and Communication (3) I II Examination of presidential leadership and communication strategies of the modern presidents from Kennedy to the present. May be convened with COMM 522.

423. Topics in Rhetorical Theory and Criticism (3) [Rpt.] I II Intensive reading and analysis of the works of major rhetorical theorists. Each semester will focus on a specific era or perspective. May be convened with COMM 523.

424. Media and Politics in America (3) I Survey of field; media in political campaigns; media coverage of leaders, issues and institutions; leadership strategies to influence media. May be convened with COMM 524.

425. Scientific Argument in Public Discourse (3) I I Advanced argumentation theory focused on examination of scientific argument in public decision-making. Topics include general theory of fallacies and special fallacies related to scientific reasoning. May be convened with COMM 525.

428. Communication Research Methods (3) I II Theories of communication and their research traditions; research methodology in communication behavior studies. P or CR, COMM 300 and COMM 318 and COMM 325, or consent of instructor. May be convened with COMM 528.

445. Communication of Poetry (3) I I Types of poetry analyzed, with emphasis on their differentiation for oral presentation; preparation for and presentations of a public recital.

446. Communication of Fiction (3) I II Analysis of short stories and selected short novels, with emphasis on point of view, tone, and characterization in preparation for performance.


462. Communication and Human Relationships (3) S An advanced course enabling students to inventory, evaluate, and develop oral communication skills in the interpersonal, group, and organizational dimensions of their lives. P, senior status. May be convened with COMM 562.

489. Honors Thesis (3) [Rpt.] I II  
493. Internship (1-3) [Rpt.]  
493. Internship  

I. Legislative Internship (1-12) [Rpt.] I II  
494. Practicum (1-5) [Rpt.]  
496. Seminar  
a. Research in Contemporary Issues in Communication (3) I II P or CR, COMM 300 and COMM 318 and COMM 325, or consent of instructor.

498H. Honors Independent Study (1-3) [Rpt.]  
499. Independent Study (1-3) [Rpt.]  
500. Independent Study (3) [Rpt.] I II  

503. Theories of Small Group Presentation (3) I II For a description of course topics see COMM 403. Graduate-level requirements include an in-depth research paper on a single aspect of macro-interpersonal communication patterns. May be convened with COMM 403.

509. Theories of Mass Communication (3) I II For a description of course topics see COMM 409. Graduate-level requirements include an in-depth theoretical paper on social effects of the mass media. May be convened with COMM 409.

510. Struggle for the Presidency (3) I I For a description of course topics see COMM 410. Graduate-level requirements include an in-depth research project. [Identical with POL 510]. May be convened with COMM 410.
511. Communication and Conflict Management (3) I II For a description of course topics see COMM 411. Graduate-level requirements include an in-depth research paper of communication in some conflict situation. May be convened with COMM 411.

514. Verbal Communication (3) I For a description of course topics see COMM 414. Graduate students will be required to write a final paper. May be convened with COMM 414.

515. Nonverbal Communication (3) I II For a description of course topics see COMM 415. Graduate-level requirements include an in-depth research project or theoretical paper on some issue in the management of interpersonal relationships. May be convened with COMM 415.

517A. Relational Communication (3) I For a description of course topics see COMM 417A. Graduate-level requirements include an in-depth research project or theoretical paper on some issue in the management of interpersonal relationships. May be convened with COMM 417A.

517B. Relational Communication (3) I II For a description of course topics see COMM 417B. Graduate-level requirements include an in-depth research project or theoretical paper on some issue in the management of interpersonal relationships. May be convened with COMM 417B.

520. Communication and the Legal Process (3) I For a description of course topics see COMM 420. Graduate-level requirements include an in-depth research paper on a single aspect of communication in some legal context. May be convened with COMM 420.

521. Political Campaign Communication (3) I II For a description of course topics see COMM 421. Graduate-level requirements include an in-depth research project or theoretical paper on some issue in a recent campaign. May be convened with COMM 421.

522. Presidential Leadership and Communication (3) I II For a description of course topics see COMM 422. Graduate-level requirements include an in-depth research paper or project. May be convened with COMM 422.

523. Topics in Rhetorical Theory and Criticism (3) [Rpt./] I II For a description of course topics see COMM 423. Graduate-level requirements include an in-depth research project or theoretical paper on some issue in a recent campaign. May be convened with COMM 423.

524. Media and Politics in America (3) I For a description of course topics see COMM 424. Graduate students are required to produce a 15 to 20 page research paper involving the application of two major, competing theories to a study of nightly network news. May be convened with COMM 424.

525. Scientific Argument in Public Discourse (3) I For a description of course topics see COMM 425. Graduate students are required to complete a controversy-centered literature review. May be convened with COMM 425.

528. Communication Research Methods (3) II For a description of course topics see COMM 428. Graduate-level requirements include an in-depth research project demonstrating ability to design and conduct research and to analyze data. May be convened with COMM 428.

550. Communication and Cognition (3) I II For a description of course topics see COMM 450. Graduate-level requirements include an in-depth research project on some issue in communication and cognition. May be convened with COMM 450.

562. Communication and Human Relationships (3) S For a description of course topics see COMM 462. Graduate-level requirements include an in-depth research project on some single aspect of communication and human relations and additional examination questions. May be convened with COMM 462.

576. Field and Observational Methods (3) I II (Identical with SOC 576, which is home).

589. Scholarly Communication (3) I II (Identical with LI S 589, which is home).

599. Independent Study (1-3) [Rpt./]

610. Communication Theory I (3) I An overview of theoretical perspectives on the role of verbal and nonverbal communication in the process of generating and understanding development of interpersonal relationships.

620. Communication Theory II (3) II An overview of historical and theoretical perspectives on communication strategies used in social influence attempts from interpersonal to mass media contexts. (Identical with PHL 620).

660. Research Methodologies I (4) I An introduction to research methods and designs used in contemporary communication research.

670. Research Methodologies II (4) II Advanced study of research design and statistical analysis in contemporary communication research.


691. Preceptorship (1-3) [Rpt./]

693. Internship (1-6) [Rpt./]

694. Practicum (1-4) [Rpt./]

696. Seminar

698. Linguistic Investigations and Applications (3) [Rpt./] III

699. Independent Study (1-3) [Rpt./]

700. Research (1-3) [Rpt./ 90 units]

701. Master's Report (2) [Rpt./]

705. Thesis (1-4) [Rpt./]

709. Dissertation (1-9) [Rpt./]

900. Research (1-3) [Rpt./]

909. Master's Report (2) [Rpt./]

910. Thesis (1-4) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

COMPARATIVE CULTURAL AND LITERARY STUDIES (CCLS)
1239 N. Highland Ave.
The University of Arizona
PO Box 210431
Tucson AZ 85721-0431
Phone: (520) 626-8693
FAX: (520) 626-8694
E-mail: kultur@u.arizona.edu
URL: http://grad.admin.arizona.edu/idps/idp/home.html

Baccalaureate Degree
The program offers no baccalaureate degree.

Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major and Degrees
Comparative Cultural and Literary Studies (M.A., Ph.D.)

Program Requirements
For graduate program requirements consult the Graduate Catalog and the departmental office listed above.
To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Comparative Culture and Literary Studies (CCLS)
125. Critical Concepts in Western Culture (3) [Rpt./] Analyzes concepts in art, literature, and other cultural forms that have shaped western ideology. Juxtaposes traditional and nontraditional, elite and popular, western and nonwestern materials. (Identical with ENGL 125).
195. Colloquium
a. Encounters in Cultural Studies (1) I II
205. Introduction to Feminist Literary Theory (3) I (Identical with W S 205, which is home).
248A. Introduction to Folklore (3) I (Identical with ENGL 248A, which is home).
248B. Introduction to Folklore (3) II (Identical with ENGL 248B, which is home).
299. Independent Study (1-3) [Rpt./]
449. Folklore (3) I II (Identical with ENGL 449, which is home).
462. Linguistics and the Study of Literature (3) II (Identical with ENGL 462, which is home). May be convened with CCLS 562.
486. Topics in American Literature (3) [Rpt./]
I II (Identical with ENGL 486, which is home).
498. Senior Capstone (1-3) I II

503A. Introduction to Comparative Cultural and Literary Theories (3) I Strategies of intertextual interpretation taught through practical critique.

503B. Introduction to Comparative Cultural and Literary Theories (3) II Strategies of intertextual interpretation taught through practical critique. P, COMM 503A.

549A. Folklore (3) I (Identical with ENGL 549A, which is home).

549B. Folklore (3) II (Identical with ENGL 549B, which is home).


562. Linguistics and the Study of Literature (3) II (Identical with ENGL 562, which is home). May be convened with CCLS 462.

596. Seminar

a. Comparative Literature (3) [Rpt./] I II (Identical with ENGL 596G, which is home).

599. Independent Study (1-4) [Rpt./] I II

694. Practicum (1-6)

696. Seminar

a. Theory and Criticism (3) [Rpt./] I II (Identical with M AR 696A, which is home).

699. Independent Study (1-4) I II

799. Independent Study (1-4) I II

909. Master's Report (1-6)

930. Supplementary Registration (1-9) I II

COMPUTER SCIENCE (C SC)

For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/ongcourse/data/interface/. Minor requirements are available online at: http://www.arizona.edu/academic/ongcourse/data/ interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Computer Science (C SC)

127A. Introduction to Computer Science (4) I II Programming in a high-level language such as Java. Emphasis on program design issues. Programming topics: basic control structures, primitive data types, arrays, classes, simple recursion. 3R. IL. P, algebra recommended.

127B. Introduction to Computer Science (4) I II Continuation of 127A, programming in high-level language such as Java. Continued emphasis on program design. Programming topics: advanced recursion, linked lists, binary trees, hashing. 3R. IL. P, C SC 127A.

199H. Honors Independent Study (1-3) [Rpt./]


299. Independent Study (1-4) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./]


372. Comparative Programming Languages (3) I II Introduction to several major high-level programming languages and their characteristics. Programming projects are required in at least three languages. P, C SC 127B or C SC 227. (Identical with MATH 372).

399. Independent Study (3) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II

402. Mathematical Logic (3) I (Identical with MATH 402, which is home). May be convened with C SC 502.

409A-409B. Symbolic Logic (3-3) I (Identical with PHIL 409A-PHIL 409B, which is home) May be convened with C SC 509A-C SC 509B.

421. Advanced Systems Modeling and Simulation (3) I (Identical with MIS 421, which is home).


425. Principles of Computer Networking (3) II Theory and practice of computer networks, emphasizing the principles underlying the design of network software and the role of the communications system in distributed computing. Topics include routing, flow, and congestion control, multicast, and data representation, and RPC. P, C SC 318, C SC 340. May be convened with C SC 525.

430. Case Studies in Software Design (3) Techniques and tools for program design and implementation, especially of large programs. Specification, abstraction, verification, maintenance, performance tuning. Includes substantial programming. May be convened with C SC 530.


438. Computational Linguistics (3) I (Identical with LING 438, which is home). May be convened with C SC 538.

443. Theory of Graphs and Networks (3) I (Identical with MATH 443, which is home). May be convened with C SC 543.

445. Algorithms (3) II Mathematical preliminaries; using induction to design algorithms; introduction to analysis of algorithms; algorithms involving sequences and sets; graph algorithms; advanced topics. P, C SC 342, C SC 344, Writing-Emphasis Course.

449. Continuous-System Modeling (3) I (Identical with ECE 449, which is home). May be convened with C SC 549.

450. String and List Processing (3) II Data representation, pattern matching, programming


453. Compilers and Systems Software (4) I Basic concepts of compilation and related systems software. Topics include lexical analysis, top-down parsing, semantic analysis, code generation; assemblers, loaders, linkers; debuggers. P, C SC 318, C SC 330, C SC 340, MATH 243.


470. Foundations of Artificial Intelligence (3) I A general introductory course in Artificial Intelligence (AI). Discussion of AI and its relationship to cognitive psychology, philosophy, math, and computer science. Focus on the underlying concepts of rather than the engineering and applied aspects of AI. For advanced undergraduate and graduate students coming from a variety of disciplines. P, C SC 127B or C SC 227 or equivalent. (Identical with MATH 470). May be convened with C SC 570.

472. Continuous-System Simulation (3) II (Identical with ECE 472, which is home). May be convened with C SC 572.

473. Automata, Grammars and Languages (3) I Finite automata, regular expressions, and their applications; context-free grammars, pushdown automata, and their applications; Turing machines and undecidability; the Chomsky hierarchy. P, C SC 344, Writing-Emphasis Course. (Identical with MATH 473).

474A-474B. Computer-Aided Logic Design (3) I II (Identical with ECE 474A-ECE 474B, which is home). May be convened with C SC 573A-C SC 573B.

475A-475B. Mathematical Principles of Numerical Analysis (3) I (Identical with MATH 475A-MATH 475B, which is home).

479. Game Theory and Mathematical Programming (3) II (Identical with MATH 479, which is home). May be convened with C SC 579.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ 2] I II

499. Independent Study (1-4) [Rpt./]

499H. Honors Independent Study (3) [Rpt./] I II

502. Mathematical Logic (3) I (Identical with MATH 502, which is home). May be convened with C SC 402.

509A-509B. Symbolic Logic (3-3) I For a description of course topics see C SC 409A-C SC 409B. (Identical with PHIL 509A-PHIL 509B, which is home) May be convened with C SC 409A-C SC 409B.

520. Principles of Programming Languages (3) I Important programming language concepts, including types, control and data abstraction, denotational semantics, declarative and object-oriented languages, implementation issues. P, C SC 453.

521A-521B. Systems Modeling and Simulation (3) I (Identical with MIS 521A-MIS 521B, which is home).

522. Principles of Concurrent Programming (3) II For a description of course topics see C SC 422. Graduate-level requirements include more extensive problem sets and different examinations. May be convened with C SC 422.

525. Principles of Computer Networking (3) II For a description of course topics see C SC 425. Graduate-level requirements include additional and more challenging programming projects and different examinations. May be convened with C SC 425.

533. Computer Graphics (3) I For a description of course topics see C SC 433. Graduate-level requirements include more extensive and challenging programming assignments. May be convened with C SC 433.

538. Computational Linguistics (3) I (Identical with LING 538, which is home). May be convened with C SC 438.

541A-541B. Computer-Aided Information Systems Analysis and Design (3) I (Identical with MIS 541A-MIS 541B, which is home).

543. Theory of Graphs and Networks (3) II (Identical with MATH 543, which is home). May be convened with C SC 443.


549. Continuous-System Modeling (3) I (Identical with ECE 549, which is home). May be convened with C SC 449.

550. String and List Processing (3) II For a description of course topics see C SC 450. Graduate-level requirements include more extensive problem sets and different examinations. May be convened with C SC 450.

552. Advanced Operating Systems (3) I Operating system design, implementation and modeling; deadlock and memory management models; protection mechanisms; operating systems for parallel and distributed systems. P, C SC 452.


560. Database Systems (3) I II For a description of course topics see C SC 460. Graduate-level requirements include more extensive problem sets and different examinations. May be convened with C SC 460.

570. Foundations of Artificial Intelligence (3) I For a description of course topics see C SC 470. Graduate-level requirements include an additional project. (Identical with PSYC 470).

572. Continuous-System Simulation (3) II (Identical with ECE 572, which is home). May be convened with C SC 472.

573. Theory of Computation (3) II Chomsky hierarchy, undecidability; general recursive functions; recursion theory; computational complexity theory; NP-complete and provably intractable problems. (Identical with MATH 573).

574A. Computer-Aided Logic Design (3) I (Identical with ECE 574A, which is home). May be convened with C SC 474A.

574B. Computer-Aided Logic Design (3) II (Identical with ECE 574B, which is home). May be convened with C SC 474B.

575A. Numerical Analysis (3) I (Identical with MATH 575A, which is home).

575B. Numerical Analysis (3) II (Identical with MATH 575B, which is home).


578. Computational Methods of Algebra (3) II (Identical with MATH 578, which is home).

579. Game Theory and Mathematical Programming (3) II (Identical with MATH 579, which is home). May be convened with C SC 479.

593. Internship (1-6)

599. Independent Study (1-4) [Rpt./]

620. Advanced Topics in Programming Languages (3) [Rpt./ 3] I Design, implementation, and compilation of programming languages; specific topics to be determined by current literature and faculty and student interest.

630. Advanced Topics in Software Systems (3) [Rpt./ 3] I Problems in design and development of large systems of programs; specific topics to be determined by current literature and faculty and student interest.

645. Advanced Topics in Algorithm Analysis (3) [Rpt./ 3 I Problems in design and analysis of algorithms; specific topics to be determined by current literature and faculty and student interest.

652. Advanced Topics in Operating Systems (3) [Rpt./ 3 I Operating system design, development, analysis, and performance; specific topics to be determined by current literature and faculty and student interest.

674. Digital System Design and Verification (3) I (Identical with ECE 674, which is home).

696. Seminar

a. Current Computing Research (1-3) [Rpt./ 27 units]

699. Independent Study (1-4) [Rpt./]
100. Looking at Dance (3) I Origins of dance as human expression in ritual, social, and theatrical context. Twentieth century developments in ballet, modern dance, movie, and show dancing. Open to non-dance majors only. Open to non-majors only.

112A. Introduction to Ballet (1)

112B. Ballet for Beginners with Limited Experience (1) P, DNC 112A.

112C. Intermediate Ballet (2)

143. Improvisation (1) II Improvisation for non-majors and those students in education desiring certification for teaching dance K-12.

144A. Introduction to Jazz Dance (2) [Rpt./ 2 units] I II

144B. Jazz Dance for Beginners with Limited Experience (1) P, DNC 112A.

144C. Intermediate Jazz Dance (2) [Rpt./ 1]

145. Beginning Improvisation for Dance Majors (1) I Introduction to principles of improvisation, utilizing basic elements of movement, movement qualities, spatial awareness, vocabulary development and spontaneous creative decision making. P. Enrollment by audition only.

152A. Beginning Modern Dance (1)

152B. Modern Dance for Beginners with Limited Experience (1) P, DNC 152A.

152C. Intermediate Modern Dance (2)

175. Theatre Dance (1) Jazz movement styles for the beginning dancer; basic steps, phrases, and performing techniques for musical comedy and media dance entertainment.

176A. Introduction to Tap Dance (1) I

176B. Tap Dance for Beginners with Limited Experience (1) [Rpt./ 1] II Tap dance basic skills and new rhythmic challenges incorporated to advance the beginner to a higher performance level. Explores a variety of music styles. P, DNC 176A or enrollment by audition only.

**DANCE (DNC)**

Gittings Bldg., Rm. 121
The University of Arizona
PO Box 21004
Tucson AZ 85721-0004
Phone: (520) 621-4698
FAX: (520) 621-6981
E-mail: dance@u.arizona.edu
URL: http://www.arts.arizona.edu/somd.html

**Baccalaureate Degree**

Bachelor of Fine Arts (B.F.A.)

**Graduate Degree**

Master of Fine Arts (M.F.A.)*

**Majors and Degrees**

Dance (B.F.A.)

Theatre Arts (M.F.A.)*

* The Master of Fine Arts degree in Theatre Arts with a dance emphasis is jointly administered with the Theatre Arts Department

**Program Requirements**

For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are also available online at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

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To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

**Critical Languages (CRL)**

101. Elementary Language Study (4) [Rpt./ ]
Introduction to the language with an emphasis on its spoken aspects utilizing tape-intensive preparations with biweekly tutorial reviews. 2R, 6L. P, course may be repeated if language is different. Special fees.

102. Elementary Language Study (4) [Rpt./ ]
Continued introduction to the language with an emphasis on its spoken aspects utilizing tape-intensive preparations with biweekly tutorial reviews. P, CRL 101. P, course may be repeated if language is different. Special fees.

197. Workshop

a. Elementary Language Study (1-6) [Rpt./ 12 units] I II P, CRL 102 or consent of CLEP/ language examiner. Special fees.

201. Intermediate Language Study (4) [Rpt./ ]
Continuing study of the language with an emphasis on its spoken aspects utilizing tape-intensive preparations with biweekly reviews. 2R, 6L. P, CRL 102; course may be repeated if language is different. Special fees.

202. Intermediate Language Study (4) [Rpt./ ]
Continuing study of the language with an emphasis on its spoken aspects utilizing tape-intensive preparations with biweekly reviews. 2R, 6L. P, CRL 201; course may be repeated if language is different. Special fees.

297. Workshop

a. Intermediate Language Study (1-6) [Rpt./ 12 units] I II P, CRL 202 or consent of CLEP/ language examiner. Special fees.

301. Advanced Language Study (3) [Rpt./ I II
Continuing study of the language with an emphasis on developing reading and writing skills, continuing practice with spoken aspects utilizing tape-intensive preparations with biweekly reviews. 2R, 4L. P, proficiency at 202 level; course may be repeated if language is different. Special fees.

302. Advanced Language Study (3) [Rpt./ I II
Continuing study of the language with an emphasis on developing reading and writing skills, continuing practice with spoken aspects utilizing tape-intensive preparations with biweekly reviews. 2R, 4L. P, proficiency at 202 level; course may be repeated if language is different. Special fees.

497. Workshop

a. Specialized Language Study (1-6) [Rpt./ 12 units] I II P, CRL 397 or consent of language examiner. Special fees.

**CRITICAL LANGUAGES (CRL)**

1230 N. Park Ave., Suite 214
The University of Arizona
PO Box 210420
Tucson AZ 85721-0067
Phone: (520) 621-3387
FAX: (520) 3386
URL: http://www.coh.arizona.edu/crit_lang/crit.html

**Baccalaureate Degree**

The program offers no baccalaureate degree.

**Graduate Degrees**

The program offers no graduate degrees.

The Critical Languages Program provides tape-intensive instruction in languages not offered by other language departments or committees at the University of Arizona. Criteria for the introduction of new languages are: (1) student, university or community need, (2) availability of native language tutors, (3) proper audiolingual instructional materials. Sections vary in size from four to seven students. The program offers no degrees.

Languages recently offered are Czech, Hindi-Urdu, Hungarian, Indonesian, Irish-Gaelic, Kazakh, Korean, Swahili, Swedish, Tagalog, Turkish, Ukrainian and Uzbek. Additional languages (African, North and South American, Asian, European) will be offered in response to student, university or community need. For further information, contact the Committee on Critical Languages.

**Program Requirements**

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For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.
200. History of Dance (3) II History of dance in western civilization from ancient Egypt to the present.

201A. Beginning Alignment-Floor Barre (1) [Rpt./ 3] 1

239A. Beginning Ballet Pointe (1) [Rpt./ 1] I Strength, stretch, and placement techniques for the beginning student on pointe; barre and center practice. P, enrollment by audition only CR, DNC 240A or DNC 240B or higher level ballet technique.

239B. Beginning Ballet Pointe (1) [Rpt./ 1] II Strength, stretch, and placement techniques for the beginning student on pointe; barre and center practice. P, DNC 240A or DNC 240B or higher level ballet technique, Enrollment by audition only.

240A. Ballet Technique I (2) [Rpt./ 1] I P, DNC 201, enrollment by audition only, DNC 240A is prerequisite to DNC 240B; CR, DNC 201.

240B. Ballet Technique I (2) [Rpt./ 1] I II P, DNC 240A is prerequisite to DNC 240B, DNC 201 or CR DNC 201, enrollment by audition only.

241A. Modern Dance Technique I (2) [Rpt./ 1] I Foundational studies of human movement as an art form, with focus on developing strength, flexibility and coordination. P, enrollment by audition only.

241B. Modern Dance Technique I (2) [Rpt./ 1] II Foundational studies of human movement as an art form, with focus on developing strength, flexibility and coordination. P, enrollment by audition only.

243. Creating with Movement and Rhythms (2) II Develops analytical and technical skills that support the student in becoming an interpreter of movement and its relationships to sound. P, 240A or DNC 241A or DNC 244A; DNC 145.

244A. Jazz Dance Technique I (2) [Rpt./ 1] I P, enrollment by audition only.

244B. Jazz Dance Technique I (2) [Rpt./ 1] II P, enrollment by audition only.

245A. Basic Choreography (2) II Study of the elements of time, space, and energy; basic concepts of phrasing and structure leading to dance composition. P, DNC 143.

245B. Basic Choreography (2) I Study of the elements of time, space, and energy; basic concepts of phrasing and structure leading to dance composition. P, DNC 143.

276A. Intermediate Tap Dance (2) [Rpt./ 1] I Expanding fundamental tap technique with a variety of musical styles and rhythmic applications, intermediate tap dance will emphasize basic tap steps and how those basics can augment advanced skills and techniques. P, enrollment by audition only.

276B. Intermediate Tap Dance (2) [Rpt./ 1] II Expanding fundamental tap technique with a variety of musical styles and rhythmic applications, intermediate tap dance will emphasize basic tap steps and how those basics can augment advanced skills and techniques. P, enrollment by audition only.

a. Dance Production (1-3) [Rpt./ 12 units] I II

294. Practicum (1) [Rpt./ 1] I


304A. Ballet Technique II (2) [Rpt./ 2] I P, DNC 240B, enrollment by audition only.

304B. Ballet Technique II (2) [Rpt./ 2] II P, DNC 240B, enrollment by audition only.

314A. Modern Dance Technique II (2) [Rpt./ 2] I P, DNC 241B, enrollment by audition only.

314B. Modern Dance Technique II (2) [Rpt./ 2] II P, DNC 241B, enrollment by audition only.

343. Dance Ensemble (1-3) [Rpt./ 24 units] I II Production preparation, rehearsal methods, repertorial development, and performance of dance, with particular emphasis on ensemble. P, enrollment by audition only.

344A. Jazz Dance Technique II (2) [Rpt./ 1] I Continued development of jazz dance technique emphasizing stylistic diversity, including contemporary, lyrical, funky and classical jazz. P, enrollment by audition only.

344B. Jazz Dance Technique II (2) [Rpt./ 1] II Continued development of jazz dance technique emphasizing stylistic diversity, including contemporary, lyrical, funky and classical jazz. P, enrollment by audition only.

376. Advanced Tap Dance Technique (2) [Rpt./ 3] I Advanced tap technique is structured with the knowledge of basic tap vocabulary and then expanded to include varied rhythmic and advanced technique skills. Explores a wide variety of musical styles P, DNC 276, enrollment by audition only.

391. Preceptorship (3) [Rpt./] I

394. Practicum (1) [Rpt./] I

439A. Advanced Pointe Technique (1) [Rpt./ 3] I Barre work; continuing development of strength, speed, and stamina. Introduction of advanced barre combinations. Center work; allegro en pointe, also adagio, and pirouettes and consecutive turns. P, Enrollment by audition only. May be convened with DNC 539A.

439B. Advanced Pointe Technique (1) [Rpt./ 3] II Continuation of 439A with increasing difficulty and complexity in the enchainments. P, Enrollment by audition only. May be convened with DNC 539B.

440A. Ballet Technique III (2) [Rpt./ 3] I P, DNC 340B, enrollment by audition only. May be convened with DNC 540A.

440B. Ballet Technique III (2) [Rpt./ 3] II P, DNC 340B, enrollment by audition only. May be convened with DNC 540B.

441A. Modern Dance Technique III (2) [Rpt./ 3] I P, enrollment by audition only. May be convened with DNC 541A.

441B. Modern Dance Technique III (2) [Rpt./ 3] II P, enrollment by audition only. May be convened with DNC 541B.

444A. Jazz Dance Technique III (2) [Rpt./ 3] I Continued development of jazz dance technique emphasizing stylistic diversity and technical proficiency including contemporary, lyrical, funky and classical jazz styles. P, DNC 244A, DNC 244B, DNC 344A, DNC 344B or by audition. May be convened with DNC 544A.

444B. Jazz Dance Technique III (2) [Rpt./ 3] II Continued development of jazz dance technique emphasizing stylistic diversity and technical proficiency including contemporary, lyrical, funky and classical jazz styles. P, DNC 244A, DNC 244B, DNC 344A, DNC 344B or by audition. May be convened with DNC 544B.

445A. Advanced Choreography (2) I Movement, motif development for solo and group composition. 4S. P, DNC 245B. May be convened with DNC 545A.

445B. Advanced Choreography (2) II Balancing the intuitive and intellectual components of the creative process to create meaningful and well-crafted dances. 4S. P, DNC 245B. May be convened with DNC 545B.

456. Careers in Dance (3) III Develops knowledge and skills for management, and pursuit of professional careers in dance. P, consent of instructor for non-majors.

488. Dynamics of Movement (3) [Rpt./ 1] S Experiential approach to movement training and analysis based on anatomical and psychological principles, including movement, voice, guided imagery, lecture and hands-on practice. May be convened with DNC 548.

518. Ballet Repertoire (2) [Rpt./ 5] I Repertoire from romantic, classical and contemporary ballets including works by Bournonville, Petipa, Ashton, Balanchine, Christensen and others. 1R, 3S. P, DNC 340 or enrollment by audition. May be convened with DNC 551B.
Dance—East Asian Studies

451. Biomechanics for Dancers (3) II Study of the human body in its relation to the environment and, in particular, as the medium for dance. Topics include: comparative and developmental anatomy, musculoskeletal system and Newtonian physics, the mechanism of muscular contraction, somatics. P, DNC 145, DNC 241A.

462. Collaborative Play Development (3) [Rpt./ 1] II (Identical with T AR 462, which is home). May be convened with DNC 562.

491. Preceptorship (1-3)

493. Internship (1-3) [Rpt./]

494. Practicum (1-3) [Rpt./] I II

495. Colloquium

a. Teaching Methods for Dance (3) I P, intermediate level ballet, jazz, or modern dance techniques. (Identical with T AR 495A). May be convened with DNC 595A.

b. Teaching Methods in Dance - Grades K-12 (3) II S, P DNC 143, DNC 259, at least 11 units of dance technique, DNC 100 or DNC 370. May be convened with DNC 595B.

496. Seminar

a. Critical Issues (2) [Rpt./ 1] II S P, Junior status. May be convened with DNC 596B.

b. Seminar in Music and Dance Collaborations (2) [Rpt./ 1] I (Identical with music 496E). P/F only. May be convened with 596e.

498. Senior Capstone (1-3) I II

499. Independent Study (1-3) [Rpt./]

499H. Honors Independent Study (1-3) [Rpt./]

500. Dance and Culture (3) [Rpt./] I For a description of course topics see DNC 400. Graduate-level requirements include a research paper. May be convened with DNC 400.

501. Advanced Floor Barre (1) [Rpt./ 3] II I For a description of course topics see DNC 401. Graduate-level requirements include additional written assignments. P, DNC 201. May be convened with DNC 401.

539A. Advanced Pointe Technique (1) [Rpt./ 3] I For a description of course topics see DNC 439A. Graduate-level requirements include completion of additional exercises. May be convened with DNC 439A.

539B. Advanced Pointe Technique (1) [Rpt./ 3] II For a description of course topics see DNC 439B. Graduate-level requirements include completion of additional exercises. May be convened with DNC 439B.

540A. Ballet Technique III (2-3) [Rpt./ 12 units] I For a description of course topics see DNC 440A. Graduate-level requirements include an additional creative and/or research project. May be convened with DNC 440A.

540B. Ballet Technique III (2-3) [Rpt./ 12 units] II For a description of course topics see DNC 440B. Graduate-level requirements include an additional creative and/or research project. May be convened with DNC 440B.

541A. Modern Dance Technique III (2) [Rpt./ 1] I For a description of course topics see DNC 441A. Graduate-level requirements include an additional creative and/or research project. By audition only. May be convened with DNC 441A.

541B. Modern Dance Technique III (2) [Rpt./ 1] II For a description of course topics see DNC 441B. Graduate-level requirements include an additional creative and/or research project. By audition only. May be convened with DNC 441B.

543. Dance Ensemble (1-3) [Rpt./ 18 units] I II Rehearsal methods, repertorial development, and performance of dance with particular emphasis on ensemble. P, repertory audition, intermediate level in modern and ballet (DNC 340A-340B or DNC 341A-341B). By audition only. May be convened with DNC 443B.

544A. Jazz Dance Technique III (2) [Rpt./ 3] I For a description of course topics see DNC 444A. Graduate-level requirements include an additional creative and/or research project. By audition only. May be convened with DNC 444B.

544B. Jazz Dance Technique III (2) [Rpt./ 3] II For a description of course topics see DNC 444B. Graduate-level requirements include an additional creative and/or research project. By audition only. May be convened with DNC 444A.

544A. Advanced Choreography (2) I For a description of course topics see DNC 445A. Graduate-level requirements include completion of a full-scale group composition, which will be evaluated by the dance faculty. May be convened with DNC 445A.

545A. Advanced Choreography (2) II For a description of course topics see DNC 445B. Graduate-level requirements include completion of a full-scale group composition, which will be evaluated by the dance faculty. May be convened with DNC 445A.

545B. Advanced Choreography (2) II For a description of course topics see DNC 445B. Graduate-level requirements include completion of a full-scale group composition, which will be evaluated by the dance faculty. May be convened with DNC 445B.

546. Dynamics of Movement (3) [Rpt./ 1] S For a description of course topics see DNC 446. For a description of course topics see DNC 448. Graduate-level requirements include an additional creative and/or research project. May be convened with DNC 448.

550. Literary Resources for Choreography (3) [Rpt./ 1] II Studies in primary world literature, in drama, and in psychology of personages as sources for choreographic themes; presentation of motifs and scenario. 6 S, P, DNC 445.

551A. Ballet Repertoire (2) [Rpt./ 5] II For a description of course topics see DNC 451A. Graduate-level requirements include performance of classical repertoire at the professional level.

551B. Ballet Repertoire (2) [Rpt./ 5] I For a description of course topics see DNC 451B. Graduate-level requirements include performance of classical repertoire at the professional level.

562. Collaborative Play Development (3) II (Identical with T AR 562, which is home). May be convened with DNC 452.

591. Preceptorship (1-3) [Rpt./]

594. Practicum (1-3) [Rpt./] I II

595. Colloquium

a. Teaching Methods for Dance (3) I For a description of course topics see DNC 495A. Graduate-level requirements include performance of classical repertoire at the professional level. May be convened with DNC 495A.

b. Teaching Methods in Dance - Grades K-12 (3) II S For a description of course topics see DNC 496B. May be convened with DNC 496B.

c. Seminar in Music and Dance Collaborations (2) [Rpt./ 1] I (Identical with music 496E). P/F only. May be convened with 496e.

599. Independent Study (1-3) [Rpt./] II

694. Practicum

a. Concert Production and Choreography (1-4) [Rpt./ 12 units] I II

696. Seminar

a. Graduate Forum (1) [Rpt./ 4 units] I P, Graduate status.

900. Research (1-9) I II

930. Supplementary Registration (1-9) [Rpt./] I II

EAST ASIAN STUDIES (EAS)

Franklin Bldg., Rm. 404
The University of Arizona
PO Box 210080
Tucson AZ 85721-0080
Phone(520) 621-7505
FAX: (520) 621-1149
URL: http://dizzy.library.arizona.edu/branches/eas/eashome.html

Baccalaureate Degree
Bachelor of Arts (B.A.)
Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major and Degrees
East Asian Studies (B.A., M.A., Ph.D.)

B.A. Options:

China
Japan

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/
For graduate program requirements consult the Graduate Catalog and the departmental office listed above. To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Chinese Studies (CHN)


142. Chinese Humanities (3) II Major trends and traditions in the arts, literatures and languages, religions and philosophies of China. (Identical with RELI 142).

194. Practicum (1-3) [Rpt./]

199. Independent Study (1-3) [Rpt./]


276. History of China (3) II Historical development of China. From 750 A.D. to 1900 A.D. (Identical with HIST 276).

294. Practicum (1-3) [Rpt./] I II

299. Independent Study (1-4) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./] I II

331. Taoist Traditions of China (3) I Intellec- tual foundations of Taoism in its two classical sources, the Lao Tzu and the Chuang Tzu, and a sampling of the varieties of religious practice which developed later. (Identical with RELI 331).

340. Masterpieces of Chinese Literature in English (3) I Early poetry and classical prose.

396H. Honors Proseminar (3) I II

399H. Honors Independent Study (1-3) [Rpt./] I II

415-416-417-418. Advanced Modern Chinese (3) I Study of advanced modern (Mandarin) Chinese through readings in social science texts. P, CHN 402 or consent of instructor. May be convened with CHN 515, 516, 517, 518, respectively.

419. Linguistic Structure of Modern Chinese (3) I Linguistic study of the phonological, morphological, and syntactic systems of modern Chinese, with particular attention to linguistic analysis. (Identical with LING 419). May be convened with CHN 519.

420. Linguistic Structure of Modern Chinese (3) II Linguistic study of the phonological, morphological, and syntactic systems of modern Chinese, with particular attention to linguistic analysis. P, CHN 419. (Identical with LING 420). May be convened with CHN 520.

422. Literary Chinese (3) I Introduction to pre-20th-century Chinese styles through readings in classical Chinese literature. P, CHN 402. May be convened with CHN 522.

423. Japanese Aesthetics (3) II (Identical with JPN 423, which is home). May be convened with CHN 522.

427B. The Archaeology of Pre-Han China (3) II (Identical with ANTH 427B, which is home). May be convened with CHN 527B.

429. Chinese-American Literature 1960- Present (3) II Studies of the significant literary works by Americans of Chinese descent between 1960 and the present. (Identical with ENGL 429). May be convened with CHN 529.

430. Law in Traditional China (3) I Survey of law in traditional China, including examination of dispute resolution processes, the development of written law codes, formal judicial procedures, the theory and practice of punishment, crime and criminals, and the social role of legal process as reflected in civil law disputes (over such issues as marriage, divorce, property exchanges, and inheritance). May be convened with CHN 530.

440. Chinese Calligraphy (2) [Rpt./ 1 I Theory, practice, and aesthetics of Chinese brush writing, with emphasis on individual training and development. May be convened with CHN 540.

450. Studies in Modern Chinese (3) [Rpt./ 1 I Grammar and readings in modern Chinese texts, with emphasis on written comprehension and translation. P. Any two courses from CHN 415, 416, 417, 418. May be convened with CHN 550.

460. Modern Chinese Foreign Relations (3) II (Identical with POL 460, which is home). May be convened with CHN 560.

468. Women in China (3) I Analysis of the role of women in Chinese society with equal emphasis on modern and pre-modern periods. Writing-Emphasis Course. (Identical with W S 468). May be convened with CHN 568.

475A. Periods in Chinese History: Ancient and Classical (3) [Rpt./ 1 I II In-depth treatment of major pre-modern eras: Ancient and classical, to 200 B.C. (Identical with HIST 475A). May be convened with CHN 575A.

475B. Periods in Chinese History: Early Empire (3) [Rpt./ 1 I II In-depth treatment of major pre-modern eras: Early Empire 200 B.C. - 200 A.D. (Identical with HIST 475B). May be convened with CHN 575B.

475C. Periods in Chinese History: Medieval (3) [Rpt./ 1 I II In-depth treatment of major pre-modern eras: Medieval 200-750 A.D. (Identical with HIST 475C). May be convened with CHN 575C.

475D. Periods in Chinese History: New Empire (3) [Rpt./ 1 I II In-depth treatment of major pre-modern eras: New Empire, 750-1350 A.D. (Identical with HIST 475D). May be convened with CHN 575D.

475E. Periods in Chinese History: Late Empire (3) I II In-depth treatment of major pre-modern eras: Late Empire, 1350-1800 A.D. (Identical with HIST 475E). May be convened with CHN 575E.

476. Modern China (3) I II (Identical with HIST 476, which is home). May be convened with CHN 576.

482. Social History of China (3) I II Formation of ancient Chinese society; organization of families and clans; social stratification, mobility, conflict, and control in traditional China; and transformation from traditional to modern society. Writing-Emphasis Course. (Identical with HIST 482). May be convened with CHN 582.


484. Confucianism: The Neo-Confucian Tradition (3) I II (Identical with RELI 484). May be convened with CHN 584.

494. Practicum (1-3) [Rpt./] I II

495. Colloquium

a. Readings in Chinese History (3) I II May be convened with CHN 595A.

b. Chinese History Since 1949 (3) II (Identical with HIST 495R). May be convened with CHN 595R.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ 2 I II

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (1-5) [Rpt./] I II

515. Advanced Modern Chinese (3) I For a description of course topics see CHN 415. Study of advanced modern (Mandarin) Chinese through readings in modern literature and readings in social science texts. Graduate-level requirements include more translations and additional reading. May be convened with CHN 415.

516. Advanced Modern Chinese (3) II For a description of course topics see CHN 416. Study of advanced modern (Mandarin) Chinese through readings in modern literature and composition. Graduate level requirements include more translations and additional reading. May be convened with CHN 416.

517. Advanced Modern Chinese (3) I II For a description of course topics see CHN 417. Study of advanced modern (Mandarin) Chinese through readings in modern literature. Graduate-level requirements include more translations and additional reading. May be convened with CHN 417.

518. Advanced Modern Chinese (3) I II For a description of course topics see CHN 418. Study of advanced modern (Mandarin) Chinese through conversation. Graduate level requirements include more translations and additional reading. May be convened with CHN 418.

519. Linguistic Structure of Modern Chinese (3) I For a description of course topics see CHN 419. Graduate-level requirements include two presentations and one term paper. (Identical with LING 519). May be convened with CHN 419.

520. Linguistic Structure of Modern Chinese (3) II For a description of course topics see CHN 420. Graduate-level requirements include two presentations and one term paper. (Identical with LING 520). May be convened with CHN 420.
521. Resources and Methods in Sinology (3)  
II Introduction to and exercises in the use of standard sinological reference and research resources.

522. Literary Chinese (3) I For a description of course topics see CHN 422. Graduate-level requirements include additional assignments relating to translation skill and research methodology. May be convened with CHN 422.

523. Readings in Classical Chinese Philosophical Texts (3) [Rpt./ 2] II Requirements include assignments relating to translation skill and research methodology.

527B. The Archaeology of Pre-Han China (3) II (Identical with ANTH 527B, which is home). May be convened with CHN 427B.

529. Chinese-American Literature (3) II For a description of course topics see CHN 429. Graduate-level requirements include a longer and more substantive paper than that required of the undergraduate student, one which demonstrates advanced knowledge of either American literature, literary theory or Asian studies, as well as familiarity with the relevant research tools. (Identical with ENGL 529). May be convened with CHN 429.

530. Law in Traditional China (3) I For a description of course topics see CHN 430. Graduate-level requirements include additional reports. May be convened with CHN 430.

540. Chinese Calligraphy (2) [Rpt./ 1] I For a description of course topics see CHN 440. Graduate-level requirements include an independent project assignment with instructor. May be convened with CHN 440.

541. Chinese Historical Linguistics (3) I Historical survey of the development of the Chinese language, with particular attention to linguistic changes in phonology, morphology, and syntax. P, CHN 402, a general linguistics course.


547. Readings in Classical Chinese Prose (3) [Rpt./ 2] I Readings in selected texts from literary, philosophical, and historical traditions; includes selections from the Five Classics and the great prose masters of the Han-Qing. Variable content. P, CHN 422.

550. Studies in Modern Chinese (3) [Rpt./ 1] I For a description of course topics see CHN 450. Graduate-level requirements include an additional class presentation and a translation project of an essay of over 1500 words. May be convened with CHN 450.

556. Modern Chinese Foreign Relations (3) II (Identical with POL 560, which is home). May be convened with CHN 460.

558. Women in China (3) I For a description of course topics see CHN 468. Graduate-level requirements include a 15-page term paper. May be convened with CHN 468.

575A. Periods in Chinese History: Ancient and classical (3) [Rpt./ 1] I II For a description of course topics see CHN 475A. Graduate-level requirements include a bibliography, reports, and a term paper similar to that required in a preliminary doctoral exam. (Identical with HIST 575A). May be convened with CHN 475A.

575B. Periods in Chinese History: Early Empire (3) [Rpt./ 1] I II For a description of course topics see CHN 475B. Graduate-level requirements include a bibliography, reports, and a term paper similar to that required in a preliminary doctoral exam. (Identical with HIST 575B). May be convened with CHN 475B.

575C. Periods in Chinese History: Medieval (3) [Rpt./ 1] I II For a description of course topics see CHN 475C. Graduate-level requirements include a bibliography, reports, and a term paper similar to that required in a preliminary doctoral exam. (Identical with HIST 575C). May be convened with CHN 475C.

575D. Periods in Chinese History: New Empire (3) [Rpt./ 1] I II For a description of course topics see CHN 475D. Graduate-level requirements include a bibliography, reports, and a term paper similar to that required in a preliminary doctoral exam. (Identical with HIST 575D). May be convened with CHN 475D.

575E. Periods in Chinese History: Late Empire (3) [Rpt./ 1] I II For a description of course topics see CHN 475E. Graduate-level requirements include a bibliography, reports, and a term paper similar to that required in a preliminary doctoral exam. (Identical with HIST 575E). May be convened with CHN 475E.

576. Modern China (3) I II (Identical with HIST 576, which is home). May be convened with CHN 476.

582. Social History of China (3) I II For a description of course topics see CHN 482. Graduate-level requirements include an extra term paper. (Identical with HIST 582). May be convened with CHN 482.

583. Confucianism: The Classical Period (3) I For a description of course topics see CHN 483. (Identical with RELI 583). May be convened with CHN 483.

584. Confucianism: The Neo-Confucian Tradition (3) I II For a description of course topics see CHN 484. (Identical with RELI 584). May be convened with CHN 484.

593. Internship (1-3) [Rpt./]

594. Practicum (1-3) [Rpt./]

595. Colloquium

596. Seminar

597. Honors Preceptorship (1-6) [Rpt./] I II

598. Honor Practicum (1-3) [Rpt./] I II

599. Independent Study (1-5) [Rpt./]

600. Research (2-4) [Rpt./]

608. Women in China (3) I For a description of course topics see CHN 468. Graduate-level requirements include a 15-page term paper. May be convened with CHN 468.

609. Independent Study (1-3) [Rpt./ II

799. Independent Study (1-4) [Rpt./]

800. Case Studies (3) [Rpt./ 29]

910. Thesis (2-6) [Rpt./ 90 units]

920. Dissertation (1-9) [Rpt./]

East Asian Studies (EAS)

120. Confucian Asia (3) I Explores the central ideas of Confucianism and their adoption and adaptation across Asia at different times, from early China to contemporary Asian Americans.

130. Asian Religions (3) I II Religions of India and the Far East. (Identical with RELI 130).

150. The Worlds of Buddhism (3) II Introduction to Buddhism as both a religion and an array of cultural traditions, with emphasis on its various contributions to the formation of the South, Central, Southeast, and East Asian civilizations. (Identical with RELI 150).

191. Preceptorship (1-6) [Rpt./] I II

191. Preceptorship

195. Colloquium

199. Independent Study (1-3) [Rpt./]

270. Modern East Asia (3) II (Identical with HIST 270, which is home).

291. Preceptorship (1-6) [Rpt./] I II

291. Preceptorship

h. Honors Preceptorship (1-6) [Rpt./] I II

294. Practicum (1-3) [Rpt./] I II

299. Independent Study (1-4) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./] I II

333. Buddhist Meditation Traditions (3) I Major forms of Buddhist meditation from both the South Asian and East Asian traditions, with emphasis on the nature of meditation as a variety of religious experience. (Identical with RELI 333).

345. Hindu Religious Activities (3) I II Practical Hinduism through worship, rituals, and ceremonies based on Vedic, Puranic and folk traditions. (Identical with RELI 345).

350. Hindu Mythology (3) II S Overview of the traditional Hindu myths. Topics from Vedic, Epic, Puranic and other religious sources; their influence upon culture, philosophy, literature, and folklore. (Identical with HUMS 350, RELI 350).

391. Preceptorship (1-5)

391. Preceptorship

h. Honors Preceptorship (1-6) [Rpt./] I II

396. Seminar

h. Honors Seminar (3) I II


415. Advanced Japanese (3) I II Advanced conversation, grammar, reading and writing in modern Japanese. P. grade of B or higher in JPN 202 and consent of instructor. May be convened with JPN 515.


417. Business Japanese (3) III Advanced study of the Japanese language for business purposes. P. JPN 415 or JPN 515 and consent of instructor. May be convened with JPN 517.

421. Advanced Practice in Japanese Language (3) [Rpt./ 1] I Reading and discussion in Japanese of a variety of advanced-level materials, including newspaper articles, short stories, and poetry. P. JPN 416, consent of instructor. May be convened with JPN 521.

422. Advanced Practice in Japanese Language (3) [Rpt./ 1] I Reading and discussion in Japanese of a variety of advanced-level materials, including newspaper articles, short stories, and poetry. P. JPN 421, consent of instructor. May be convened with JPN 522.


446A. Classical Japanese Literature: Ancient and Medieval, to 1600 (3) I Survey of classical Japanese literature, with readings in English translation: Ancient and medieval, to 1600. P. Writing-Emphasis Course. May be convened with JPN 546A.

446B. Classical Japanese Literature: Tokugawa and Meiji, 1600-1900 (3) I II Survey of classical Japanese literature, with readings in English translation: Tokugawa and Meiji, 1600-1900. P. Writing-Emphasis Course. May be convened with JPN 546B.

447A. Modern Japanese Literature: Meiji to World War Two (3) I Survey of modern Japanese literature with readings in English translation: Meiji to World War Two. P. Writing-Emphasis Course. May be convened with JPN 547A.

447B. Modern Japanese Literature: Postwar and Contemporary Literature (3) I Survey of modern Japanese literature with readings in English translation: Postwar and Contemporary Literature. P. Writing-Emphasis Course. May be convened with JPN 547B.

447C. Modern Japanese Literature: From Earliest Times to 1500 (3) I (Identical with HIST 447A, which is home). May be convened with JPN 547C.

447D. Modern Japanese Literature: From 1500 to 1800 (3) I II (Identical with HIST 447B, which is home). May be convened with JPN 547D.

448. History of Japanese Religions: Ancient (3) A selective survey of the history of religions in Japan from earliest times until the thirteenth century, emphasizing the roles of Shinto, Buddhism, and Confucianism in the formation of Japanese culture. (Identical with RELI 448). May be convened with JPN 548.

449. History of Japanese Religions: Medieval to Modern (3) I A selective survey of religions in Japan from the fourteenth century to modern times, emphasizing the variety of religious forms and public reactions to them that have appeared in that time frame. (Identical with RELI 449). May be convened with JPN 549.

500. Practicum (1-3) (Rpt./) I II

505. Classical Japanese (3) I Introduction to classical Japanese grammar and to writing styles used from the 8th century through medieval times. P. grade of B or higher in JPN 416 or JPN 516 or consent of instructor.

508. Classical Japanese Literature: Ancient and Medieval, to 1600 (3) I For a description of course topics see JPN 446A. Graduate-level requirements include a substantial term paper and a class presentation based on that paper. (Identical with LING 508). May be convened with JPN 516.

512. Advanced Japanese Linguistics (3) II For a description of course topics see JPN 412. Graduate-level requirements include a substantial term paper and a class presentation based on that paper. P. JPN 511. (Identical with LING 512). May be convened with JPN 512.

515. Advanced Japanese (3) I II For a description of course topics see JPN 415. Graduate-level requirements include special projects component consisting of reports on aspects of Japanese sociolinguistics. May be convened with JPN 415.

516. Advanced Japanese (3) I II For a description of course topics see JPN 416. Graduate-level requirements include a special projects component consisting of reports on aspects of Japanese grammatical idiom. May be convened with JPN 416.

517. Business Japanese (3) II For a description of course topics see JPN 417. Graduate-level requirements include additional readings, assignments, and class presentations. May be convened with JPN 417.

521. Advanced Practice in Japanese Language (3) (Rpt./) I II For a description of course topics see JPN 421. Graduate requirements include extra readings and an extra translation project. May be convened with JPN 421.

522. Advanced Practice in Japanese Language (3) (Rpt./) I II For a description of course topics see JPN 422. Graduate-level requirements include extra readings and extra translation project. May be convened with JPN 422.

536. Japanese Sociolinguistics (3) I For a description of course topics see JPN 436. Graduate-level requirements include extra readings, class presentations, and a substantial term paper. (Identical with LING 536). May be convened with JPN 436.

546A. Classical Japanese Literature: Ancient and Medieval, to 1600 (3) I For a description of course topics see JPN 446A. Graduate-level requirements include an extra seminar meeting a week, additional readings, and a research paper. May be convened with JPN 446A.

546B. Classical Japanese Literature: Tokugawa and Meiji, 1600-1900 (3) II For a description of course topics see JPN 446B. Graduate-level requirements include an extra seminar meeting a week, additional readings, and a research paper. May be convened with JPN 446B.

547A. Modern Japanese Literature: Meiji to World War Two (3) I For a description of course topics see JPN 447A. Graduate-level requirements include additional readings and a research paper. May be convened with JPN 447A.
547B. Modern Japanese Literature: Postwar and Contemporary Literature (3) II For a description of course topics see JPN 447B. Graduate-level requirements include additional readings and a research paper. May be conved with JPN 447B.

574A. History of Japan: from Earliest Times to 1500 (3) I II (Identical with HIST 574A, which is home). May be convened with JPN 474A.

574B. History of Japan: from 1500-1800 (3) I II (Identical with HIST 574B, which is home). May be convened with JPN 474B.

574C. History of Japan: from 1800-Present (3) I II (Identical with HIST 574C, which is home). May be convened with JPN 474C.

585. History of Japanese Religions: Ancient (3) I II For a description of course topics see JPN 485. For a description of course topics see 486. Graduate-level requirements include longer, more in-depth papers and readings and leading of discussion groups. (Identical with RELI 585). May be convened with JPN 485.

586. History of Japanese Religions: Medieval to Modern (3) I II For a description of course topics see JPN 486. For a description of course topics see 486. Graduate-level requirements include longer, more in-depth papers and readings and leading of discussion groups. (Identical with RELI 586). May be convened with JPN 486.

593. Internship (1-3) [Rpt./]

594. Practicum (1-3) [Rpt./]

595. Colloquium
b. Japanese (3) [Rpt./ 2] I II For a description of course topics see JPN 495B. May be convened with JPN 495B.

c. Topics in Japanese Linguistics (3) [Rpt./ 2] I II For a description of course topics see JPN 496A. May be convened with JPN 496A.

596. Seminar
a. Japanese Literature (3) [Rpt./ 3] I II For a description of course topics see JPN 496A. May be convened with JPN 496A.

598. Case Studies (3) [Rpt./]

104 • Japanese Studies—Ecology & Evolutionary Biology

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Baccalaureate Degrees
Bachelor of Arts (B.A.)
Bachelor of Science (B.S.)

Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Ecology and Evolutionary Biology (B.A., B.S., M.S., Ph.D.)

General Biology (B.S., M.S., Ph.D.)

Program Requirements
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Ecology and Evolutionary Biology (ECOL)

123. Introduction to Evolution (2) II Study of the directional and random forces that lead to adaptation within populations, speciation between populations, and quantum differences between major groups. The origin of life and the products of the evolutionary ages are not covered. P, cursory knowledge of Mendelian genetics recommended.

130. Natural History of the Southwest (3) I Elementary biology of the common plants and animals of the Southwest; identification, distribution, ecology. Field trips.

181L. Introductory Biology Laboratory I (1) I (Identical with MCB 181L, which is home).

181R. Introductory Biology I (3) I S (Identical with MCB 181R, which is home).

182. Introductory Biology II (4) II Origin, diversity and evolution of life; physiology of plants, animals and organ systems; processes of micro and macroevolution; animal behavior and ecology of populations and communities emphasizing biotic interactions and biogeography. Designed for biology majors. 3R, 3L, P, at least Level III placement on the Math Readiness Exam, high school biology recommended; Field trips. (Identical with MIOC 182, MCB 182, MIC 182).


195. Colloquium
a. Eros and Evolution: Sex, Individuality, and Immortality in Biology (1) I
b. Society and Science (1) I II (Identical with BIOL 195C, which is home).

199. Independent Study (1-4) [Rpt./]

205H. Do Animals Think? (3) I A survey of studies on animal cognition. Discussion and comparison of papers describing the rationale, design, and success of research projects comparing non-human primates, mammals, and birds. P, completion of first year composition, for psychology credit PSYC101 must be completed first. (Identical with PSYC 205H).

206. Environmental Biology (4) I Fundamental of ecology and their relevance to human impact on natural ecosystems. Non-majors orientation. 3R, 3L. Field trips.

260. Elementary Plant Physiology (4) I Functions, nutrition, metabolism, and development of higher plants. 3R, 3L. P, ECOL 181 and ECOL 182, or PL100; CHEM101B, 102B.

299. Independent Study (1-4) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./]

302. Ecology (4) I Single species population biology, competition, predation, and mutualism, community and organization, behavioral ecology and evolutionary ecology. 3R, 3L, P, ECOL 182, MATH 125A, MATH 125B.

303. Vertebrate Diversity (4) I II Phylogeny and diversification of the major groups of fishes and tetrapods, and evolution of their diagnostic features and adaptations. P, ECOL 182 or equivalent.

308. Paleontology (3) (Identical with GEOS 308, which is home).

320. Genetics (4) I The principles that govern the inheritance of all living organisms including molecular, chromosomal, organismal, population and evolutionary aspects of genetics with laboratory experience and problem solving. 3R, 3L, P, ECOL 181R, ECOL 181L, ECOL 182, CHEM 103B, CHEM 104B. (Identical with MCB 320).

320H. Genetics (5) I The principles that govern the inheritance of all living organisms including molecular, chromosomal, organismal, population and evolutionary aspects of genetics with laboratory experience and problem solving. (Identical with MCB 320H).

321. Genetics Lab (2) I Laboratory principles and techniques that govern genetic analysis, including molecular, chromosomal, organismal, population, and evolutionary aspects. 1R, 3L. (Identical with MCB 321).

335. Evolutionary Biology (4) II Basic processes and patterns of evolution: natural selection, evolutionary genetics, the analysis of adaptation, the phylogeny of life, the fossil record, molecular evolution, macroevolution. Mandatory discussion session to meet once per week. P, ECOL 181R, ECOL 181L, ECOL 182.
ECOLOGY & EVOLUTIONARY BIOLOGY

390. Math Models In Biology (3) I Introduction to mathematical techniques in the biological sciences. Applications include biochemistry, physiology, and ecology. P. MATH 223 or consent of instructor. (Identical with MATH 380).

396. Proseminar

399. Independent Study (1-4) [Rpt.]

399H. Honors Independent Study (1-3) [Rpt.] I II


403L. Parasitology Laboratory (1) I (Identical with V SC 403L, which is home). May be convened with ECOL 503R.

403R. Biology of Animal Parasites (3) I (Identical with V SC 403R, which is home). May be convened with ECOL 503R.

404. Physiological Systems (3) I Comparison of the diversity of ways that invertebrates and vertebrates develop to meet their common physiological problems and a detailed examination of well studied examples. P. ECOL 182, MCB 181R, MCB 181L. Course in biochemistry suggested. (Identical with BIOC 404, ENTO 404, INSC 404).

405. Aquatic Entomology (4) II (Identical with ENTO 405, which is home).


406L. Conservation Biology in the Field (1) II 2-3 day weekend trips March-April. Field trips. (Identical with GEOS 406L, RNR 406L). May be convened with ECOL 506L.


411. Insect Behavior (4) I II (Identical with ENTO 411, which is home).

412. Plants Useful to Man (2) S Lecture-demonstration course for teachers and others wishing information on the uses of plants: foods and food plants, medicinal plants, plants and industry, plants in textiles and other manufacturers. May be convened with ECOL 512.

414. Plants of the Desert (2) S Designed for teachers and others wishing to become familiar with common native and cultivated plants; identification, ecology, and uses. May be convened with ECOL 514.

415L. Insect Biology Laboratory (1) I (Identical with ENTO 415L, which is home). May be convened with ECOL 515L.

415R. Insect Biology (3) I (Identical with ENTO 415R, which is home). May be convened with ECOL 515R.

416. Bioinformatics and Genomic Analysis (3) II 1R, 3L. (Identical with MCB 416, which is home). May be convened with ECOL 516.

417. Insect Systematics (4) I (Identical with ENTO 417, which is home). May be convened with ECOL 517.

420. Evolutionary Quantitative Genetics (4) II Rigorous coverage of the inheritance and evolution of quantitative characters. Theory, estimation and design issues, and experimental results given equal coverage. P. calculus. May be convened with ECOL 520.

421. Philosophy of the Biological Sciences (3) II (Identical with PHIL 421, which is home). May be convened with ECOL 521.

424. Theoretical Population Genetics (3) I Mathematical theory of modern population genetics developed from first principles with emphasis on evolutionary implications and the historical development of ideas. P. ECOL 320, MATH223. (Identical with ANTH 424, GENE 424, INSC 424). May be convened with ECOL 524.

428. Microbial Genetics (3) I II (Identical with PL P 428, which is home).

433. Human Genetics (3) I (Identical with GENE 433, which is home). May be convened with ECOL 533.

434. Population Interactions (4) I II Empirical and theoretical treatment of competition, exploitation, and mutualism within and between species, with emphasis on application of modern dynamics to ecological problems. 3R, 3L. P. ECOL 302, 2 semesters of calculus. May be convened with ECOL 534.

435. Evolution II (4) I A thorough coverage of the empirical and theoretical foundations of modern evolutionary thought. The fossil record and associated conceptual issues are explored in detail. The heart of the course is the theoretical (mathematical), experimental, and analytical logic necessary to understand processes of evolutionary change at molecular-biological, population, life history, species, and phylogenetic levels. The course is most appropriate for undergraduate and graduate students intending to pursue advanced study and research involving evolutionary questions in biology. P. ECOL 302, MATH 125A; P or CR, MATH 125B. (Identical with GENE 435). May be convened with ECOL 535.

441. Limnology (4) I (Identical with WFSC 441, which is home). May be convened with ECOL 541.

444. Insect Ecology (3) I (Identical with ENTO 444, which is home). May be convened with ECOL 544.

450. Marine Discovery (4) I II Participate in this marine biology outreach program for grades 3-8. Undergraduates do all of the instruction in on-campus, inquiry-based workshops featuring marine diversity and conservation with a focus on the nearby Sea of Cortez. You will gain experience in developing your own teaching style, while learning about marine biology. There is one required weekend field trip to Rocky Point, Mexico.

459. Comparative Vertebrate Histology (4) II (Identical with V SC 459, which is home). May be convened with ECOL 559.


466. Physiology Laboratory (3) I II Emphasis on data acquisition, analysis and interpretation. Laboratory techniques and investigation of physiological mechanisms. 2R, 4L. P. ECOL437 and ECOL465 or V SC400A and V SC400B or PSY450. (Identical with MCB 466, PCOL 466, PSIO 466, V SC 466). May be convened with ECOL 566.

468. Comparative Physiology (3) II The responses of physiological systems to the environment; energy exchanges, respiration, thermal and osmotic regulation, locomotion, behavioral regulation, and integration of responses. P. PSIO 480 or V SC400A and V SC400B or ECOL 437. (Identical with PSIO 468, V SC 468). May be convened with ECOL 568.
470. Plant Diversity and Evolution (4) 1
Survey of the plant kingdom, with emphasis on comparative structure and evolution of major plant divisions. 2R, 6L. Field trips. P. 4 units of biological or plant sciences; Field trips. May be convened with ECOL 570.

472. Systematic Botany (4) II Evolutionary relationships of orders and families of spermatophytes; systems of classification; collection and identification of local flora. (Identical with PL S 472). 2R, 6L. May be convened with ECOL 572.

474. Aquatic Plants and the Environment (4) I II (Identical with SWES 474, which is home). May be convened with ECOL 574.

475. Freshwater and Marine Algae (4) II Systematics, ecology, and evolution of planktonic and benthic species; field techniques and lab culture. 2R, 6L. P. 4 units of biological or plant sciences; Field trips. (Identical with SWES 475, WFSC 475).

476A. Analysis of Biological Diversification (3) [Rpt./ 1] I (Identical with GEOS 476A, which is home). May be convened with ECOL 576A.
476B. Analysis of Biological Diversification (3) [Rpt./ 1] II (Identical with GEOS 476B, which is home). May be convened with ECOL 576B.

478. Global Change (3) II (Identical with GEOS 478, which is home). May be convened with ECOL 578.

479. Art of Scientific Discovery (3) [Rpt./ 1] II Techniques of posing questions and solving puzzles encountered in scientific research, with emphasis on life sciences and mathematics. May be convened with ECOL 579.

480. Invertebrate Zoology (4) I Comparative morphology, physiology, and ecology of invertebrates. 3R, 3L. P. ECOL182; Field trips. May be convened with ECOL 580.

482. Ichthyology (4) I Ecology, evolution and systematics of fishes, with field and lab emphasis on Gulf of California and Arizona fishes. 2R, 6L. May be convened with ECOL 582.

488L. Arizona Mammals Laboratory (1-2) S The identification and study of species of Arizona mammals; with laboratory, library, and field experience. P or CR, ECOL 488R/588R or equivalent. (Identical with WFSC 488L). May be convened with ECOL 588L.

488R. Arizona Mammals (3) S The distribution, ecology, relative abundance, conservation, politics and management implications of the mammals of Arizona. P, ECOL 182 or equivalent. (Identical with WFSC 488R). May be convened with ECOL 588R.

489. Selected Studies of Birds (2) [Rpt./ 1] I Recent advances in ornithology. 1R, 3L. (Identical with WFSC 489). May be convened with ECOL 589.

496. Seminar d. Selected Topics in Marine Biology (1-4) [Rpt./ 6 units] II P, junior or senior ecology majors only. Writing-Emphasis Course if taken for 3-4 units. Field trips. May be convened with ECOL 596D.

j. Plant Population Ecology (1-3) [Rpt./ 18 units] II P, some introductory botany, ecology and consent of instructor. May be convened with ECOL 596J.

r. Species Diversity (2) II May be convened with ECOL 596R.

497. Workshop a. Undergraduate Teaching Training in Ecology and Evolutionary Biology (1-5) [Rpt./ 12 units] P, consult department before enrolling.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ 2] I II

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (1-3) [Rpt./] I II

500A. Topics in Ecology and Evolutionary Biology (2) I Introduction to graduate study in ecology and evolutionary biology, via discussion of ongoing faculty research interests. (Identical with INSC 500A).

500B. Topics in Ecology and Evolutionary Biology (2) II Introduction to field research methods in ecology. (Identical with INSC 500B).

501. Teaching Biology (2) I For a description of course topics see ECOL 401. Graduate-level requirements include the design and presentation of an original research paper. May be convened with ECOL 401.

503L. Parasite Laboratory (1) I (Identical with V SC 503L, which is home). May be convened with ECOL 583L.

503R. Biology of Animal Parasites (3) I (Identical with V SC 503R, which is home). May be convened with ECOL 503R.

505. Aquatic Entomology (4) II (Identical with ENTO 505, which is home).
535. Evolution II (4) I For a description of course topics see ECOL 435. Graduate-level requirements include two term papers, the subject to be determined by the professor. (Identical with GENE 535). May be convened with ECOL 435.

538. Biogeography (3) II For a description of course topics see ECOL 438. Graduate-level requirements include a research paper. (Identical with GEOS 538). May be convened with ECOL 438.

539. Animal-Human Communication (3) I For a description of course topics see ECOL 439. Graduate-level requirements include a research paper. (Identical with PSYC 539). May be convened with ECOL 439.

540R. Oceanography (2) I For a description of course topics see ECOL 440R. Graduate-level requirements include an additional literature paper on a modern aspect of oceanography. May be convened with ECOL 440R.

541. Limnology (4) I (Identical with WFSC 541, which is home). May be convened with ECOL 441.

542. Marine Ecology (6) S For a description of course topics see ECOL 442. Graduate-level requirements include an in-depth research project on a single aspect of the course topic. Optional travel fee. May be convened with ECOL 442.

544. Insect Ecology (3) I (Identical with ENTO 544, which is home). May be convened with ECOL 444.

545. Concepts in Genetic Analysis (3) I (Identical with MCB 545, which is home).


559. Comparative Vertebrate Histology (4) II (Identical with V SC 559, which is home). May be convened with ECOL 459.

560. Current Advances in Plant Physiology (3) I (Identical with PL S 560, which is home).

565. Phylogenetic Biology (3) I For a description of course topics see ECOL 465. Graduate-level requirements include a more in-depth term paper. (Identical with ENTO 565, GEOS 565). May be convened with ECOL 465.

566. Physiology Laboratory (3) II For a description of course topics see ECOL 466. Graduate-level requirements include students completing a series of directed laboratory exercises, then designing and carrying out an experiment of their own. (Identical with MCB 566, PCOL 566, V SC 566). May be convened with ECOL 466.

568. Comparative Physiology (3) II For a description of course topics see ECOL 468. Graduate-level requirements include an additional literature review paper on a modern aspect of comparative physiology. (Identical with PSIO 568, V SC 568). May be convened with ECOL 468.

570. Plant Diversity and Evolution (4) I For a description of course topics see ECOL 470. Graduate-level requirements include a research paper on a relevant topic. May be convened with ECOL 470.

572. Systematic Botany (4) II For a description of course topics see ECOL 472. Graduate-level requirements include either an additional research project or literature review paper on a modern aspect of systematic biology. (Identical with PL S 572). May be convened with ECOL 472.

574. Aquatic Plants and the Environment (4) I (Identical with SWES 574, which is home). May be convened with ECOL 474.

575. Freshwater-Marine Algae (4) II For a description of course topics see ECOL 575. Graduate-level requirements include a special topic report on an aspect of freshwater algae. (Identical with WFSC 575).

576A. Analysis of Biological Diversification (3) I (Rpt./1) I (Identical with GEOS 576A, which is home). May be convened with ECOL 476A.

576B. Analysis of Biological Diversification (2) II (Identical with GEOS 576B, which is home). May be convened with ECOL 476B.

578. Global Change (3) II (Identical with GEOS 578, which is home). May be convened with ECOL 478.

579. art of Scientific Discovery (3) I (Rpt./1) I For a description of course topics see ECOL 479. Graduate-level requirements include use of all techniques in a semester-long research project and final paper. May be convened with ECOL 479.

580. Invertebrate Zoology (4) I For a description of course topics see ECOL 480. Graduate-level requirements include an in-depth research project on a modern aspect of invertebrate zoology. May be convened with ECOL 480.

582. Ichthyology (4) I For a description of course topics see ECOL 482. Graduate-level requirements include an in-depth research project on a single aspect of the course topic. (Identical with WFSC 582). May be convened with ECOL 482.

583. Herpetology (4) II For a description of course topics see ECOL 483. Graduate-level requirements include an in-depth research paper. (Identical with WFSC 583). May be convened with ECOL 483.

584. Ornithology (4) II For a description of course topics see ECOL 484. An independent research project. (Identical with WFSC 584). May be convened with ECOL 484.

585. Mammalogy (4) I For a description of course topics see ECOL 485. Graduate-level requirements include an exercise in mammalian taxonomy and a higher level of performance. (Identical with WFSC 585). May be convened with ECOL 485.


587L. Animal Behavior Lab (1) I For a description of course topics see ECOL 487L. Graduate-level requirements include organizing and leading of group discussion. May be convened with ECOL 487L.

587R. Animal Behavior (3) I For a description of course topics see ECOL 487R. Graduate-level requirements include term paper involving hands-on research. May be convened with ECOL 487R.

588L. Arizona Mammals Laboratory (1-2) S For a description of course topics see ECOL 488L. Graduate-level requirements include an in-depth research paper, which may be an expanded version of that done for 588R. (Identical with WFSC 588L). May be convened with ECOL 488L.

588R. Arizona Mammals (3) S For a description of course topics see ECOL 488R. Graduate-level requirements include an in-depth presentation of a single aspect of the course topics. (Identical with WFSC 588R). May be convened with ECOL 489.

591. Preceptorship (1-4) I (Rpt.)

596. Seminar
a. Evolutionary Ecology (1-2) I (Rpt./ 12 units) II
b. Population Biology (1) I (Rpt./ 6 units) II Open to majors only.
c. Selected Topics in Marine Biology (1-4) I (Rpt./ 6 units) II For a description of course topics see ECOL 496D. May be convened with ECOL 496D.

599. Plant Population Ecology (1-3) I (Rpt./ 18 units) II For a description of course topics see ECOL 496J. May be convened with ECOL 496J.

m. Conservation Biology (1) I (Rpt./ 5 units) II Field trips. (Identical with RNR 596M).

597. Workshop
b. Phylogenetic Inference (2) I (Identical with ENTO 597B, which is home).

599. Independent Study (1-4) I (Rpt.)

610A-610B. Research in Ecology and Evolution (1-5) I (Rpt./ 1) I Introduction to the research currently being pursued by faculty and staff in the department. Open to majors only. 623A-623B. Biology Update (2) S (Identical with BIOL 623A-BIOL 623B, which is home).
ECONOMICS (ECON)
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Baccalaureate Degrees
Bachelor of Arts (B.A.)*
Bachelor of Science in Business Administration (B.S.B.A.)

Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Business Economics (B.S.B.A.)
Economics (B.A.*, M.A., Ph.D.)

* The Bachelor of Arts is jointly administered with the College of Social and Behavioral Sciences

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Economics (ECON)
195. Colloquium
a. Economics (1) II P, open to freshmen only.
200. Basic Economic Issues (3) CDT National and international economic issues. An introduction to economic analysis. P, not available to students who have completed or are enrolled in ECOL201A, 201B, or ECOL210.
201A. Principles of Economics (3) CDT Nature of economics, price theory for the product market, factor prices, international economics. P, not available to students who have completed or are enrolled in ECOL200 or ECOL210.
201B. Principles of Economics (3) CDT Introduction to the theory of national income and employment, money and banking, economic growth and stabilization. P, ECON 201A, not available to students who have completed or are enrolled in ECON200 or ECON210.
210. Survey of Economic Theory (3) Introduction to micro- and macroeconomic theory and the application of theory to situations involving individuals, society, and institutions. P, 6 units of calculus, not available to students who have completed or are enrolled in ECON 200, ECON201A or 201B.
217. Resources and Environmental Economics (3) II (Identical with AREC 217, which is home).
225. Contemporary Economic Problems (3) Analysis of various problems such as poverty, crime, discrimination, and unemployment facing individuals, institutions, and society using various methodologies of economics. Not available to students who are enrolled in or have completed any upper-division economics class. P, ECON 200 or ECON 210 or ECON201A-201B, not available to students who are enrolled in or have completed any upper-division economics class.
242. World Food Economy (3) I II (Identical with AREC 242, which is home).
291. Preceptorship (1-4)
299. Independent Study (2-4) [Rpt./]
299H. Honors Independent Study (1-3) [Rpt./]
300. Microeconomic Analysis for Business Decisions (3) I II Examination of industrial structure; theory of prices under varying market conditions; applications to business problems. P, ECON 200 or ECON 210 or ECON201A-201B, not available to students who are enrolled in or have completed ECON361. Open only to students who meet the requirements for Advanced Standing in the College of Business & Public Administration. Open to non-majors only.
303. History of Economic Thought (3) I The origins and evolution of contemporary economic doctrines; classical, socialist, Keynesian and neoclassical thought in past and present social contexts. P, ECON 200 or ECON 210 or ECON201A-201B, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.
305. Soviet Economic System (3) I Marxist-Leninist foundations of Soviet economic policy; economic management and planning mechanisms; problems of international trade and integration; economic reform and prospects. P, ECON 200 or ECON 210; ECON201A, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. (Identical with R SS 305).
307. Economic History of the United States (3) I Development of economic institutions of the United States. P, ECON 200 or ECON 210 or ECON201A-201B, open only to students who meet the requirements for Advanced Standing in the College of Business & Public Administration.
313. Economics of Futures Markets (3) I II (Identical with AREC 313, which is home).
330. Macroeconomic Institutions and Policy (3) I II The study of how the macroeconomy is affected by institutions, technology and other forces, and governmental policy. P, ECON 200 or ECON 210 or ECON201A-201B, not available to students who are enrolled in or have completed ECON332, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. Open to non-majors only.
332. Intermediate Macroeconomics (3) I II Analysis of output, employment, interest rates, and the price level; the effects of these on changes in monetary and fiscal variables. P, ECON 200 or ECON 210 or ECON201A-201B; MATH 124 or MATH 125 or MATH 123, not available to students who are enrolled in or have completed ECON330. Open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. Open to non-majors only.
339. Economic Statistics (3) I II (Identical with AREC 339, which is home).
340. International Economics and Policy (3) I II Normative and positive aspects of international trade and international monetary economics, with attention drawn to governmental policy as it relates to international commercial relations. P, ECON 200 or ECON 210 or ECON201A-201B, not available to students who are enrolled in or have completed ECON442 or ECON443, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.
361. Intermediate Microeconomics (3) I II Determination of prices and quantities in product and factor markets. P, ECON 200 or ECON 210 or ECON201A-201B; MATH 124 or MATH 125 or MATH 123, not available to students who are enrolled in or have completed ECON330, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.
371. Economic Development (3) I II Analysis of the economic development process of newly developing nations. P, ECON 200 or ECON 210 or ECON201A-201B, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.
375. Economics of Land and Water in the American West (3) I (Identical with AREC 375, which is home).
376. Statistical Inference in Management (3) (Identical with MAP 376, which is home).
382. Labor and Public Policy (3) I II Economic and legal analysis of the issues and problems arising out of executive, legislative, and judicial efforts to define the rights, duties, and responsibilities of labor and management in the field of
industrial relations. P, ECON 200 or ECON 210 or ECON 201A-201B, open only to students who meet the requirements for Advanced Standing in the College of Business & Public Administration.

383. Labor Arbitration (3) I The place and function of arbitration in the field of labor management relations. P, ECON 200 or ECON 210 or ECON 201A-201B, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.

386. Collective Bargaining (3) II Law of collective bargaining; negotiating and administering the contract; public policy. P, ECON 200 or ECON 210 or ECON 201A-201B, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.

391. Preceptorship (1-3) [Rpt./] I II

396. Proseminar

b. Honors Preseminar (3) II P, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.

399. Independent Study (1-3) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II

405. Comparative Economic Systems (3) II Analysis of economic policy in market (capitalist) economies and of economic ideology and planning in command economies. P, ECON 300 or ECON 361; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 505.

406. Introduction to Experimental Economics (3) II Lab experimental studies of economic behavior; applications to monopoly, bilateral bargaining, and competitive markets under various exchange rules; speculation, voting processes, public goods. 2R, 3L. P, ECON 210 or ECON 300 or ECON 361; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.

407. Studies in Microeconomics (3) II Studies in microeconomics, such as the economics of imperfect information and uncertainty, externalities and public goods, and imperfect competition. P, ECON 361; MATH 125B, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 507.

411. Microeconomic Theory and Behavior (3) II Microeconomic theory with an emphasis on the use of experimental laboratory and field methods for testing the behavioral implications of the theory. P, ECON 300 or ECON 361; MATH 125B, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 511.

418. Introduction to Econometrics (3) I II Statistical methods in estimating and testing economic models; single and simultaneous equation estimation, identification, forecasting, and problems caused by violating classical regression model assumptions. P, ECON 339 or ECON 376; open only to students who meet the requirements for Advanced Standing in the College of Business & Public Administration. May be convened with ECON 518.

421. Introduction to Mathematical Economics (3) II Comparative statics, stability, classical optimization, the Kuhn-Tucker theory, calculus of variations, linear algebra, game theory, and application of these techniques in economic analysis. P, MATH 125B, six upper-division units of economics, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 521.

422. Introduction to Health Economics (3) II (Identical with PA 422, which is home).

424. The Chinese Economy (3) I Analysis of some facets of economic development of historical and modern China. P, ECON 300 or ECON 361; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 524.

425. Topics in the Economic History of the United States (3) I II Examines the economic history and development of the United States, including roles of legal and cultural institutions, changes in output mix, government regulation, income distribution, monetary policy, and demographic factors. P, ECON 300 or ECON 361; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 525.

430. Monetary Economics (3) II Analysis of the role of money and monetary policy in the macroeconomic process. P, ECON 330 or ECON 332; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.

431. Games and Decisions (3) II Introduction to decision theory and game theory and their application to various economic situations under conditions of complete and incomplete information. P, ECON 300 or ECON 361; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 531.


435. Public Sector Economics (3) The influence of governmental revenue and expenditure decisions on resource allocation, income distribution, and aggregate economic performance. P, ECON 300 or ECON 361; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 535.

438. Law and Economics (3) II The economic analysis of legal rules and institutions. The economics of the common law, constitutional law, and the legal process. P, ECON 300 or ECON 361 or ECON 500. May be convened with ECON 538.

442. International Macroeconomics (3) I S Analysis of exchange rates, balance of payments, and macroeconomic/financial interdependencies among nations. P, ECON 330 or ECON 332; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.

443. International Trade Theory (3) II General equilibrium analysis of product and input markets of international trade, tariffs, commercial policy, and growth and the welfare aspects of each. P, ECON 300 or ECON 361; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.

444. International Financial Management (3) II Evaluation of international risk exposure and financial management of the multinational firm. P, ECON 330 or ECON 332; FIN 311, open only to students who meet the requirements for Advanced Standing in the College of Business & Public Administration. (Identical with FIN 444).

449. International Business Environments (3) I Study of the widely-varying social, political, cultural and economic factors which make up different countries' unique business environments. P, ECON 300 or ECON 361; open to international business majors only.


453. Business and Economic Forecasting (3) I Forecasting techniques used in business and government; assembly, interpretation and use of economic data; analysis of business conditions; examination of related environmental factors; construction of actual sales or revenue forecasts. P, ECON 300 or ECON 361; ECON 418, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 553.

460. Industrial Organization (3) I Structure, conduct, and performance of American industry; governmental institutions and policies affecting business. P, ECON 300 or ECON 361; ECON 339 or ECON 376, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 560.

461. Economics of Regulated Industries (3) II Economic analysis of the regulated sector of the American economy, including communications, transportation and energy industries; impact of existing and alternative public policies. P, ECON 300 or ECON 361; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 561.
481. Economics of Wage Determination (3) I
Applications of economic theory and empirical methods to labor supply and demand, investment in human capital, minimum wages, union effects on relative wages, and labor market discrimination. P, ECON 339 or ECON 376; ECON 361, open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration.

482. Labor and the Economy (3) II
Macro aspects of labor economics: unemployment causes and cures; unemployment and inflation; distribution of income. P, ECON 339 or ECON 376; ECON 361, open only to students who meet the requirements for Advanced Standing in the College of Business & Public Administration.

484. Economics of Fuels and Energy (3)
II Analysis of demand/supply, pricing, competitive behavior, transportation, interfuel competition, technical change, and externalities for markets for coal, oil, natural gas, and nuclear power. P, ECON 300 or ECON 361; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 584.

485. Economics of Non-Fuel Mineral Industries (3)
II Analysis of national and international minerals markets; reserves/deposits, production technologies, market structure and pricing, recycling, and international trade. P, ECON 300 or ECON 361; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 585.

486. Economics of Minerals, Residuals, Effluents, and the Environment (3) II
Economic aspects and process analysis of minerals production, control and measurement of effluents and residuals for environmental compliance, case studies of production mitigation, competitiveness, and technology. P, ECON 300 or ECON 361; open only to students who meet the requirements for Advanced Standing in the College of Business and Public Administration. May be convened with ECON 586.


489. Public Choice (3) I II
The study of voting, theory, government expenditures, government structures, behavior of voters and bureaucracy. (Identical with POL 489). May be convened with ECON 589.

491. Preceptorship (1-3) [Rpt./] I II

493. Internship (3) [Rpt./] I II

498. Senior Capstone (1-3) I II

499H. Honors Thesis (3) [Rpt./] II I II

499H. Independent Study (1-5) [Rpt./]

500. Managerial Economics (3) I S
Microeconomic theory and applications. P, MIS 400 or MATH 119 or MATH 123; advanced degree credit available for non-majors only, open only to students admitted to a BPA graduate program.


501C. Microeconomic Theory (3) I II Other selected topics. P, ECON 501B.


502B. Macroeconomic Theory (3) I II Advanced topics in macroeconomic analysis; macroeconomic dynamics. P, ECON 502A, ECON 519.

504. Production Economics (3) I (Identical with AREC 504, which is home).

505. Comparative Economic Systems (3) II For a description of course topics see ECON 405. Graduate-level requirements include a research project and different tests. May be convened with ECON 405.

506. Experimental Economics (3) I Introduction to laboratory experimental economics: review of current research, exploration of methodological issues, development of techniques of experimentation. P, ECON 501A.

507. Studies in Microeconomics (3) II For a description of course topics see ECON 407. Graduate-level requirements include a research paper or additional problem sets, depending on exact content. May be convened with ECON 407.

508. Applied Economic Analysis (3) II Uses economic history to show how research methods in economics are used to analyze data collected through empirical observation. P, ECON 501A, ECON 520.

510. Macroeconomics (3) I Theory of income, employment, interest rates, and the price level. P, ECON 500, open only to students admitted to a BPA graduate program.

511. Microeconomic Theory and Behavior (3) II For a description of course topics see ECON 411. Graduate-level requirements include a research paper or additional problem sets, depending on exact content. P, ECON 521. May be convened with ECON 411.

512. Economic Policy in Developing Countries (3) II (Identical with AREC 512, which is home).

513. Consumption Economics and Price Analysis (3) II (Identical with AREC 513, which is home).

514. Cost-Benefit Analysis (3) II (Identical with AREC 514, which is home).

515. Operations Research in Applied Economics (3) II (Identical with AREC 515, which is home).

516. Agricultural Development (3) [Rpt./] I I (Identical with AREC 516, which is home).

518. Introduction to Econometrics (3) I II For a description of course topics see ECON 418. Graduate-level requirements include a research project that involves applications of econometric methods to the estimating and testing of behavioral models or simulation studies of the statistical properties of an econometric estimation technique. Advanced degree credit available for non-majors only. May be convened with ECON 418.

519. Mathematical Economics (3) I Introduction to the theory and methods of mathematical economics and its applications. Designed primarily for entering graduate students majoring in economics. P or CR, ECON 520; consult department before enrolling.

520. Theory of Quantitative Methods in Economics (3) I Introduction to the basic concepts of statistics and their application to the analysis of economic data. Designed primarily for entering graduate students majoring in economics. P or CR, ECON 519; consult department before enrolling.

521. Introduction to Mathematical Economics (3) II For a description of course topics see ECON 421. Graduate-level requirements include a research paper or additional problem sets, depending on exact content. May be convened with ECON 421.

522A. Econometrics (3) I The theory of econometric estimation of single and simultaneous equation models. P, ECON 520.

522B. Econometrics (3) II Additional topics in the theory of econometric estimation of single and simultaneous equation models. P, ECON 522A.

524. The Chinese Economy (3) I For a description of course topics see ECON 424. Graduate-level requirements include a research paper or additional problem sets, depending on exact course content. Advanced credit available for non-majors only. May be convened with ECON 424.

525. Topics in the Economic History of the United States (3) I II For a description of course topics see ECON 425. Graduate-level requirements include a research paper or additional problem sets, depending on exact course content. May be convened with ECON 425.

526. Health Economics (3) I (Identical with PA 526, which is home).

530. Macroeconomic Aspects of Finance (3) II The effects of changing economic conditions upon a firm’s operation, including capital decisions as well as production decisions. P, ECON 500.

531. Games and Decisions (3) II For a description of course topics see ECON 431. Graduate-level requirements include a research paper or additional problem sets, depending on exact content. May be convened with ECON 431.

534. Industry Analysis and New Venture Development (3) I Value maximization; simulation of value distribution, sources of venture capital; timing of initial public offering; new venture ownership structuring. P, ECON 500, FIN 511, MKTG 500, open to entrepreneurship program students only. (Identical with MAP 534).
535. **Public Sector Economics** (3) For a description of course topics see ECON 435. Graduate-level requirements include an in-depth research project on a major current public sector issue. P, ECON 500. May be convened with ECON 436.

542. **International Macroeconomics** (3) I S For a description of course topics see ECON 442. Graduate-level requirements include a research project and different tests. Advanced credit available for non-majors only. May be convened with ECON 442.

543. **International Trade Theory** (3) II For a description of course topics see ECON 443. Graduate-level requirements include a research project and different tests. May be convened with ECON 443.


553. **Business and Economic Forecasting** (3) I For a description of course topics see ECON 453. Graduate-level requirements include a research project and different tests. Advanced credit available for non-majors only. P, ECON 361 or ECON 500; MKTG 552. May be convened with ECON 453.

560. **Industrial Organization** (3) I For a description of course topics see ECON 460. Graduate-level requirements include an applied research project that examines the impact of public policy on industry performance. Advanced credit available for non-majors only. P, ECON 300 or ECON 361 or ECON 500; ECON 339 or ECON 376 or MKTG 552. May be convened with ECON 460.

561. **Economics of Regulated Industries** (3) II For a description of course topics see ECON 461. Graduate-level requirements include a case study of a major market and different tests. Advanced credit available for non-majors only. P, ECON 300 or ECON 361 or ECON 500. May be convened with ECON 461.

562. **Theory and Institutions in Industrial Organization** (3) I II Major issues in the field of industrial organization. Theoretical issues presented with case studies and policy applications. P, ECON 500.

568. **Environmental Scanning and Business Strategy** (3) I II (Identical with MKTG 568, which is home).

575. **Economics of Natural Resource Policy** (3) II (Identical with AREC 575, which is home).

576. **Advanced Natural Resource Economics** (3) I (Identical with AREC 576, which is home).

577. **Advanced Topics In the Economics of Environmental Regulation** (3) I (Identical with AREC 577, which is home).

580. **Mathematics for Economists** (2) I (Identical with AREC 580, which is home).

584. **Economics of Fuels and Energy** (3) II For a description of course topics see ECON 484. Graduate-level requirements include a research project and different tests. Advanced degree credit available for non-majors only. P, ECON 300, ECON 361, ECON 500, ECON 501A or AREC 504. May be convened with ECON 484.

585. **Economics of Non-Fuel Mineral Industries** (3) II For a description of course topics see ECON 485. Graduate-level requirements include a research project and different tests. P, ECON 300, ECON 361, ECON 500, ECON 501A or AREC 504. May be convened with ECON 485.

586. **Economics of Minerals, Residuals, Effluents, and the Environment** (3) II For a description of course topics see ECON 486. Graduate-level requirements include a research project and different tests. P, ECON 500, ECON 501A or AREC 504. May be convened with ECON 486.

589. **Public Choice** (3) I II For a description of course topics see ECON 489. Graduate-level requirements include a research project and different tests. P, ECON 500. May be convened with ECON 489.

591. **Preceptorship** (2-3) [Rpt./]

593. **Internship** (3) [Rpt./]

597. **Workshop**


b. **Computational Methods in Laboratory Economics** (1-3) [Rpt./ 12 units] I II P, MATH 125A, MATH 125B, consult department before enrolling.


d. **Summer Institute on the American Economy** (3) S P, consult department before enrolling.

e. **Economics Education Workshop** (2) S P, consult department before enrolling.

f. **Economic Development for Educators** (2) S P, consult department before enrolling. Open to non-majors only.

599. **Independent Study** (3) [Rpt./] S

676. **Economic Dynamics and Natural Resources** (3) I II (Identical with AREC 676, which is home).

701. **Preceptorship** (1-3) [Rpt./] 1

691. **Seminar**

a. **Experimental Economics I** (3) [Rpt./] 1 II

b. **Experimental Economics II** (3) I

c. **Applied Economic Analysis I** (3) II

d. **Applied Economic Analysis II** (3) I

e. **Econometric Modeling I** (3) [Rpt./] 1 II

f. **Econometric Modeling II** (3) [Rpt./] 1 I

g. **Monetary Economics** (3) [Rpt./] 1 I

h. **Labor Economics I** (3) [Rpt./] 1 II

i. **Labor Economics II** (3) [Rpt./] 1 I

j. **Public Policy Analysis I** (3) [Rpt./] 1 II

k. **Public Policy Analysis II** (3) [Rpt./] 1 I

l. **International Economics I** (3) [Rpt./] 1 II

m. **International Economics II** (3) [Rpt./] 1 I

n. **Advanced Macroeconomic Theory I** (3) [Rpt./] 3 II

o. **Advanced Macroeconomic Theory II** (3) [Rpt./] 3 I

p. **Industrial Organization and Regulation I** (3) [Rpt./] 3 II

q. **Industrial Organization and Regulation II** (3) [Rpt./] 3 I

r. **Advanced Microeconomic Theory I** (3) [Rpt./] 1 II

s. **Advanced Microeconomic Theory II** (3) [Rpt./] 1 I

t. **Mathematical Economics I** (3) II

u. **Game Theory I** (3) II

v. **Public Choice I** (3) I (Identical with POL 696V).

w. **Public Choice II** (3) I (Identical with POL 696W).

x. **Economic History I** (3) [Rpt./] 1 I

y. **Economic History II** (3) [Rpt./] 1 I

697. **Workshop**

a. **Experimental Economics** (3) [Rpt./] 4 I P, ECON 696A, ECON 696B.

b. **Applied Economic Analysis** (3) I P, ECON 696C, ECON 696D.

c. **Econometric Modeling** (3) [Rpt./] 4 I P, ECON 696E, ECON 696F.

d. **Labor Economics** (3) [Rpt./] 4 I P, ECON 696H, ECON 696I.

e. **Public Policy Analysis** (3) [Rpt./] 4 I P, ECON 696J, ECON 696K.

f. **International Economics** (3) [Rpt./] 4 I P, ECON 696L, ECON 696M.

g. **Advanced Macroeconomic Theory** (3) [Rpt./] 4 I P, ECON 696N, ECON 696O.

h. **Industrial Organization and Regulation** (3) [Rpt./] 4 I P, ECON 696P, ECON 696Q.

i. **Advanced Microeconomic Theory** (3) [Rpt./] 4 I P, ECON 696R, ECON 696S.

j. **Economic History** (3) [Rpt./] 4 II S P, ECON 696T, ECON 696U.

699. **Independent Study** (1-3) [Rpt./]

900. **Research** (2-4) [Rpt./]

909. **Master’s Report** (3) [Rpt./]

910. **Thesis** (1-4) [Rpt./]

920. **Dissertation** (1-9) [Rpt./]

930. **Supplementary Registration** (1-9) [Rpt./]

**COLLEGE OF EDUCATION**

Office of Student and Career Services
Education Building, Room 247
The University of Arizona
PO Box 210069
Tucson AZ 85721-0069
Phone: (520) 621-7865
FAX: (520) 621-1827
E-mail: oscs@mail.ed.arizona.edu
URL: http://www.ed.arizona.edu/

The College of Education prepares students for teaching, supervisory and administrative positions in elementary and secondary schools,
community colleges, and universities. The college also prepares persons for teaching and non-teaching positions in special education and rehabilitation.

**Baccalaureate Degrees**
- Bachelor of Arts in Education (B.A.E.)
- Bachelor of Science (B.S.)
- Bachelor of Science in Education (B.S.E.)

**Graduate Degrees**
- Master of Arts (M.A.)
- Master of Education (M.Ed.)
- Master of Teaching (M.T.)
- Master of Educational Administration (Ed.D., Ph.D.)
- Educational Specialist (Ed.S.)
- Doctor of Education (Ed.D.)
- Doctor of Philosophy (Ph.D.)

**Majors and Degrees**
- Bilingual/Bicultural Education (M.Ed.)
- Bilingual/Multicultural Education (M.A.)
- Early Childhood Education (B.A.E.)
- Educational Administration (Ed.D., Ed.S.)
- Educational Psychology (M.A., Ed.S., Ph.D.)
- Elementary Education (B.A.E.)
- Extended English (B.A.E.)
- Foundations of Education (M.A., Ph.D.)
- Higher Education (M.A., Ph.D.)
- Language Arts/Social Studies (B.A.E.)
- Language, Reading and Culture (M.A., Ed.S., Ed.D., Ph.D.)

**Secondary Education Teaching Majors**
- Chemistry (B.S.E.)
- Communications (B.A.E.)
- Earth Sciences (B.S.E.)
- English (B.A.E.)
- French (B.A.E.)
- General Biology (B.S.E.)
- Geography (B.A.E.)
- German (B.A.E.)
- History (B.A.E.)
- Journalism (B.A.E.)
- Latin (B.A.E.)
- Mathematics (B.S.E.)
- Physical Education (B.S.E.)
- Physics (B.S.E.)
- Political Science (B.A.E.)
- Russian (B.A.E.)
- Spanish (B.A.E.)
- Social Studies

**Undergraduate Minors**
Most majors in secondary education require a teaching minor in a second field of specialization. Other approved teaching minors are listed below:
- Anthropology
- Athletic Coaching
- Bilingual/Bicultural Education
- Chemistry/Physics (available with a science teaching major only)
- Computer Science
- Economics
- Health Education
- Italian
- Media Arts
- East Asian Studies
- Portuguese
- Psychology
- Sociology

**Theatre Arts Education**
Majors in elementary education require an academic concentration, chosen in consultation with an academic advisor from the Office of Student and Career Services (621-7865). The non-teaching major in special education and rehabilitation recommends a minor chosen from the following disciplines: Anthropology, Psychology, Sociology, or Special Education. For specific information on the majors and minors available for each of the other degrees offered by the college, please consult department sections of the on-line catalog, or contact the Office of Student and Career Services (621-7865) in the College of Education.

**Associate Teaching Majors**
The College of Fine Arts, the College of Agriculture, and the School of Health Related Professions offer programs for training teachers in their particular disciplines in association with the College of Education.

**Major**
- Agricultural Education (B.S.A.)
- Art Education (B.F.A.)
- Health Education (B.S.H.S.)
- Music Education (B.M.)
- Theatre Arts (B.F.A.)

**Academic Unit**
- College of Agriculture
- College of Fine Arts
- School of Health Professions
- School of Music & Dance
- College of Education

**Fine Arts**

Students in the programs listed above earn degrees specific to the units. Refer to the administering unit for more information.

**General education program**
All undergraduate students are required to complete the university-wide general education program. Designed to provide a foundation for university learning, the program develops students' creative and analytical skills and integrates knowledge across university disciplines.

**Program Requirements**
For undergraduate academic program requirements, consult the *On Course! Academic Program Requirements Reports* (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/interface. Minor requirements are available online at: http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

**Education (EDUC)**

199. Independent Study (1-3) [Rpt./]
250. Basic Priorities in Education (3) Nature and functions of schools in society; school reform proposals; moral dimensions of schooling; equality of educational opportunity; alternatives to schooling; nature of teaching profession.

396. Proseminar

498. Senior Capstone (1-3) I II

500. Disciplined Inquiry in Education (3) Introduction to research methods in education: analysis of research; writing of research reviews; applying research results in educational settings.

501. Foundations of Education (3) Schools and social institutions; political and social influences on education; nature of the education profession; reform and implementation in education.

502. Variations in Learners (3) Nature and extent of differences among learners, both among and within groups; causes and factors relating to variations in learners; implications for educational placement, curricular planning and program development.

600. Quantitative/Inferential Methods in Education (4) Statistical procedures for addressing educational questions using data from experimental (ANOVA) and correlational (multiple regression) studies; relationships between inferential statistics and other forms of educational research inquiry. P, PSYC 230 or SOC 274 or equivalent, EDUC 500.

601. Qualitative Methods in Education (3) Introduction to theory and methods of conducting research through extended participant observation in school or community settings; field work, ethnography, case study, qualitative methods. P, EDUC 500.

602. Research Design and Techniques in Education (3) In-depth explorations of various research paradigms in educational inquiry and their research designs; critical analysis of the
Higher Education (M.A., Ph.D.)
Foundations of Education (M.A., Ph.D.)
Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available online at http://www.arizona.edu/academic/oncourse/data/interface/minors/.
For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the
addresses above.

Educational Administration (ED A)

199. Independent Study (1-4) [Rpt.]
299. Independent Study (1-4) [Rpt.]
393. Internship (1-6) [Rpt.]
394. Practicum (1-6) [Rpt.]
399H. Honors Independent Study (1-3) [Rpt.]
494. Practicum (1-6) [Rpt.]
497. Workshop
a. Trends in Educational Leadership (3) [Rpt./]
   May be convened with ED A 497A.
498. Senior Capstone (1-3) I II
498H. Honors Thesis (3) [Rpt./ 2]
499. Independent Study (1-3) [Rpt.]
594. Practicum (1-6) [Rpt.]
597. Workshop
a. Trends in Educational Leadership (3) [Rpt./]
   For a description of course topics see ED A 497A. May be convened with ED A 497A.
   b. School Evaluation/Accreditation: Problems and Procedures (3)
599. Independent Study (1-4) [Rpt.]

620. Personal/Interpersonal Leadership (5) I Examination of basic constructs of leadership in relationship to personal values and attributes, sensitivity, communication skills, cognitive skills, ethical behavior, and vision. Open to majors only.

660. Leadership and the Educational Environment (5) Introduction to educational leadership; overview of administration within school contexts and larger societal environment; organizational and leadership theories.

661. Administration of Bilingual Education Programs (3) I S Dynamics of the administration of educational programs for the bilingual learner including sociopolitical realities, mandated federal and state funded educational programs, and effective community participation.
696. Seminar
a. Topics in Educational Leadership (1-3) [Rpt./12 units] I II
b. Research in Educational Leadership (1-3) [Rpt./9 units] I II

697. Workshop
a. Problems in Educational Leadership (1-3) [Rpt./12 units] I II

699. Independent Study (1-4) [Rpt./]

900. Research (1-3) [Rpt./]

910. Thesis (1-3) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

Higher Education (H ED)

396. Proseminar
b. Honors Proseminar (3)

498. Senior Capstone (1-3) I II

561. The Community College (3) I The scope, objectives, and educational functions of the community college, patterns of community college programs.

601. Higher Education in the United States (3) I The scope of higher education in the United States; brief survey of historical developments and philosophic bases, public policy issues at the state and federal level; types of institutions and their purposes; characteristics of faculty, students and curricula.

608. The College Student (3) I History and characteristics of the college student; interactions with campus environmental influences; developmental and normative trends; major research findings.

609. Organization and Administration in Higher Education (3) I Organizational theory, structures, systems, and administrative procedures in varied higher education institutions; patterns of governance and policy development.

617. Student Personnel Services in Higher Education (3) II Student personnel services, philosophy, history, administrative procedures, representative programs, current trends.

622. Teaching in Higher Education (3) II Planning, organizing, presenting and evaluating learning experiences for mature students.

641. Institutional Research and Planning (3) I Development of institutional research programs for short-term/long-term planning; and input/output measures.

650. Higher Education Finance (3) I Historical patterns of financing private/public higher education; current sources/types of financial support; alternative methods of financing; social benefits and consumer theories.

651. Higher Education Business Management (3) II Budget planning and execution; systems of resource allocation; personnel management; physical plant planning and construction; information systems and use in management.

695. Colloquium
c. Issues in Higher Education (1-3) [Rpt./12 units] I II

696. Seminar
c. Topics in Higher Education (1-3) [Rpt./12 units] I II

699. Independent Study (1-6) [Rpt./]

793. Internship (3-6) [Rpt./]

794. Practicum (1-3) [Rpt./]

795. Independent Study (1-6) [Rpt./]

900. Research (2-4) [Rpt./]

910. Thesis (1-6) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

EDUCATIONAL PSYCHOLOGY

(ED P)

Education Bldg., Rm. 602
The University of Arizona
PO Box 210069
Tucson AZ 85721-0069
Phone: (520) 621-7828
FAX: (520) 621-2909
E-mail: edp@u.arizona.edu
URL: http://www.ed.arizona.edu/depart/edpsych/

Baccalaureate Degree

The department offers no baccalaureate degrees.

Graduate Degrees
Educational Specialist (Ed.S.)
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major and Degrees
Educational Psychology (Ed.S., M.A., Ph.D.)

Program Requirements
For undergraduate academic program requirements, consult the On Course/ Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available online at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

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To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Educational Psychology (ED P)

195. Colloquium
a. Empowering Women in the Classroom (1)

300. Development Throughout Life (3) I II Life span development within the context of physical, intellectual, social, emotional, and moral development; emphasis on the dynamics of personal growth.

301. Child Development (3) I II Human growth and development from conception through early adolescence; integration of behavioral principles into the elementary school setting. P, admission to the College of Education.

310. Learning in the Schools (3) I II Psychological principles applied to learning and instructional design in the educational setting, emphasizing learning and instructional variables and their applications. P, admission to the College of Education.

340. Research in Education (3) I II Basic concepts essential to the comprehension of research in education, including measurement principles and descriptive statistics.

358. Psychological Measurement in Education (3) I II Psychometric methods as applied to the assessment of achievement, mental ability, and attitudes.

399. Independent Study (1-3) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II

402. Early Adolescent Development (3) I II Major cognitive, psychosocial, physical and anthropological developmental theories of early adolescence (ages 10-14 years old). Also, the implications of theory into practice regarding early adolescents and schooling.

403. Preadolescence and Adolescent Development (3) I II Major developmental tasks within the preadolescent and adolescent years. Emphasis on the importance of theoretically grounded research and the integration of theory, research and practice. (Identical with FS 403).

411. Computer Applications in Education (3) I Essentials of computer operations; presentations software; software evaluations; telecommunications; computer-based diagnosis; application to instruction. May be convened with ED P 511.

412. Multimedia Production in Education (3) I Design of multimedia for instructional applications with an emphasis in production techniques and programming tools. P, ED P 411 or consent of instructor. May be convened with ED P 512.

493. Internship
1. Legislative Internship (1-12) [Rpt./] I II

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./2] I II

499. Independent Study (1-3) [Rpt./]

499H. Honors Independent Study (3) [Rpt./] I II

500. Life Span Development (3) I II Overview of major findings of theories of development from infancy through late adulthood. Special emphasis on cognitive, linguistic, and sociocultural development with concentration on applications to instruction and assessment. (Identical with FS 500).

501. Advanced Child Development (3) I II Aspects of growth and development which influence behavior of the school-age child; emphasis on current research findings. P, ED P 301.

502. Motivation and Development in Classroom Learning (3) I II S Major theories of motivation as they bear upon developmental and classroom dynamics. Special emphasis on the
relationships among basic and applied research and suggested classroom practice.

503. Advanced Adolescent Development (3) II Major developmental tasks within the adolescent years. Emphasis on the importance of theoretically grounded research and the integration of theory, research, and practice. (Identical with FS 503).

410. Learning Theory in Education (3) Major theories of learning and motivation; emphasis on relationships between theory and practice in the schools.

511. Computer Applications in Education (3) I For a description of course topics see ED P 411. Graduate-level requirements include a substantial multimedia production project. May be convened with ED P 411.

512. Multimedia Production in Education (3) I For a description of course topics see ED P 412. Graduate-level requirements include justification of production with learning bases. P, ED 511 and EDUC 500. May be convened with ED P 412.

517. Classroom Application of Behavior Modification Techniques (3) I A S Application of behavior principles and techniques to promote learning and social development of school-related behavior. P or CR, ED P 510.

523. Socio-Cultural Context of Human Development (3) II (Identical with FS 523, which is home). May be convened with ED P 423.

541. Statistical Methods in Education (3-4) Descriptive, correlational, and inferential procedures for presenting and analyzing school and research data. For students in all fields, 3R, 1L.

548. Statistical Packages in Research (4) Covers SPSS and SAS; creating data files; writing syntax; understanding documentation and output. Descriptive statistics, chi-square test of independence, regression, ANOVA. P, ED P 541 or equivalent.

557. Design of Questionnaires and Scales (3) Emphasis on theoretical and methodological issues related to the development of survey and rating scales, sampling procedures, and response bias.

558. Educational Tests and Measurements (3) II Theoretical and practical application of psychometric techniques to test construction, analysis, and interpretation of test results. P, ED P 541.

559. Assessment of Minorities (3) II Critical review of major recent research findings applied to state-of-the-art assessment models and measures, includes hands-on-practice assessment with minority school children.

593. Internship (1-6) [Rpt./] I II

594. Practicum (1-6) [Rpt./]

599. Independent Study (1-4) [Rpt./]

600. Theories of Human Development (3) Critical discussion of research standards, methodologies, and findings of traditional and contemporary developmental theories. Emphasis on applications to developing a personal theoretical position and opening research interests. P, ED P 500 or ED P 501.

613. Psychological Theory in Educational Practice (3) Major theories of psychological thought; strategies for utilizing such theories in educationally relevant research. P, ED P 510.


615A. Developmental Issues in Schooling (3) I Policy, theory, research for understanding and assessing student's development and socialization in instructional settings. Development theory and research needed for exploring how students develop and learn the informal curriculum in educational settings.

615B. Developmental Issues in Schooling (3) II Foundations, policy, theoretical, methodological and educationally applied issues related to contemporary measures for young children across different developmental areas; practice in applying assessment models is provided.


619B. Design of Instructional Technologies (3) II Historical and theoretical bases for developing instructional technologies; emphasis on relationship between learning theory and instructional technologies. Emphasis on production and evaluation, using multimedia and other technologies. P, ED P 619A.


646B. Multivariate Methods in Educational Research (3) II Experimental Design: confounding of effects, statistical power, diagnosing violations of assumptions, crossed and nested designs including one way multiple comparison procedure. P, ED P 640 or equivalent, ED P 548.

647. Techniques in Dimensionality Analysis: Principal Components and Factor Analysis (3) Construction, use, and interpretation of principal component and factor analytical methods in data analysis. Includes eigenvalues, eigenvectors, selection of factors, orthogonal and non-orthogonal rotation methods, interpretation of loadings. P, ED P 548 or ED P 640 or equivalent.


658B. Theory of Measurement (3) Advanced topics in theoretical and practical issues in psychometrics. Item response theory, scaling, and computer-adaptive testing P or CR, ED P 640, ED P 548, and ED P 558. ED P658A is not prerequisite to ED P658B.


679. Psychoeducational Assessment in the Schools (3) Psychoeducational assessment techniques; practice in prescribing remedial programs.

682A. Educational Evaluation (3) Program evaluation; principles, methods, interpretation of data; political context, illustrative cases, technical skills for determining merit or making decisions about educational and social programs. P, ED P 541, ED P 558.


691. Internship (1-6) [Rpt./] I II

692. Seminar

693. Internship a. Research/evaluation (1-3) [Rpt./] I II

696. Colloquium

699. Independent Study (1-3) [Rpt./] I II

900. Research (2-4) [Rpt./]

910. Thesis (1-4) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

- ELECTRICAL AND COMPUTER ENGINEERING (ECE)

Electrical and Computer Engineering Bldg.
104
The University of Arizona
PO Box 210104
Tucson AZ 85721-0104
Phone: (520) 621-6202
FAX: (520) 621-8076
URL: http://www.ece.arizona.edu

Baccalaureate Degrees
Bachelor of Science in Computer Engineering (B.S.Com.E)
Bachelor of Science in Electrical Engineering (B.S.E.E.E)
Bachelor of Science in Optics Engineering (B.S.Op.E)
Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Computer Engineering (B.S., Co.E.)
Electrical Engineering (B.S.E.E., Ph.D.)
Optical Engineering (B.S., Op.E.)
Electrical and Computer Engineering (M.S., Ph.D.)

Program Requirements
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Electrical and Computer Engineering (ECE)

197. Workshop
a. Career Experience and Development Workshop (1) [Rpt./2 units] I II P, freshman ECE status.

205. Electrical Engineering Analysis (4) I II Power series, complex functions, matrices, vectors, analytical geometry; line, surface and volume integrals, vector fields for electrical engineering practice. P, MATH 125B; CR, ECE 220.

207. Elements of Electrical Engineering (3) CDT Introductory survey of electrical engineering, with emphasis on electric power. 3ES, P, PHYS 241; MATH 125A.

208. Elements of Electronics (3) CDT Introductory survey of electronic principles and instrumentation. 3ES, P, ECE 207.

210. Geometrical Optics (3) I (Identical with OPTI 210, which is home).

210L. Geometrical Optics Laboratory (1) I (Identical with OPTI 210L, which is home).


226. Physical Optics (3) II (Identical with OPTI 226, which is home).

226L. Physical Optics Laboratory (1) II (Identical with OPTI 226L, which is home).

250. Writing in Engineering (3) GRD [Rpt./6 units] Required course for ECE students who fail the University Undergraduate Writing Proficiency Exam. The course will assist these students in developing their writing skills for their academic and professional careers. Writing Emphasis Course.

274. Digital Logic (3) I II CDT Number systems and coding, logic design, sequential systems, register transfer language. 2ES, 1ED, P or CR, PHYS 241.

275. Computer Programming for Engineering Applications (3) I II Fundamentals of C, complexity and efficiency analysis, numerical precision and representations, intro to data structures, structured program design, application to solving engineering problems.

297. Workshop
a. Career Experience and Development Workshop (1) [Rpt./2 units] I II P, sophomore ECE status.

299. Independent Study (1-3) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./]

301. Electrical Engineering Laboratory (3) I II CDT Emphasis on measurement techniques, lab procedures, and operating principles of instruments. Experiments deal primarily with basic circuit and electronic concepts and basic design techniques. 3ES, P, ECE 220B; CR, ECE 330, ECE 351A.

302. Electrical Engineering Design Laboratory (3) I II Design-oriented lab. Exercises in circuits, electronics and fields. 3ED, P, ECE 301; CR, ECE 351B.

320. Circuit Theory (3) CDT Electric circuits in the frequency domain, using sinusoidal steady-state, Laplace and Fourier methods, and including single-phase and three-phase power; time domain methods and convolution; transformed networks; natural frequencies; poles and zeros; two-port network parameters; and Fourier series analysis. 2ES, 1ED, P, ECE 220.

340. Engineering Systems Analysis (3) CDT Basic concepts in the modeling and analysis of engineering systems and fundamental topics in communications, controls, and signal processing. Includes classification of systems; signal characterization in frequency domain, Fourier and Laplace transforms; representation of continuous-time systems by/0 models; system diagrams; state variable models; stability analysis and Bode plots; feedback system characteristics; discrete-time systems; and digital signal processing. 2ES, 1ED, P, ECE 320.

350. Radiometry, Sources and Detectors (3) I II CDT Fundamentals of C, carrier transport phenomena; P-N junctions; bipolar, unipolar, microwave and photonic devices. 1.5ES, 1.5ED, P, ECE 351A.

369. Fundamentals of Computer Architecture (3) I II Fundamentals of computer architecture and organization, processor organization and design, control design, microprogramming memory hierarchy, including caches and virtual memory input/output. P, ECE 274.

370. Lasers and Electro-Optical devices (3) I II (Identical with OPTI 370, which is home).

372. Microprocessor Organization (3) I II Computer organization and assembly language, random access memory devices, peripherals and interface design, case studies of computer systems. 2R, 3L, 1.5ES, 1.5ED, P, ECE 276.

381. Introductory Electromagnetics (3) I II Electrostatic and magnetostatic fields; Maxwell's equations; introduction to plane waves, transmission lines, and sources. 2ES, 1ED, P, MATH 322.

397. Workshop
a. Career Experience and Development Workshop (1) [Rpt./2 units] I II P, junior ECE status.

399. Independent Study (1-5) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./]

412. Optical Instrumentation (3) I (Identical with OPTI 412, which is home).

416. Optical Design, Fabrication and Testing (4) II (Identical with OPTI 416, which is home).

419. Physiology for Engineers (4) I (Identical with PSIO 419, which is home).

419. Physiology Laboratory (2) I (Identical with PSIO 419, which is home).

422. Analog Signal Processing and Filtering (3) I Approximation of magnitude, phase and delay characteristics; design of passive, active, and switched capacitor filters; effects of op amp parasitics; sensitivity and gain bandwidth; optimization of designs. 2ES, 2ED, P, ECE 320.

425. Image Science and Engineering (3) II Properties of optical images and image forming systems; acquisition and manipulation of digital images; two-dimensional Fourier representation; image quality criteria; introduction to image processing. 2ES, 1ED, P, ECE 340.

429. Digital Signal Processing (3) I II Discrete-time signals and systems, z-transforms, discrete Fourier transform, fast Fourier transform, digital filter design. 1.5ES, 1.5ED, P, ECE 340, MATH 222. May be convened with ECE 529.

430. Optical Communication Systems (3) II Physics of optical communication components and applications to communication systems. Topics include fiber attenuation and dispersion, laser modulation, photo detection and noise, receiver design, bit error rate calculations, and coherent communications. 1ES, 2ED, P, SIE 305, ECE 340, ECE 352, ECE 381; CR, ECE 431. May be convened with ECE 530.

431. Introduction to Analog Communications Systems (3) I Continuous wave modulation systems such as amplitude modulation, frequency modulation, and
453. Design-Oriented Analysis of Electronic Circuits (3) I Emphasis on obtaining analytical approximations for maximum insight into circuit behavior. Elementary theorem, feedback, low-entropy design equations, frequency-domain measurement of loop gains. Impedances. 1.5ES, 1.5ED. P, ECE 351A, ECE 351B, ECE 352. May be convened with ECE 553.

455. Elementary Digital Circuit Design (3) II Emphasis on first-order analysis and design; integrated bipolar and MOS digital circuits. 2ES, 2ED. P, ECE 351A, ECE 351B.

456. Optoelectronics (3) I Properties and applications of optoelectronic devices and systems. Topics include radiation sources, detectors and detector circuits, fiber optics, and electro-optical components. 1.5ES, 1.5ED. P, ECE 352, ECE 381. May be convened with ECE 556.

457. Integrated Circuit Laboratory (3) II Experiments in diffusion, oxidation, processing, etc. Fabrication of an integrated circuit. (Identical with MSE 457). P. May be convened with ECE 557.

458. Solid-State Circuits (3) I Introduction to unit step processes in semiconductor manufacturing. Introduction to various semiconductor processes, with emphasis on process and device integration issues for major integrated circuit processes. Basic circuit and device techniques including subsystem design and device scaling. Fundamentals of chip layout and integrated circuit design methodology for solid state circuits. 1ES, 2ED. P, ECE 352.

459. Fundamentals of Optics for Electrical Engineers (3) I Introduction to diffraction and 2D Fourier optics, geometrical optics, paraxial systems, third-order aberrations, Gaussian beam propagation, optical resonators, polarization, temporal and spatial coherence, optical materials and nonlinear effects, electro-optic modulators. Applications to holography, optical data storage, optical processing, and optical memory. 1.5ES, 1.5ED. P, ECE 352, ECE 381. May be convened with ECE 559.

460. Aerosol Science and Engineering (3) I (Identical with CHEE 460). May be convened with ECE 560.

461. Energy Conversion (3) I Principles and operating characteristics of rotating machinery and electromagnetic transducers, single-phase and polyphase transformer operation, laboratory demonstrations and tests of transducers and rotating machinery. 2ES, 1ED. P, ECE 320, ECE 381.

465. Microelectronic Packaging Materials (3) II (Identical with MSE 465). May be convened with ECE 565.

470A. Optics Laboratory (3) I (Identical with OPT 470A). May be convened with ECE 565.

470B. Optics Laboratory (3) II (Identical with OPT 470B). May be convened with ECE 565.


473. Software Engineering Concepts (3) II In-depth consideration of each of the phases of the software process life cycle. Object-oriented design and prototyping. Includes a large-scale software development project involving groups of students. 2R, 3L. 1ES, 2ED. P, ECE 275. May be convened with ECE 573.

474A. Computer-Aided Logic Design (3) I Tabular minimization of single and multiple output Boolean functions, NMOS and CMOS realizations, synthesis of sequential circuits, RTL description, laboratory exercises. 1.5ES, 1.5ED. P, ECE 274. (Identical with C SC 474A). May be convened with ECE 574A.

474B. Computer-Aided Logic Synthesis (3) II Standard cell layout, gate and switch level simulation, level mode sequential circuits, VLSI testing, CAD tools, laboratory projects. 1ES. 2ED. (Identical with C SC 474B). May be convened with ECE 574B.

475. Microcomputer-Based Design (3) I Design of microprocessor-based real-time test and control systems, use of development systems and microprocessors. 2R, 3L. 1ES, 2.5ED. P, ECE 372.

478. Fundamentals of Computer Networks (3) I Introduction to computer networks and protocols. Study of the ISO open systems interconnection model, with emphasis on the physical, data link, network, and transport layers. Discussion of IEEE 802, OSI, and Internet protocols. 2ES, 1ED. P, ECE 275, ECE 372, SIE 305. May be convened with ECE 578.

479. Principles of Artificial Intelligence (3) I Provides an introduction to problems and techniques of Artificial Intelligence (AI). Problem solving: basic problem solving methods and techniques; search and game strategies. Knowledge representation using predicate logic; structured representations of knowledge; semantic nets, system entity structures, frames and scripts; planning, learning, expert systems, implementing AI systems. 1.5ED, 1.5ED. P, ECE 275, ECE 473. May be convened with ECE 579.

481. Microwave Measurements (3) I Measurement techniques and the application of hardware and test equipment in the modern microwave laboratory. 2R, 3L. 1.5ES, 1.5ED. P, ECE 381.

482. Electromagnetics (3) I Electromagnetic waves in complex media, wave guides, cavity resonators, and antennas. 1.5ES, 1.5ED. P, ECE 381 or PHYS 331.

484. Antenna Theory and Design (3) I Introduction to the fundamentals of radiation, antenna theory and antenna array design. Design considerations for wire, aperture, reflector and printed circuit antennas. 1.5ES, 1.5ED. P, ECE 381. May be convened with ECE 584.

485. Radio Waves and Telemetry (3) I Principles and properties of electromagnetic propagation through the atmosphere and space including terrain effects. Applications to telemetry, with emphasis on design of microwave and optical links, frame and packet transmission, data synchronization, link characterization and systems considerations. 1.5ES, 1.5ED. P, ECE 340, ECE 381, SIE 305 CR, ECE 431 or ECE 435. May be convened with ECE 585.

486. Microwave Engineering (3) I Review of transmission line theory; microstrip lines and planar circuits; RF/microwave network analysis; scattering parameters; impedance transformer design; filter design; hybrids and resonators; RF/microwave amplifier design; RF transceiver design; RF/microwave integrated circuits. 1.5ES, 1.5ED. P, ECE 381. May be convened with ECE 586.
487. Fiber Optics Laboratory (3) II (Identical with ECE 487, which is home). May be convened with ECE 587.

489. Atmospheric Electricity (3) II (Identical with ATM 408, which is home).

493. Internship (1-2)

493. Internship
a. Manufacturing (3) [Rpt/] P. junior status.

494. Practicum
a. Senior Practicum in Design (3) [Rpt/] I II .5ES, 2.5ED. P. ECE 302; CR, ECE 495A.

495. Colloquium
a. Technical Communications (1) I II P, senior status; CR, ECE 494A. Writing-Emphasis Course.

497. Workshop
a. Career Experience and Development Workshop (1) [Rpt/2 units] I II P, ECE status.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt/ 2] I II

499. Independent Study (1-5) [Rpt/]

499H. Honors Independent Study (1-3) [Rpt/] I II

501. Linear Systems Theory (3) I Mathematical descriptions of linear systems, state-variable models, analysis methods-stability, controllability and observability, state feedback techniques, design of feedback controllers and observers.


503. Random Processes for Engineering Applications (3) I II Probability, random variables, stochastic processes, correlation functions and spectra with applications to communications, control, and computers. P, SIE 305.

522. Analog Signal Processing and Filtering (3) I For a description of course topics see ECE 422. Graduate-level requirements include additional homework and a term project. May be convened with ECE 422.

527. Holography (3) I (Identical with OPTI 527, which is home).


529. Digital Signal Processing (3) I II For a description of course topics see ECE 429. Graduate-level requirements include additional homework and a term project. May be convened with ECE 429.

530. Optical Communication Systems (3) II For a description of course topics see ECE 430. Graduate-level requirements include additional homework and a term paper. May be convened with ECE 430.

531. Image Processing Laboratory for Remote Sensing (3) I Techniques and applications of digital image processing in remote sensing, multispectral image enhancement and analysis, classification, feature extraction for cartography, rule-based systems for mapping from imagery. 3R, 1L (Identical with OPTI 531). Not applicable to the ECE major. OPTI 531 may be applied by ECE majors to an optical sciences or remote sensing minor.

532. Computer Vision (3) I Digital image analysis, including feature extraction, boundary detection, segmentation, region analysis, mathematical morphology, stereoscopy and optical flow. P, ECE 340. (Identical with OPTI 532).


534. Advanced Topics in Electronic Materials (3) [Rpt/ 2] I (Identical with MSE 534, which is home).

535. Introduction to Digital Communication Systems (3) II For a description of course topics see ECE 435. Graduate-level requirements include additional homework and a term project. May be convened with ECE 435.

537. Digital Transmission and Telephony (3) I Spectrum control, synchronization, and multiplexing in digital transmission systems. Topics include line coding, scrambling, spread spectrum, time-division multiplexing, frequency division multiplexing, timing recovery, frame synchronization, jitter, and echo cancellation. P, ECE 431; SIE 305.

538. Digital Image Processing (3) II Digital modulation techniques for the Gaussian white noise channel, emphasizing optimal demodulation methods, analysis of error rates, and signaling techniques over finite bandwidth channels. P, ECE 503.

539. Algebraic Coding Theory (3) II (Identical with MATH 539, which is home).


541. Synthesis of Control Systems (3) I Introduction to design of state feedback controllers and optimal control, modeling of performance indices, controller design algorithms by dynamic programming, calculus of variations and Pontryagin's minimum principle. P or CR, ECE 501.

542. Digital Control Systems (3) II For a description of course topics see ECE 442. Graduate-level requirements include additional homework and a term project. May be convened with ECE 442.


544. Numerical Linear Algebra in Control (3) II Analysis and design of multivariable systems in time- and frequency-domain by using the digital computer. Numerical aspects of linear algebra and polynomial matrix operations in control design algorithms, familiarization with computer-aided control system design software, emphasis on continuous-time systems. P, ECE 501.

545. Decentralized Control and Large-Scale Systems (3) II Introduction to large-scale systems, definitions and special problems, modeling/model reduction, structural properties, decentralized control and information, hierarchical and multi-level controllers. P, ECE 501.

547. Direct Energy Conversion (3) II (Identical with a ME 547, which is home). May be convened with ECE 447.


549. Continuous-System Modeling (3) I For a description of course topics see ECE 449. Graduate-level requirements include more difficult homework and separate grade normalization. (Identical with C SC 549). May be convened with ECE 449.


552. Solid-State Devices (3) II Basic semiconductor physics and materials, PN junctions, metal semiconductor junctions/contacts, BJTs and MOSFETs, device operation, terminal behavior and frequency response, device models. P, ECE 352, ECE 451.

553. Design-Oriented Analysis of Electronic Circuits (3) I For a description of course topics see ECE 453. Graduate-level requirements may include additional homework, different test problems. May be convened with ECE 453.

554. Electronic Packaging Principles (3) I II Introduction to problems encountered at all levels of packaging: thermal, mechanical, electrical, reliability, materials and system integration. Future trends in packaging. (Identical with MSE 554).

556. Optoelectronics (3) I For a description of course topics see ECE 456. Graduate-level requirements include additional homework and a term project. May be convened with ECE 456.
networks for parallel processing, algorithms for parallel processing. P, ECE 369.


571. Advanced Logic Synthesis and Verification Algorithms (3) I Mathematical foundations of Boolean Algebras, elementary finite automata theory, exact algorithms and heuristic procedures for synthesis and minimization of two and multi-level logic, mathematical models of sequential systems and algorithms for synthesis and verification of finite state machines, and algorithms for technology mapping. P, ECE 474A or ECE 574A, ECE 474B or ECE 574B, background in digital design, mathematical maturity, programming in C or equivalent.

572. Continuous-System Simulation (3) II For a description of course topics see ECE 472. Graduate-level requirements include more difficult homework and separate grade normalization. (Identical with C SC 572). May be convened with ECE 472.

573. Software Engineering Concepts (3) II For a description of course topics see ECE 473. Graduate-level requirements include additional homework and a term project. May be convened with ECE 473.

574A-574B. Computer-Aided Logic Design (3) I For a description of course topics see ECE 474A-474B. Graduate-level requirements include additional homework and term projects. (Identical with C SC 574A-574B). May be convened with ECE 474A-474B.


576. Engineering of Computer-Based Systems (3) II Provides methods and techniques for engineering and design of systems that comprise homogeneous, software, hardware, communication, and other components. Characterization of design methodologies, object-oriented modeling and design, systems synthesis and performance analysis. A term project is central to the course. P, ECE 471, ECE 479, or consent of instructor.


578. Fundamentals of Computer Networks (3) I For a description of course topics see ECE 478. For a description of course topics see 478. Graduate-level requirements include additional homework and assignments. May be convened with ECE 478.

579. Principles of Artificial Intelligence (3) I For a description of course topics see ECE 479. Graduate-level requirements include additional homework and a term project. May be convened with ECE 479.

581A. Electromagnetic Field Theory (3) II Time-harmonic fields; fundamental theorems and concepts; rectangular and circular wave guides and resonators; apertures in ground planes, cylinders, and wedges; scattering by cylinders and wedges. P, ECE 502 or MATH 422B.

581B. Electromagnetic Field Theory (3) I

583. Remote Sensing Instrumentation and Techniques (3) II Development of instrumentation, measurement and signal processing techniques required for electromagnetic remote sensing applications with emphasis on atmospheric remote sensing. P, ECE 482. (Identical with ATMO 553, CHEE 583).

584. Antenna Theory and Design (3) II For a description of course topics see ECE 484. Graduate-level requirements include additional homework and a term project. P, ECE 581A. May be convened with ECE 484.

585. Radio Waves and Telemetry (3) II For a description of course topics see ECE 485. Graduate-level requirements include a research report on a topic selected by the instructor from the course material. May be convened with ECE 485.

586. Microwave Engineering (3) I For a description of course topics see ECE 486. Graduate-level requirements include additional homework and a term project. May be convened with ECE 486.

587. Fiber Optics Laboratory (3) I (Identical with OPTI 587, which is home). May be convened with ECE 487.

589. Atmospheric Electricity (3) II (Identical with ATM 589, which is home). May be convened with ECE 489.

591. Preceptorship (1-3) I II

599. Independent Study (1-6) [Rpt.]

631. Neural Networks (3) I Theory and application of parallel distributed computation via elementary processing elements; PE models, and neural analogies; statistical classification, supervised/unsupervised; neural net models; associative memories; training algorithms.

636. Information Theory (3) II Definition of a measure of information and study of its properties; introduction to channel capacity and error-free communications over noisy channels; rate distortion theory; error detecting and correcting codes. P, ECE 636. (Identical with MATH 636).

650. Advanced Analog Circuits (3) II Advanced topics in bipolar and CMOS analog integrated circuits including both switching and non-switching applications. Voltage references, DAC and ADC systems, instrumentation amplifiers, sample-hold circuits, switched-mode power supply regulators. P, ECE 550.

652. Advanced Solid-State Devices (3) I Analysis and design of devices including BJTs, MOSFETS, MESFETS, MODFETS, microwave devices, and photonic devices. P, ECE 552.


659. Advanced Topics in Microelectronics and Solid-State Devices (3) [Rpt./ 2] I II Specialized topics, as announced, such as submicron MOSFETS, radiation effects on devices, yield analysis, advanced semiconductor processing technologies, and introduction to software design tools. P, ECE 554.

672. Computer-Aided Design Algorithms and Techniques for VLSI (3) I Introduction to VLSI design, combinational and sequential logic synthesis, layout generation and optimization, logic and timing simulation, design styles. P, ECE 544 or ECE 574.


678. Integrated Telecommunications Networks (3) I Analysis and design of integrated voice, data, and image networks for integrated telecommunications applications. Protocols for LANs, ISDNs, WANS, MANs and interoperable networks. ISO-based network software design for applications. P, ECE 566, ECE 673.

688. Electromagnetics Boundary Value Problems (3) II Methods of solution of boundary value problems in electromagnetics; Green's function and eigenfunction expansion techniques; moment methods, asymptotics. P, ECE 502, ECE 581A.

693. Internship (2-3) [Rpt./]

696. Seminar b. Advanced Topics in Electrical Engineering (3) [Rpt./ 2] I II P, consent of instructor.

Bachelor of Science degrees referenced above as ABET are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Engineering Science:
Bachelor of Science in Hydrology (B.S.Hyd.)
Bachelor of Science in Engineering Mathematics (B.S.E.Ma.)
Bachelor of Science in Engineering Physics (B.S.E.Ph.)

Bachelor of Arts:
Bachelor of Arts in Engineering (B.A.)

Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Aerospace Engineering (B.S.Ae.E., M.S., Ph.D.)
Agricultural and Biosystems Engineering (B.S.A.B.E., M.S., Ph.D.)
Chemical Engineering (B.S.Ch.E., M.S., Ph.D.)
Civil Engineering (B.S.C.E., M.S., Ph.D.)
Computer Engineering (B.S.Co.E.)
Electrical & Computer Engineering (M.S., Ph.D.)
Electrical Engineering (B.S.E.E.)
Engineering with a liberal and technical education - ELITE (B.E.A.)
Engineering Mathematics (B.S.E.Ma.)
Engineering Mechanics (M.S., Ph.D.)
Engineering Physics (B.S.E.Ph.)
Environmental Engineering (M.S., Ph.D.)
Geological and Geophysical Engineering (M.S., Ph.D.)

Geological Engineering (B.S.Ge.E.)
Hydrology (B.S.Hyd., M.S., Ph.D.)
Industrial Engineering (B.S.Eng., M.S., Ph.D.)
Materials Science and Engineering (B.S.M.S.E., M.S., Ph.D.)
Mechanical Engineering (B.S.M.E., M.S., Ph.D.)
Mining Engineering (B.S.Min.E., M.S., Ph.D.)
Nuclear Engineering (M.S., Ph.D.)

Optical Engineering (B.S.Op.E.)
Reliability & Quality Engineering (M.S.)
Systems & Industrial Engineering (Ph.D.)
Systems Engineering (B.S.E.Eng., M.S., Ph.D.)
Water Resources Engineering (B.S.W.R.E.)

Specializations
Software Systems Engineering
Energy Engineering
Environmental Engineering
Manufacturing Systems Engineering
Medical and Biological Engineering
Nuclear Engineering
Preliminary

Detailed descriptions of each specialization are
196. Proseminar
Identical with W S 195C.

195. Colloquium
ENGR 102; CR, MATH 124 or MATH 125A.

170. Problem Solving Using Computers (3)
The design of problem-solving algorithms, their implementation in a structured programming language, and their application in engineering. P, ENGR 102; CR, MATH 124 or MATH 125A.

195. Colloquium
b. Materials Science and Engineering (1) II (Identical with MEE 195B, which is home).
c. Women in Science and Engineering (1) I (Identical with W S 195C).

196. Proseminar
a. Survey of Engineering Professions (1) I
b. Planning Engineering Design (1) I

h. Honors Proseminar (1) II

249. Technology and The Growth of Civilizations (3) II (Identical with ANTH 249, which is home).

251. Social Constraints on Engineering (3) I (Identical with MEE 251, which is home).

257. Materials Science of Art and Archaeological Objects (3) II (Identical with MEE 257, which is home).

258. Materials Science of Art and Archaeological Objects Laboratory (1) I (Identical with MEE 258, which is home).

265. Engineering Economic Analysis (3) (Identical with SIE 265, which is home).

320. Introduction to Computer Aided Design (3) II 1R, 6L. (Identical with ABE 320, which is home).

345. Corrosion and Degradation (3) II (Identical with MEE 435, which is home).

454. Law for Engineers/Scientists (3) II (Identical with CHEE 454, which is home). May be convened with ENGR 554.

479. Culture and Materials Technology (3) I (Identical with ANTH 479, which is home).

485. Technological Forecasting (3) I (Identical with MEE 485, which is home).

486. Technology and Society (3) I (Identical with MEE 486, which is home).

488. Scanning Electron Microscopy (3) I (Identical with MEE 488, which is home).

498. Senior Capstone (1-3) I II

501. Planning for Discovery (3) [Rpt./] II (Identical with MEE 501, which is home).

502. Research Proposal Preparation (3) [Rpt./] I (Identical with MEE 502, which is home).

554. Law for Engineers/Scientists (3) II (Identical with CHEE 554, which is home). May be convened with ENGR 454.

596. Seminar
a. Technology and Social Theory (3) II (Identical with MEE 596S, which is home).

696. Seminar
a. Science and Social Theory (3) II (Identical with SOC 696A).

ENGLISH (ENGL)

Modern Languages Bldg., Rm. 445
The University of Arizona
PO Box 210067
Tucson AZ 85721-0067
Phone: (520) 621-1836
FAX: (520) 621-7397
E-mail: ckiezel@ccit.arizona.edu
URL: http://www3.arizona.edu/~english

Baccalaureate Degree
Bachelor of Arts (B.A.)

Graduate Degrees
Master of Arts (M.A.)
Master of Fine Arts (M.F.A.)
Doctor of Philosophy (Ph.D)

 Majors and Degrees
Creative Writing (B.A., M.F.A.)
English (B.A., M.A., Ph.D.)

B.A. Options:
American literature
British literature
language and literature
literature and composition

English as a Second Language (M.A.)

Rhetoric, Composition and the Teaching of English (Ph.D.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/ interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

English (ENGL)

100. First-Year Composition (3) I II Elements of expiatory prose.

101. First-Year Composition (3) I II Exposition, emphasis on essays.

102. First-Year Composition (3) I II Critical papers on selected subjects. P, ENGL 101.

103H. First-Year Composition (3) I II Exposition for advanced students.

104H. First-Year Composition (3) I II Critical papers for advanced students. P, ENGL 103H.

106. English Composition for ESL Students (3) I II Elements for expiatory prose for ESL students. P, all entering international students must take a placement examination given at the beginning of each semester and summer session. Contact the Composition Board.

107. English Composition for ESL Students (3) I II Exposition, emphasis on essays, for ESL students. P, all entering international students must take a placement examination given at the beginning of each semester and summer session. Contact the Composition Board.

108. English Composition for ESL Students (3) I II Critical papers on selected subjects for ESL students. P, ENGL 107, all entering international students must take a placement examination.
given at the beginning of each semester and summer session. Contact the Composition Board.

109H. Advanced First-Year Composition (3) I II Critical papers. AP English score of 4 or 5.

125. Critical Concepts in Western Culture (3) [Rpt./ 2] (Identical with CCLS 125, which is home).

177. Eroticism and Love in the Middle Ages (3) I II (Identical with GER 177, which is home).

195. Colloquium
   a. Critical Reading and Writing (3) S P, open to Bio-Prep program students only.
   b. Encounters in World Literature (1) [Rpt./ 2] I

197. Workshop
   a. Thinking and Writing (3) S

199. Independent Study (1-3) [Rpt/]

207. Sophomore Composition (3) I II Exposition and critical papers.

209. Introduction to the Writing of Poetry (3) I II Beginning techniques of poetry writing, taught through exercises, the writing of original poetry, and readings in contemporary poetry. P, completion of freshman composition sequences.

210. Introduction to the Writing of Fiction (3) I II Beginning techniques of fiction writing, taught through exercises, the writing of original fiction, and readings in contemporary fiction. P, completion of freshman composition sequences.

220A. Literature of the Bible (3) I Old Testament: legendary and historical narratives, prophetic literature, and poetry. (Identical with RELI 220A).


222. The Structures and Sources of American English Words (3) I S (Identical with LING 222, which is home).

230. Introduction to African Literature (3) I II (Identical with AFAS 230, which is home).

231. Shakespeare’s Major Plays (3) I II A close reading of six to eight plays, including a comedy, a history, a tragedy, and a tragicomedy.

245. African Literature in Translation (3) II (Identical with FREN 245, which is home).


248B. Introduction to Folklore (3) II Non-verbal folklore and material culture. (Identical with AIS 248B, ANTH 248B, CCLS 248B).

250. Critical Themes in Western Literature and Culture (3) A critique of fundamental themes in the Western tradition, with attention to some other forms of both elite and popular culture and to some non-Western examples for comparison.

251A. Western Civilization, Literary Perspectives: Ancient Visions (3) Ancient Visions. A study of man and woman and their struggle in literature to find patterns and methods for self-completion. Courses need not be taken in sequence.

251B. Western Civilization, Literary Perspectives: Middle Ages through Enlightenment (3) Middle Ages through Enlightenment. Continued study of western man and woman in literature.

251C. Western Civilization, Literary Perspectives: 19th and 20th Centuries (3) 19th and 20th Centuries. Continued study of western man and woman in modern literature.

255. Introduction to the English Language (3) I Basic concepts in the study of the English language: history, semantics, phonology, morphology, syntax, and discourse. English in its social context: regional and social varieties, language acquisition, and English as an international language. Application of basic concepts to English literature, composition, and creative writing.

260. Major British Writers (3) I II Intensive study of selected works by major British writers.

261. Modern Literature (3) I II Readings in modern fiction, drama, and poetry.

265. Major American Writers (3) I II Intensive study of selected works by major American writers.

267. Continental Literature (3) I II Great works of the western literary tradition with emphasis on style, theme and cultural context. Non-European works will occasionally be included for contrast.

270. Approaches to Literature (3) I II Examines literary works for aesthetic qualities, for understanding of the historical conditions which produced them, and for insights into our contemporary world. Emphasizes major authors, major works, genres, or themes.

278. American Indian Literature (3) I I Works by and/or about American Indian writers. (Identical with AIS 278).

279. Oral Tradition (3) I II A study of oral tradition, with an emphasis on American Indian myth, legend and lore. (Identical with AIS 279).

285. Introduction to Humanities Computing (3) S (Identical with GER 285, which is home).

290. Politics and the Novel (3) I II (Identical with POL 290, which is home).

293. Internship (1-6) [Rpt./]

294. Practicum (1-6) [Rpt./]

295. Colloquium
   a. British Life and Culture (3) I II
   q. 10Q4 Creativity: A Class in Self-Expression (3) GRD (Identical with HUMS 295Q, which is home).

299. Independent Study (1-3) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./]

300. Literature and Film (3) I Comparative study of literature and cinema as aesthetic media.

301. Creative Nonfiction Writing (3) I II P, ENGL 207 or ENGL 210 or ENGL 306; consult department before enrolling.

304. Intermediate Fiction Writing (3) I II Practice in writing short fiction.


308. Technical Writing (3) I II Analysis and presentation of scientific and technical information. P, ENGL 102.


310. Studies in Literary Genre (3) [Rpt./ 1] I I The origin and evolution of the following literary genres: the novel, lyric poetry, science fiction and fantasy, the short story.

322. Word Meaning and Dictionaries (3) II (Identical with LING 322, which is home).

342. Writers, Women and the Gods: The Caribbean Novel (3) [Rpt./ 2] I (Identical with AFAS 342, which is home).

351A. Intro to Lesbian and Gay Literature (3) I (Identical with W S 351A).

351B. Intro to Lesbian and Gay Literature (3) II (Identical with W S 351B).

355. English Sociolinguistics (3) II Examines variation in English form and use as it relates to interaction factors (such as age, gender, ethnicity, role and status) utilizing both quantitative and qualitative analytic approaches. Includes world Englishes and social and regional variation as represented in literature. P, ENGL 255 or introductory course in linguistics.

370A. English Literature: From Old English to Renaissance Literature (3) I II A survey, with emphasis on major writers in their literary and historical contexts from Old English to Renaissance literature.

370B. English Literature: From Restoration to Modern Literature (3) I II A survey, with emphasis on major writers in their literary and historical contexts from Restoration to modern literature.

371A. American Literature: From the Revolutionary Period to 1900 (3) I A survey, with emphasis on writers in their literary and historical contexts from the Revolutionary Period to 1900.

371B. American Literature: From 1900 to the Present (3) I A survey, with emphasis on writers in their literary and historical contexts from 1900 to the present.

380. Literary Analysis (3) I II Introduction to the various modes, techniques, and terminology of practical criticism.

393. Internship (1-6) [Rpt./]

394. Practicum (1-6) [Rpt./]

397. Workshop
   a. Writing Workshop (1) [Rpt./ 2]
   b. Writing Workshop for International Students (1) [Rpt./ 2]

399H. Honors Independent Study (1-3) [Rpt./]

400. Themes in Literature and Film (3) I II Special topics or themes in literature and film. (Identical with M AR 400).
401. Advanced Creative Writing Nonfiction Writing (3) [Rpt./J 7] I II P, ENGL 301 or ENGL 306; consult department before enrolling. Writing-Emphasis Course for creative writing majors. May be convened with ENGL 501.

402. Advanced Fiction Writing (3) I II P, ENGL 304. Writing-Emphasis Course for creative writing majors.

403. History of the English Language (3) I II The evolution of English sounds, inflections, and vocabulary from earliest times to the present, with attention to historical conditions. (Identical with GER 405). May be convened with ENGL 505.

404. Modern English Grammar (3) Introduction to the nature of grammar and approaches to the description of English grammar, emphasizing Chomsky's transformational-generative model. Focus is on grammatical structure, but scope includes phonology and social/historical factors which influence the form and use of English in various contexts. Includes practice in phonemic transcription and sentence diagramming. P, ENGL 405. May be convened with ENGL 506.

405. Advanced Composition for International Students (3) I II Expository writing and forms of essay writing.

406. Advanced Composition for International Students (3) I II Report writing, research, and development of the longer essay.

407. English as a Second Language in Bilingual Education (3) I II Methodology for the teaching of English as a component of bilingual education. (Identical with TTE 408). May be convened with ENGL 508.

306. (Identical with TTE 410). May be convened with ENGL 506; consult department before enrolling.

306. Writing-Emphasis Course for creative writing majors.


413. Poetry in Forms (3) I Explores prosody through discussing and writing of forms and types, research paper. P, ENGL 309. May be convened with ENGL 513.

414. Advanced Scientific Writing (3) I II Preparation of professional literature for publication. May be convened with ENGL 514.

415A. Practice Creative Writing (3) I

415B. Practice Creative Writing (3) II

416. Advanced Literary Analysis (3) I What literature is and does, as exposed in theories of writing and in literary works.

417. Women and Literature (3) I I Analysis of selected writings by women, as well as representations of women in literature, with attention to social and intellectual contexts. (Identical with W S 418).


419B. Non-Fiction Prose (3) II Other prose forms. P, upper division status.

420. Studies in the Bible as Literature (3) I II Both the Old and New Testaments of the Bible as literature, legendary and historical narratives, and poetry. P, upper division status. (Identical with RELI 420).

421. American English (3) I II History of the development of American English from the colonial period to the present. Topics include regional and social varieties, language contact, and slang. Geographic atlas, social survey, and lexicographic research methods are utilized. P, ENGL 405; introduction to linguistics. May be convened with ENGL 521.

422. Studies in Southwest Literature (3) I II (Identical with AIS 424). May be convened with ENGL 524.

425A. Old English (3) I Introduction to the language and literature. (Identical with GER 425A). May be convened with ENGL 525A.

425B. Old English (3) I II Beowulf: Study of the poem in the original language. (Identical with GER 425B). May be convened with ENGL 525B.

426. Medieval English Literature (3) I Survey of Old and Medieval English literature (exclusive of Chaucer), with some use of modernized or glossed versions. May be convened with ENGL 526.

427. Chaucer (3) I II The Canterbury Tales and other poems, read in Middle English. May be convened with ENGL 527.


431A. Shakespeare (3) I II Twelve comedies, histories and tragedies from the period 1590-1600 (including Hamlet).

431B. Shakespeare (3) I II Ten comedies, tragedies and tragicomedies from the period 1601-1613. P, ENGL 431A is not prerequisite to ENGL 431B.

432. Renaissance Drama (3) I II Critical and historical survey of Marlowe, Kyd, Jonson, Greene, Dekker, Webster, Heywood, and other contemporaries of Shakespeare.

434A. Renaissance Literature (3) I Critical and historical survey of major authors, including More, Skelton, Wyatt, Sidney, and Spenser.

434B. Renaissance Literature (3) I II Bacon and Hobbes; Ben Jonson and his Tribe; Donne and the Metaphysicals; Milton.

443. Mexican-American Literature in English (3) I II Study of the literature, in English or English translation, by Mexican-American authors, or important to the development of Mexican-American literature. P, upper division status.

444. Milton (3) I II Survey of Milton's English poetry, with emphasis on Paradise Lost.

445. Introduction to TESL: Overview (2) I Development of the field of English as a second language with emphasis on current trends, the influence of linguistic theory, and the international role of English. May be convened with ENGL 545.

446. Restoration Drama (3) I Critical and historical study of major plays from Dryden to Sheridan (1660-1780).

448. The Theory and Practice of Writing (3) I (Identical with FREN 448, which is home). May be convened with ENGL 548.

449. Folklore (3) I II Forms of verbal and non-verbal folklore and material culture. (Identical with AIS 449, CCLS 449).


454. Irish Revolutionary Literature (3) I (Identical with HUMS 454, which is home).

458A. The English Novel (3) I Defoe, Richardson, Fielding, Sterne, Burney, and Austen.

458B. The English Novel (3) I Scott, the Brontes, Dickens, Thackeray, Eliot, Trollope, and Hardy. P, ENGL 458A is not prerequisite to ENGL 458B.

460A. Romantic Literature (3) I Focus on the "older" Romantics: William Blake and those born in the 1770s; Wordsworth, Coleridge, Lamb, and others.

460B. Romantic Literature (3) I Focus on the "younger" Romantics, those born in the 1790s and 90s, particularly Shelley, Keats, Byron, and others.

462. Linguistics and the Study of Literature (3) I Linguistic methods in the analysis of literature and implications of linguistic theory for the study of literature. Development of the field of English as a second language with particular attention to the development of characteristic modern techniques.

472. Modern Fiction (3) I American, British, and Continental fiction, with particular attention to the development of characteristic modern techniques.

473A. Modern British Literature (3) I Development of British fiction from the late 19th century to the present.

473B. Modern British Literature (3) II Development of British poetry from the turn of...
of course topics see ENGL 421. Graduate-level requirements include additional readings and a special topics paper. May be convened with ENGL 421.

524. Studies in Southwest Literature (3) I II For a description of course topics see ENGL 442. Graduate-level requirements include an additional term paper. (Identical with AIS 524). May be convened with ENGL 442.

525A. Old English (3) I For a description of course topics see ENGL 425A. Graduate-level requirements include an in-depth paper. (Identical with GER 525A). May be convened with ENGL 425A.

525B. Old English (3) II For a description of course topics see ENGL 425B. Graduate-level requirements include an in-depth paper.

526. Medieval English Literature (3) II For a description of course topics see ENGL 426. Graduate-level requirements include an in-depth paper. May be convened with ENGL 426.

527. Chaucer (3) II For a description of course topics see ENGL 427. Graduate-level requirements include an in-depth paper. May be convened with ENGL 427.

529. Chinese-American Literature (3) II (Identical with CHN 529, which is home). May be convened with ENGL 429.

531. Advanced Studies in Shakespeare (3) I

533. Studies in the Renaissance (3) [Rpt.]/ I

534. Advanced Studies in Milton (3) I

541. Studies in the Restoration and Eighteenth Century (3) [Rpt.]/ II

543. Mexican-American Literature in English (3) [Rpt.]/ I II Graduate-level requirements include an extra paper and leading a class discussion.

545. Introduction to TESL: Overview (2) I For a description of course topics see ENGL 445. Graduate-level requirements include an in-depth paper. May be convened with ENGL 445.

548. The Theory and Practice of Writing (3) I (Identical with FREN 548, which is home). May be convened with ENGL 448.

549A. Folklore (3) I Forms of verbal folklore. (Identical with AIS 549A, ANTH 549A, CCLS 549A).

549B. Folklore (3) II Non-verbal folklore and material culture. (Identical with AIS 549B, ANTH 549B, CCLS 549B).

550. Modern Theories of Cultural Studies (3) [Rpt.]/ I (Identical with CCLS 550, which is home).

554. Contemporary Feminist Theories (3) II (Identical with W S 554, which is home).

555A. Studies in Nineteenth-Century British Literature (3) [Rpt.]/ I The Romantics.

555B. Studies in Nineteenth-Century British Literature (3) [Rpt.]/ II The Victorians.

557A. Modern British Literature (3) [Rpt.]/ I Modern British literature.

557B. Contemporary British Literature (3) [Rpt.]/ II Contemporary British literature.
562. Linguistics and the Study of Literature (3) II For a description of course topics see ENGL 462. Graduate-level requirements include a greater number of assignments and a higher level of performance. (Identical with CCLS 562, LING 562). May be convened with ENGL 462.

565. Studies in American Literature to 1900 (3) [Rpt./ 3] I Reading course in American literatures before 1900.


577. Studies in American Indian Literature (3) I II In-depth study of works by and/or about American Indian writers. (Identical with AIS 577).

585. Linguistic and Computer-Assisted Approaches to Literature (3) II (Identical with GER 585, which is home).

587. Testing and Evaluation in Foreign/Second Language Programs (3) I II (Identical with GER 587, which is home).

591. Preceptorship (1-6) [Rpt./ 1 II

593. Internship (1-3) [Rpt./

594. Practicum (1-6) [Rpt./

595. Colloquium

a. Professional Studies (1-6) I II

596. Seminar

a. British Literature (3) [Rpt./ 8] I II

b. Studies in Colonial and Post-Colonial Literature and Theory (3) [Rpt./ 2] I II

c. American Literature (3) [Rpt./ 8] I II

d. Comparative Literature (3) [Rpt./ 4] I II (Identical with CCLS 596G).

f. Modern Literature (3) [Rpt./ 1] I II P, open to creative writing majors only.

g. Germanic Linguistics (3) [Rpt./ 1] I II

h. Second Language Acquisition Research (3) [Rpt./ 2] I II P, ENGL 506. (Identical with FREN 596G).

i. Methods and Materials of Literary Research (3) [Rpt./ 1] I II

j. Theories of Criticism (3) [Rpt./ 2] I II

k. Studies in the Oral Tradition (3) [Rpt./ 2] I II (Identical with AIS 596M).

l. Discourse Analysis (3) [Rpt./ 3 units] I II

m. Topics in Second Language Teaching (3) [Rpt./ 2] I II P, ENGL 613 or equivalent.

n. Contrastive Rhetoric (3) [Rpt./ 2] II S P, graduate status.

o. Women’s Studies (3) [Rpt./ 2] I II (Identical with WS 596W).

597. Workshop

a. Southern Arizona Writing Project (3-9) [Rpt./ 12 units] I II (Identical with LRC 597A).

b. The Teaching of English (3) [Rpt./ 1]

(Identical with LRC 597O).

c. Research and Composition (3) II

599. Independent Study (1-6) [Rpt./

604. Writing Project in Fiction (1-6) [Rpt./ 12 units] I II For M.F.A candidates working toward book-length writing project in fiction. P, for M.F.A. candidates working toward book-length writing project in fiction.

609. Writing Project in Poetry (1-6) [Rpt./ 12 units] I II For M.F.A candidates working toward book-length writing project in poetry. P, for M.F.A. candidates working toward book-length writing project in poetry.

612. Grammatical Analysis (3) I English grammatical analysis in relation to the acquisition of English as a second language. P, ENGL 406 or ENGL 506 or an introductory linguistics course. (Identical with LRC 612).

613. Methods of Teaching English to Speakers of Other Languages (3) I Foundations, theory, and methodology in English as a second language. (Identical with LRC 613).

614. Literature in Second Language Teaching (3) I I Survey of major perspectives on second language acquisition processes, including interlanguage theory, the Monitor Model, acculturation/pidgin-ization theory, cognitive/ connectionist theory, and linguistic universals. Analysis of research from the different perspectives includes consideration of grammatical, pragmatic, and sociolinguistic dimensions of language learning. P, ENGL 506.


693. Internship

a. Applied ESL (3) [Rpt./ 1] I II P, ENGL 613; ENGL 612.

696. Seminar

b. Linguistics (2-4) I II (Identical with GER 696B).

c. History of Rhetoric (3) [Rpt./ 6] I II

d. Studies in Rhetoric and Composition (3) [Rpt./ 6]

794. Practicum (1-6) [Rpt./

900. Research (1-3) [Rpt./

909. Master’s Report (1-6) [Rpt./

910. Thesis (1-3) [Rpt./

920. Dissertation (1-9) [Rpt./

930. Supplementary Registration (1-9) [Rpt./

ENTOMOLOGY (ENTO)

Forbes Bldg., Rm. 410
The University of Arizona
PO Box 210033
Tucson AZ 85721-0036
Phone: (520) 621-1151
FAX: (520) 621-1150
E-mail: rkilby@ag.arizona.edu
URL: http://ag.arizona.edu/

Baccalaureate Degree

No baccalaureate degrees are offered.

Graduate Degrees

Master of Science (M.S.)

Doctor of Philosophy (Ph.D.)

Major and Degrees

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

Program Requirements

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Entomology (ENTO)

151L. Insects and Society Laboratory (1) I Provides hands-on experience with arthropods introduced in 151R, including basic disciplines and practical applications in urban, medical and agricultural entomology. Collection field trips.

151R. Insects and Society (3) I Introduction to the biology, ecology, and management of insects affecting man and his interests. Intended for non-majors.


195. Colloquium

a. Exploring Biology (1) I II

b. Agriculture As a Science (1) I II (Identical with PL S 195B, which is home).

202. Applied Entomology (3) [Rpt./ 1] I Survey of insect pests of crops and domestic animals, in the forest and urban environments, and as vectors of plant and animal diseases. Control of insects using pesticides and biological methods and the public debate over insect control will be discussed. 2R, 3L. Field trips.

205. The Universe of Insects (4) I Learn about biology from the point of view of the most diverse and fascinating animals on earth.

299. Independent Study (1-3) [Rpt./

393. Internship (1-6) [Rpt./

399. Independent Study (1-3) [Rpt./

402. Agriculture and the Environment: Focus on Pesticides (3) II (Identical with AGTM 402, which is home). May be convened with ENTO 502.

403L. Parasitology Laboratory (1) I (Identical with V SC 403L, which is home). May be convened with ENTO 503L.

403R. Biology of Animal Parasites (3) I (Identical with V SC 403R, which is home). May be convened with ENTO 503R.

404. Physiological Systems (3) I (Identical with ECOL 404, which is home).

405. Aquatic Entomology (4) II Morphological, physiological and behavioral adaptations of insects to life in water; taxonomy and ecology of aquatic insects. 2R, 3L. Field trips. P, ECOL 182. (Identical with ECOL 405, WSC 405). May be convened with ENTO 505.

408. Insect Toxicology (3) II Introduction to
the interactions of insects with natural and synthetic toxicants; metabolism, mode of action and resistance of insects to insecticides. P, 3 units of organic chemistry or biochemistry. (Identical with PCOL 408). May be convened with ENTO 508.

411. Insect Behavior (4) I II Survey of the behavioral solutions to ecological problems employed by insects and other terrestrial arthropods. Emphasis on patterns highly developed or uniquely expressed in the insects such as social behavior, chemical communication, diet choice, pollination ecology, and parasitoid host finding. Evolutionary perspective, models, and theory. Student research exercises and projects. Field trips. (Identical with ECOL 411, INSC 411). May be convened with ENTO 511.

414. Bee Biology and Pollination (2) II Fundamentals of pollination ecology with emphasis on bees as pollinators. A comprehensive review of the biology of all life stages of honey bees and honey bee colony management strategies. Field trips. P, one course in biology. May be convened with ENTO 514.

415L. Insect Biology Laboratory (1) I Survey of insect diversity through identification, classification, morphology and anatomy. P, ECOL 182. (Identical with ECOL 415L). May be convened with ENTO 515L.

415R. Insect Biology (3) I Insects and other land arthropods, their functional anatomy, perception of the environment, relationships to other animals and plants. Insect classification and taxonomy to order and major families. P, ECOL 182. (Identical with ECOL 415R). May be convened with ENTO 515R.


427. Insect Chemical Ecology (4) I The chemistry of relationships regulating insect growth, development, reproduction, diapause and communication. Derivation of biorational methods of insect control. Laboratory includes experience with modern instrumentation focused on the isolation, identification and biological assay of natural products. 3R, 3L. P, ENTO 507 or equivalent, and 3 units of organic or biochemistry. (Identical with V SC 427). May be convened with ENTO 527.

433. Teaching Biology Labs (2) II (Identical with BIOL 433, which is home). May be convened with ENTO 533.

444. Insect Ecology (3) I The study of how variation in the environment, interactions with other species and the special features of insect "design," have determined the evolution of diverse insect life histories, the dynamics of insect population and the roles of insects in communities. 2R, 3L. Field trips and project. (Identical with ECOL 444). May be convened with ENTO 544.

452. Medical-Veterinary Entomology (4) [Rpt./3] II Survey of arthropods of public health and veterinary importance with emphasis on transmission dynamics of pathogens, bionomics of vector populations, and current control concepts. P, parasitology recommended. (Identical with V SC 452). May be convened with ENTO 552.

465. Phylogenetic Biology (3) I (Identical with ECOL 465, which is home). May be convened with ENTO 565.

468. Insect Pest Management (3) I Principles underlying the management of arthropods in agricultural systems. May be convened with ENTO 568.

470. Biological Control (3) I Lecture and discussion of the theory and practice of the biological control of insects, weed, and plant pathogen pests. P, ECOL 444 or equivalent. May be convened with ENTO 570.

493. Internship (1-3) I II

494. Practicum

94. Research (3) [Rpt./2] II P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

496. Seminar

a. Entomology (1) [Rpt./6] I II May be convened with ENTO 596A.

b. Medical-Veterinary Entomology (1) I P, ENTO 452. May be convened with 596B.

c. Topics in Insect Diversity (Rpt./5) (2) I II May be convened with ENTO 596E.

d. Plant-Insect Interactions (1) [Rpt./5] I II May be convened with ENTO 596D.

e. Insect Physiology, Biochemistry, Toxicology (1) [Rpt./5] I II May be convened with ENTO 596E.

f. Topics in Pest Management (1) [Rpt./5] I II May be convened with ENTO 596F.

g. Ecology, Epidemiology and Control of Vector-Borne Diseases (1-3) [Rpt./5] I II May be convened with ENTO 596G.

498. Senior Capstone (1-3) I II

499. Independent Study (1-5) [Rpt.] 502. Agriculture and the environment: Focus on Pesticides (3) II (Identical with AGTM 502, which is home). May be convened with ENTO 402.

503L. Parasite Laboratory (1) I (Identical with V SC 503L, which is home). May be convened with ENTO 403L.

503R. Biology of Animal Parasites (3) I (Identical with V SC 503R, which is home). May be convened with ENTO 403R.

505. Aquatic Entomology (4) I For a description of course topics see ENTO 405. Graduate-level requirements include an original research or review paper on some aspect of aquatic entomology agreed upon by the student and the professor. Field trips. P, ECOL 182. (Identical with ECOL 505, ECOL 505, INSC 505, INSC 505, WFSIC 505, WFSIC 505). May be convened with ENTO 405.

507. Insect Physiology (3) I II Introduction to the diverse and unique ways insects solve physiological problems. A whole-animal approach will be used centered around various aspects of an insect's life (e.g., growing, flying, reproducing). P, CR, ENTO 407L; biochemistry recommended. (Identical with INSC 507).

508. Insect Toxicology (3) II For a description of course topics see ENTO 408. For a description of course topics see 408. Graduate-level requirements include additional in-depth material. P, 3 units of organic chemistry or biochemistry. (Identical with INSC 508, PCOL 508). May be convened with ENTO 408.

511. Insect Behavior (4) I II For a description of course topics see ENTO 411. Graduate-level requirements include a written literature review and oral presentation of a selected topic. Field trips. (Identical with ECOL 511, INSC 511). May be convened with ENTO 411.

512. Biological Electron Microscopy (4) I II (Identical with MCB 512, which is home).

514. Bee Biology and Pollination (2) II For a description of course topics see ENTO 414. Graduate-level requirements include a research paper on some topic of bee biology or pollination, terminating with an oral presentation. May be convened with ENTO 414.

515L. Insect Biology Laboratory (1) I For a description of course topics see ENTO 415L. Graduate-level requirements include making a larger insect collection. P, ECOL 182. (Identical with ECOL 515L, INSC 515L). May be convened with ENTO 415L.

515R. Insect Biology (3) I For a description of course topics see ENTO 415R. Graduate-level requirements include submission of reports on landmark papers in insect biology. P, ECOL 182. (Identical with ECOL 515R, INSC 515R). May be convened with ENTO 415R.

517. Insect Systematics (4) I For a description of course topics see ENTO 417. Graduate-level requirements include a written literature review and oral presentation of a selected topic. 3R, 3L. Field trips. (Identical with ECOL 517, INSC 517). May be convened with ENTO 417.

518. Laboratory Methods in Insect Physiology (3) II (Identical with INSC 518, which is home).

527. Insect Chemical Ecology (4) I For a description of course topics see ENTO 427. Graduate-level requirement includes a written project report. (Identical with V SC 527). May be convened with ENTO 427.

533. Teaching Biology Labs (2) II (Identical with BIOL 533, which is home). May be convened with ENTO 433.

544. Insect Ecology (3) I For a description of course topics see ENTO 444. Graduate-level requirements include an independent research project and a literature review paper. Field trips and a project. (Identical with ECOL 544, INSC 544). May be convened with ENTO 444.

552. Medical-Veterinary Entomology (4) [Rpt./3] II For a description of course topics see ENTO 452. Graduate-level requirements include a written review of contemporary journal...
900. Research (1-3) [Rpt./]


c. Advanced Epidemiology (3) I Study of computer intensive multivariate epidemiologic methods including evaluation of potential etiologic environmental exposures in human populations to the rise of disease. 2R, IL, P, EPI 596A, EPI 596B, EPI 576A, EPI 576B and advanced standing.

900. Research (1-3)

910. Thesis (1-6) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

ENVIRONMENTAL SCIENCE

The undergraduate major is interdisciplinary and leads to the Bachelor of Science degree in Environmental Science. The program is administered by the Department of Soil, Water, and Environmental Sciences. Contact the department for more information.

EPIDEMIOLOGY (EPI)

College of Medicine
Arizona Prevention Center
AHSC 4411
The University of Arizona
PO Box 245163
Tucson AZ 85724-5163
Phone: (520) 626-6379
FAX: (520) 626-6093
E-mail: epiadmit@resp-sci.arizona.edu
URL: http://grad.admin.arizona.edu/idps/epi/epi.html

Baccalaureate Degree
No baccalaureate degrees are offered.

Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Major and Degrees
Epidemiology (M.S., Ph.D.)

Program Requirements
For graduate program requirements consult the Graduate Catalog and the department office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Epidemiology (EPI)

594. Practicum (1-5) [Rpt./] I II

576B. Biostatistics for Research (3) II

Descriptive statistics and statistical inference relevant to biomedical research, including data analysis, regression and correlation analysis, analysis of variance, survival analysis, biological assay, statistical methods for epidemiology and statistical evaluation of clinical literature.

596. Seminar

a. Basic Principles of Epidemiology (3) [Rpt./] I II

b. Epidemiologic Methods (3) I II P, EPI 596A and EPI 576A.

c. Advanced Epidemiology (3) I Study of computer intensive multivariate epidemiologic methods including evaluation of potential etiologic environmental exposures in human populations to the rise of disease. 2R, IL, P, EPI 596A, EPI 596B, EPI 576A, EPI 576B and advanced standing.

900. Research (1-3)

910. Thesis (1-6) [Rpt./] I II

920. Dissertation (1-9) [Rpt./]

FAMILY AND COMMUNITY MEDICINE (FCM)

For information about family and community medicine courses, see the entry for the College of Medicine in this manual.

THE SCHOOL OF FAMILY AND CONSUMER RESOURCES (FCS/F S/ RCS)

Family and Consumer Resources Bldg
Rm. 205
The University of Arizona
PO Box 210033
Tucson AZ 85721-0033
Phone: (520) 621-1075
FAX: (520) 621-9445
Family & Consumer Resources—Family Studies

URL: http://ag.arizona.edu/FCR/FCRhome.html

Baccalaureate Degree
Bachelor of Science in Family and Consumer Resources (B.S.F.)

Graduate Degrees
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Family and Consumer Resources (M.S., Ph.D.)

Family and Consumer Sciences Education (B.S.F., M.S.)

Family Studies (B.S.F.)

Retailing and Consumer Studies (B.S.F.)

Program Requirements
For undergraduate academic program requirements, consult the On Course Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available online at http://www.arizona.edu/academic/oncourse/data/department/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the online catalog or contact the department at one of the addresses above.

Family and Consumer Resources (FCR)

120. Microcomputing Applications (3) I II 1R, 6L. (Identical with ABE 120, which is home).

193. Internship (1-12) [Rpt.]

194. Practicum (2) [Rpt.] II

195. Colloquium
a. Individual Development and Academic Success (1) I

197. Workshop
a. The Science of Human Development (1) S P. open to participants in the Horizons Unlimited Summer Program only. Field trips.

294. Practicum (1-8) [Rpt.]

297. Workshop
a. Self and the World of Work (1) I II
b. Student Executive Training in Higher Education (2) II
c. Student Assistant in College Residence Halls (1) I

299. Independent Study (1-3) [Rpt.]

299H. Honors Independent Study (3) [Rpt.] II I II

393. Internship (1-3) [Rpt.]

394. Practicum (1-8) [Rpt.]

396. Proseminar
h. Honors Proseminar (1) II

399. Independent Study (1-3) [Rpt.]

399H. Honors Independent Study (1-3) [Rpt.]

465. Women in International Development (3) II (Identical with ANTH 465, which is home). May be convened with FCR 465.

493. Internship
1. Legislative Internship (1-12)

494. Practicum
r. Research (3) [Rpt.] I II P. ENGL 101, MATH 117, ABE 120, consent of instructor.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt.] I II

499. Independent Study (1-3) [Rpt.]

499H. Honors Independent Study (3) [Rpt.] II I II

565. Women in International Development (3) II (Identical with ANTH 565, which is home). May be convened with FCR 465.

593. Internship (1-6) [Rpt.] I II

594. Practicum (1-4)

599. Independent Study (1-5) [Rpt.]

693. Internship (1-12) [Rpt.]

694. Practicum (1-8) [Rpt.]

695. Colloquium
a. Advanced Professional Teaching Development (1) I
b. Advanced Professional Research Development (1) I
c. Advanced Professional Leadership Development (1) I

696. Seminar
z. Family and Consumer Resources (1-3) [Rpt./6 units] I II

699. Independent Study (1-5) [Rpt.]

900. Research (2-8) [Rpt.]

909. Master's Report (1-6) [Rpt.]

910. Thesis (2-6) [Rpt.]

920. Dissertation (1-4)

930. Supplementary Registration (1-9) [Rpt.]

Family Studies (FS)

117. Human Development and Relations (3) I II Behavioral science approach to human development through the life span.

137. Life Span Family Relations (3) I II Behavioral science approach to family development through the life span.

193. Internship (1-12) [Rpt.]

194. Practicum (1-6) I II

199. Independent Study (1-6) [Rpt.]

223. Infancy/Child Development (3) I II Growth, development, and socialization of the child within the family setting, from conception to the middle school years; observations of infants and preschoolers. P, FS 117, PSYC 101.

288. Observation/Participation in Family and Consumer Science Education (3) II Functions and characteristics of family and consumer sciences education and family educators in school- and community-based programs; structuring learning settings to meet student/client needs.

293. Internship (1-3)

294. Practicum (1-8) [Rpt.]

299. Independent Study (1-3) [Rpt.]

299H. Honors Independent Study (1-4)

337. Dynamics of Family Relations (3) I II The modern family and its relationships with emphasis on marriage and interpersonal relationships. P, FS 117, FS 137.


377. Adolescence (3) I Growth, development and socialization of the child from the middle school years through adolescence. P, FS 117, PSYC 101.

393. Internship (1-3)

394. Practicum (1-8) [Rpt.]

399. Independent Study (1-3) [Rpt.]

399H. Honors Independent Study (1-3) [Rpt.]

401. Basic Skills in Counseling (3) S Selected counseling skills and their applications to non-counseling settings. Designed for non-majors needing basic skills in counseling as an adjunct to other primary occupational functions. P, 6 units of social science.

403. Preadolescence and Adolescent Development (3) II (Identical with ED P 403, which is home).

405. Principles in Adlerian Psychology (3) S Techniques for the study of human behavior; implications for improving adult-child relationships, with emphasis on Adlerian principles. P, 6 units of social science. May be convened with FS 505.

407. Problems in Child Development (3) II


409. Occupational Family and Consumer Sciences Program (3) I Purposes and methods of teaching family and consumer science-related occupations, with emphasis on collaborative approaches. May be convened with FS 509.

411. Consumer Issues on Nutrition (3) S (Identical with NSC 411, which is home).

413. Issues in Aging (3) II Introduction to gerontology, with emphasis upon contemporary issues. (Identical with GER 413).

415. The Design of the Mind: Genes, Adaptation, and Behavior (3) I (Identical with PSYC 415, which is home). May be convened with FS 515.

427. Problems in Human Development and Family Relations (3) I Identification and analysis of major problem areas in marriage and
the family, including economic, sexual, role conflict, emotional disorders, and child rearing. P FS 337.

428. Professional Presentations and Techniques (3) I II Theory and practice of educational techniques in non-formal settings in positions in business, government and human services. May be convened with FS 528.

439. Non-Formal Education (3) II (Identical with A ED 439, which is home). May be convened with FS 539.


457. Bio-Social Determinants of Socialization (3) II Bio-social factors, including genetic influences, related to human development, socialization, and cross-cultural patterns of behavior. P, FS 223, 6 units of child development or PSYC or SOC. Writing-Emphasis Course. (Identical with SOC 457).

458. Violence and Youth (3) I (Identical with PSYC 458, which is home). May be convened with FS 558.

466. Family Economics (3) I Analysis of the family as an economic-decision-making unit within the larger economic system. P, ECON 201B. May be convened with FS 566.

477. Genetic Basis of Normal and Deviant (3) II Explores methods of studying genetic influences on human traits and summarizes research findings on normal traits, such as sociability and IQ, and on deviant traits such as criminality. Implications for the fields of family studies, sociology, and psychology are considered. May be convened with FS 577.

487. Advanced Family Relations (3) II Critical analysis of selected studies and current research in family relations. P, FS 337 or SOC 321. Writing-Emphasis Course. May be convened with FS 587.

489. Teaching in Family and Consumer Sciences Education (1) II Teaching vocational family and consumer sciences under supervision in approved programs in secondary schools in Arizona. Pre-registration first semester of the junior year. P, FS 228, FS 338G, pre-registration first semester of the junior year; CR, FS 408, FS 428.

493. Internship (1-12) [Rpt./]

493. Internship

a. Family Life Education (1-8) [Rpt./ 24 units] II 1. Legislative Internship (1-12)

494. Practicum (1-8) [Rpt./]

494. Practicum

r. Research (3) [Rpt./ I II P, ENGL 101, MATH 117, ABE 120, consent of instructor.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ 2]

499. Independent Study (1-3) [Rpt./]

499H. Honors Independent Study (3) [Rpt./]

500. Life Span Development (3) (Identical with ED P 500, which is home).

503. Advanced Adolescent Development (3) II (Identical with ED P 503, which is home).

505. Principles in Adlerian Psychology (3) S For a description of course topics see FS 405. For a description of course topics see FS 403. Graduate-level requirements include an additional research paper dealing with a theoretical aspect of Adlerian psychology. May be convened with FS 405.

507A. Research Methods in Family Studies (3) I Design issues of general relevance to behavioral research.

507B. Research Methods in Family Studies (3) I Design issues of particular relevance to family and developmental research.

509. Occupational Family and Consumer Sciences Program (3) I For a description of course topics see FS 409. Graduate-level requirements include developing two evaluation instruments (one affective and one psychomotor) and developing two sets of teaching materials, e.g., job training manual. May be convened with FS 409.

515. The Design of the Mind: Genes, Adaptation, and Behavior (3) I (Identical with PSYC 515, which is home). May be convened with FS 415.

523. Socio-Cultural Context of Human Development (3) II Graduate-level requirements include an analysis of the research literature. (Identical with ED P 523).

528. Professional Presentations and Techniques (3) I II For a description of course topics see FS 428. Graduate-level requirements include a paper and a 30 to 45-minute presentation on a topic from the outline. In addition, graduate students must design an educational program tailor-made to their interest. May be convened with FS 428.

537. Analysis of Family Studies (3) I An analysis of major research topics; critical resources relevant to graduate training; and ethical/professional issues related to the conduct of research.

539. Non-Formal Education (3) I (Identical with A ED 539, which is home). May be convened with FS 439.

546. Foundations of Family and Interpersonal Theory (3) II Analysis of theories relevant to family behavior including formation, development and internal processes. Course will focus on developing knowledge of world views, assumptions, themes, concepts, and interrelationships of the theories. P, 6 units of FS, PSYC, or SOC.

554. Advanced Child Development (3) I Graduate-level requirements include additional assignments.

555. Addictions Counseling (3) S An analysis of issues in addictions counseling ranging from various theoretical positions, information regarding diagnosis of addictive personality, treatment programs, and research. P, 6 units of counseling or related area.

557. Methods in Marital Therapy (3) I I Theories and principles of counseling for premartial, marital, and group counseling situations.

558. Violence and Youth (3) I (Identical with PSYC 558, which is home). May be convened with FS 458.

566. Family Economics (3) I For a description of course topics see FS 466. Graduate-level requirements include extra required readings and an in-depth term paper. May be convened with FS 466.

567. Theories of Human Development (3) II Analysis of major paradigms and world views influencing the study of human development. Overview of key issues and controversies arising in the field as well as evaluations of specific theories and specific theorists.

570. Counseling the Adult (3) I Adult crisis, midlife changes and developmental patterns; counseling techniques and intervention strategies. P, 6 units of counseling or related area.

571. Counseling Woman (3) II Examination of the counseling needs of contemporary women and current types of intervention designed to meet these needs. P, 6 units of counseling or related area. (Identical with W S 571).

573. Applications of Family and Interpersonal Theory (3) II Identification of current issues in family and interpersonal relationships and the application of selected theories and research to the analysis of the issues. P, 6 units of FS, PSYC, or SOC.

577. Genetic Basis of Normal and Deviant (3) II For a description of course topics see FS 477. Graduate-level requirements include extra required readings and an in-depth term paper. May be convened with FS 477.

587. Advanced Family Relations (3) II For a description of course topics see FS 487. Graduate-level requirements include extra required readings and an in-depth term paper. May be convened with FS 487.

593. Internship (1-12) [Rpt./]

594. Practicum (1-3) [Rpt./] I II

597. Workshop
d. Counseling Children and Adolescents (3) S
f. Professional Relationships: Building Cooperation and Mediating Conflict (3)
g. Instructional Advances in Vocational/Technical Education (1-3) [Rpt./ 12 units] (Identical with A ED 597G, which is home).
h. Family Development through Family & Consumer Sciences Education Programs (1-2) I II
j. Anger, Depression and Guilt (3) S P, 6 units of counseling or related area.
k. Psychodrama (3) S P, 6 units of counseling or related area.
m. Counseling Mexican Americans (3) I S (Identical with SER 597M).
t. Instructional Advances in Non-Formal Education (1-3) [Rpt./ 12 units] (Identical with AED 597T, which is home).

599. Independent Study (1-3) [Rpt./]

601. Foundations of Counseling (3) I Relationship and contributions of various fields to the work of the counselor at all levels, in current and historical perspective; derivation of principles and objectives; integrated laboratory experience in selected settings.

602. Topics in Family Studies (1-3) [Rpt./ 12 units] I II Variable content: contemporary issues, middle childhood, and others.

610. Studies in Family and Consumer Sciences Education (3) I Study and analysis of research literature, methods, techniques, and procedures for conducting investigations, selecting and developing plans for research problems.

613. Family Issues in Aging (3) I II Critical analysis of selected family and social issues, and related current research in gerontology. (Identical with GERO 613).

622. Appraisal of the Individual (3) I Methods of appraising and reporting individual behavior, with emphasis on nonpsychometric data.

623. Testing in Counseling (3) I Evaluation and selection of psychological tests for guidance; use of psychometric data in counseling. Open to majors only.

631. Career Counseling (3) I Theories of vocational development; types, sources, and use of occupational and educational information in career counseling and decision making. P, FS 601 or FS 601.

635. Economics of Aging (3) I Analysis of economic issues, policies as they affect the aging individual, family and society. (Identical with GERO 635).

637. Trends in Human Relations (3) I Philosophical, content, and resources for understanding, teaching and working in the field of human relations.

644. The Counseling Process (3) I Introduction to theories of counseling; collation and interpretation of counseling data; the counseling process; study of cases. P, FS 601, FS 602.

645. Theories of Counseling (3) I Rationale, development, and research underling major counseling theories. P, FS 631, FS 644.

647. Premarriage and Marriage Counseling (3) I Contemporary issues, concepts, and procedures in premarriage and marriage counseling. P, FS 622.


672. Cross-Cultural Counseling (3) I Issues, research and procedures involved in counsel-
624. Advanced Services Retailing (3) I Investigation of retailing that involves the sale of services to the ultimate customer as well as the customer-service aspect of product retailing. Examines various aspects of management and strategy development in services retailing. P, MKTG 361, MKTG 400 or CR MKTG 400.

634. Retail Merchandising Analysis (3) I Analysis of research and case studies related to retail management and planning issues. Topics covered include theories of institutional change, consumer patronage behavior, strategic planning, store atmosphere, retailer information systems, merchandise planning, control, distribution, and buying, pricing, location, and customer support services. P, MKTG 361, MKTG 400 or CR MKTG 400.

656. Consumer Socialization (3) S An analysis of the process by which consumers acquire consumption-related skills, cognition, knowledge, attitudes, and behavior from a life-cycle perspective.

676. Theoretical Application in Retail Management (3) I Analysis of theoretical applications in retail management focusing on particular issues in retail management and consumer studies.

693. Internship (1-12) I II

694. Practicum (1-8) [Rpt.] I II

695. Colloquium
a. Advanced Professional Teaching Development (1) I II
b. Advanced Professional Research Development (1) I II
c. Advanced Professional Leadership Development (1) I II

699. Honors Independent Study (1-3) [Rpt.] I II

546. International Consumption and Retailing (3) II For a description of course topics see RCS 446. Graduate level requirements include an in-depth research paper or project. May be convened with RCS 424.

534. Strategic Retail Management (3) II For a description of course topics see RCS 434. Graduate-level requirements include an in-depth research paper or project. May be convened with RCS 434.

546. International Consumption and Retailing (3) II For a description of course topics see RCS 446. Graduate level requirements include an in-depth research paper or project. May be convened with RCS 446.

558. Visual Merchandising and Display (3) I S All aspects of displaying merchandise, including window display, interior display, color and lighting techniques, line and composition, three-dimensional presentation, fixtures and systems, planning and layout. P, RCS 115 or ART 101.

593. Internship (1-3) I II

594. Practicum (1-3)

599. Independent Study (1-5) [Rpt.] I II

606. Advanced International Consumption and Retailing (3) I Analysis of major retailer’s strategies; retailing environments in specific regions of the world. Implementation of international strategies utilizing the case methods. P, RCS 446 or equivalent.

607. Topics in Merchandising and Retailing (3) [Rpt./4] II Analysis of current major topics or issues facing merchandising and retailing industries. P, RCS 606.

614. Non-Store Retailing (3) II Investigation of retailing that does not involve conventional store facilities, including catalog retailing, telemarketing, and home shopping. Various aspects of management and strategic development of non-store retailing operations. P, MKTG 361, MKTG 400 or CR MKTG 400.

624. Advanced Services Retailing (3) I Investigation of retailing that involves the sale of services to the ultimate customer as well as the

FINANCE (FIN)

McClendon Hall, Rm. 315R
The University of Arizona
PO Box 210108
Tucson, AZ 85721-0108
Phone: (520) 621-7554
Fax: (520) 621-1261
E-mail: gthompson@bpa.arizona.edu
URL: http://www.bpa.arizona.edu/bpa_departments/fin/index.html

Baccalaureate Degree
Bachelor of Science in Business Administration (B.S.B.A.)

Graduate Degrees
Doctor of Philosophy (Ph.D.)

Major and Degree
Finance (B.S.B.A.)

Management (Ph.D.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on-line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on-line at: http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Finance (FIN)

195. Colloquium
a. First-Year Colloquium (1) I P, open to freshmen only.

299. Independent Study (1-3) [Rpt.] I II

311. Corporation Finance (3) I II Financial problems involved in the organization and conduct of business enterprise. P, ECON 200 or ECON 201B; ACCT 210. Open only to students with Advanced Standing in the College of Business and Public Administration.

313. Economics of Futures Markets (3) I II (Identical with AREC 313, which is home). Open only to students with Advanced Standing in the College of Business and Public Administration.

393. Internship (1-3) [Rpt.] I II

399. Independent Study (1-5) [Rpt.] I II

399H. Honors Independent Study (1-3) [Rpt.] I II

399I. Internship (1-3) [Rpt.] I II

412. Corporate Financial Problems (3) I II Advanced financial problems of the firm: capital structure, valuation, reorganization, recapitalization, growth, and failure. P, FIN 311, MAP 376. Open only to students with Advanced Standing in the College of Business & Public Administration.


421. Investments (3) I II Operation and analysis of the stock, bond, and commodity markets; theory and practice in construction and management of investment alternatives. P, ACCT 305 or MAP 376; FIN 311. Open only to students with Advanced Standing in the College of Business & Public Administration.

431. Financial Intermediaries (3) I II Financial markets and institutions; effects of economic conditions and government policy on financial institutions, the flow of funds, and interest rates; term structure of interest rates; financial institution management. P, ECON 330; FIN 311, MAP 376. Open only to students with Advanced Standing in the College of Business & Public Administration.
444. International Financial Management (3) II (Identical with ECON 444, which is home). Open only to students with Advanced Standing in the College of Business & Public Administration.

460. Real Estate Finance and Investment (3) I II Investment analysis of real estate. Sources and costs of financing. Secondary markets and government programs. P, FIN 261, FIN 311. Open only to students with Advanced Standing in the College of Business & Public Administration.

471. Policy Formation and the Finance Function (3) (I) II Integrative course utilizing the case study approach and focusing on the financial impact of marketing and production strategies. Writing Emphasis Course. P, FIN 412, MAP 305, MKTG 361, credit only for one of: ACCT 471, FIN 471, MAP 471, MIS 471, or MKTG 471.

480. New Venture Market and Finance (4) (Identical with MKTG 480, which is home).


484. Development of New Venture Plans (4) II (Identical with MAP 484, which is home).

493. Internship

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ 2] I II

499. Independent Study (1-3) [Rpt./]

499H. Honors Independent Study (3) [Rpt./ I II

511. Managerial Finance (3) I II Integration of the basic principles and underlying theory of finance, with emphasis on analytical financial management of business firms and other organizations. Open only to students admitted to a BPA graduate program. P, ACCT 550.

512. Advanced Corporation Finance (3) II Financial theory applied to capital structure; investment decisions; corporate valuation; and corporate financial policies. P, FIN 412 or FIN 511.


518. Investment Banking (3) I Examines the role of financial institutions and economic activities. In-depth evaluation analysis recognizing that the value of assets may depend on who controls them. P, FIN 511.


528. Topics in Public and Nonprofit Financial Management (3) II (Identical with PA 528, which is home).


536. Venture Finance and New Markets (3) (Identical with MKTG 536, which is home).

539. Planning of New Ventures (3) II (Identical with MAP 539, which is home).


599. Independent Study (1-4) [Rpt./]


601. Financial Decision Making Under Uncertainty (3) II Theoretical and empirical economics relating to uncertainty in markets, information, and choice.


695. Colloquium

a. Investments (1-3) [Rpt./15 units] I II

696. Seminar

a. Investments (3) [Rpt./] I II

b. Financial Markets (3) [Rpt./] I II
c. Taxation (1-3) I II (Identical with ACCT 696C, which is home).
d. Accounting Theory (1-3) I II (Identical with ACCT 696D, which is home).
e. Corporate Finance (3) [Rpt./] I II

f. Financial Institutions (3) [Rpt./] I II
g. Financial Theory (3) [Rpt./] I II

h. Research Methods (3) [Rpt./] I II

697. Workshop

a. Research Issues (1-3) [Rpt./] I II P, admission to a graduate program in BPA.

699. Independent Study (1-4) [Rpt./]

900. Research (1-4) [Rpt./]

909. Master's Report (3) [Rpt./]

910. Thesis (3-6) [Rpt./]

920. Dissertation (3-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

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**COLLEGE OF FINE ARTS**

Music Building, Room 113
The University of Arizona
PO Box 210004
Tucson AZ 85721-0004
Phone: (520) 621-1301
FAX: (520) 621-1307
E-mail: finearts@u.arizona.edu
URL: http://arts.music.arizona.edu/

The College of Fine Arts offers opportunities for training, research and experimentation in the arts, in programs directed by a faculty of practicing professionals and scholars. The college prepares students to be artists and scholars who generate innovative methods and aesthetic concepts, using formal tradition, and cultural heritage to interpret and create in contemporary society.

**Baccalaureate Degrees**

Bachelor of Arts (B.A.)
Bachelor of Fine Arts (B.F.A.)
Bachelor of Music (B.M.)

**Graduate Degrees**

Master of Arts (M.A.)
Master of Fine Arts (M.F.A.)
Master of Music (M.M.)
Doctor of Musical Arts (D.M.A.)
Doctor of Philosophy (Ph.D.)

**Majors and Degrees**

Art (M.F.A.)
Art Education (B.F.A., M.A.)
Art History (B.A., M.A.)
Composition (M.M., D.M.A.)
Conducting (D.M.A.)
Dance (B.F.A.)
Dramatic Theory (B.A.)
Fine Arts Studies (B.F.A.)*
Media Arts (B.A., B.F.A., M.A.)
Music (B.A.)
Musical Theatre (B.F.A.)
Music Education (B.M., M.M., Ph.D.)
Musicology (M.M.)
Music Theory (M.M., Ph.D.)
Performance (B.M., M.M., D.M.A.)
Studio Art (B.F.A.)
Theatre Arts (M.A., M.F.A.**)
Theatre Arts Education (B.F.A.)
Theatre Production (B.F.A.)

* Fine arts studies is a college-wide major which is not housed in a department. The college offers two concentrations in the major: arts management and digital arts. Contact the Office of Academic Student Services at 621-1301 for more information.

** An M.F.A. in theatre arts with an emphasis in dance is also available.

**Undergraduate Minors**

A minor is required in the Bachelor of Arts
degree programs. Contact the Office of
Academic Student Services at 621-1301 for
more information.

The Minor for B.F.A. and B.M. Programs
A minor is not required for all B.F.A. and B.M.
programs. Contact a departmental advisor or the
appropriate APR for more information about
particular degree programs.

General education program
All undergraduate students are required
to complete the university-wide general
education program. Designed to provide a
foundation for university learning, the
program develops students' creative and
analytical skills and integrates knowledge
across university disciplines.

Program Requirements
For undergraduate academic program require-
ments, consult the On Course! Academic
Program Requirements Reports (APRRs). APRRs
for all undergraduate majors are available in
college or departmental offices. APRRs are also
available online at: http://www.arizona.edu/
academic/oncourse/data/interface/. Minor
requirements are available online at http://
www.arizona.edu/academic/oncourse/data/
interface/minors/.

For graduate program requirements consult the
Graduate Catalog and the departmental office
listed above.

To learn more about majors, minors, and other
departmental information consult the on-line
catalog or contact the department at one of the
addresses above.

Fine Arts (FREN)

207. Western Civilization and the Arts: The
Twentieth Century (3) I The arts as an
interdisciplinary framework of human heritage
from which connections are made to contempo-
rary issues in ethics, philosophy, science, law,
and politics.

307. Western Civilization and the Arts:
Paleolithic Through Renaissance (3) II The arts as
an interdisciplinary framework of human heritage
from which connections are made to historical
issues in ethics, philosophy, science, law,
and politics.

317. Western Civilization and the Arts:
Baroque Through Nineteenth Century (3) II
The arts as an interdisciplinary framework of
human heritage from which connections are
made to historical issues in ethics, philosophy,
science, law, and politics.

93. Internship
1. Legislative Internship (1-3) [Rpt.]
118. Senior Capstone (1-3) I II

113. Intensive French (4) I FREN 113 is
the equivalent of FREN 101 and FREN 102. P,
credit allowed for FREN 101 or FREN 102 but
not for both.

114. Accelerated French (4) I S FREN 114 is
the equivalent of FREN 101 and FREN 102. P,
credit allowed for FREN 101 or FREN 102 but
not for both.

115. Intensive French (4) I FREN 115 is
the equivalent of FREN 101 and FREN 102. P,
credit allowed for FREN 101 or FREN 102 but
not for both.

116. Accelerated French (4) I S FREN 116 is
the equivalent of FREN 101 and FREN 102. P,
credit allowed for FREN 101 or FREN 102 but
not for both.

117. Eroticism and Love in the Middle Ages (3)
I II (Identical with GER 177, which is home).

FRENCH AND ITALIAN (FREN/ITAL)
Modern Languages Bldg., Rm. 549
The University of Arizona
PO Box 210067
Tucson AZ 85721-0067
Phone: (520) 621-7349

FAX: (520) 621-6104
URL: http://www.coh.arizona.edu/french/
french.html

Baccalaureate Degree
Bachelor of Arts (B.A.)

Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
French (B.A., M.A., Ph.D.)

B.A. Options:
French literature and culture
business French

M.A. Options:
French literature
Francophone studies
literature and pedagogy
Italian (B.A.)

Program Requirements
For undergraduate academic program require-
ments, consult the On Course! Academic
Program Requirements Reports (APRRs). APRRs
for all undergraduate majors are available in
college or departmental offices. APRRs are also
available online at: http://www.arizona.edu/
academic/oncourse/data/interface/.
Minor requirements are available online at http://
www.arizona.edu/academic/oncourse/data/
interface/minors/.

For graduate program requirements consult the
Graduate Catalog and the departmental office
listed above.

To learn more about majors, minors, and other
departmental information consult the on-line
catalog or contact the department at one of the
addresses above.

French (FREN)

101. Elementary French I (4) CDT Listening,
speaking, reading, and writing; an introduction
to the basic structures and vocabulary of French.
Does not count toward French major or minor.
Also see FREN 113, and FREN 213.

102. Elementary French II (4) CDT Listening,
speaking, reading, and writing; an introduction
to the basic structures and vocabulary of French.
continuation. Also see FREN 113 and FREN
213. P, FREN 101 or placement, does not count

toward French major or minor.

112. Accelerated French I (6) S FREN 112 is
the equivalent of FREN 101 and FREN 102. P,
credit allowed for FREN 101 or FREN 102 but
not for both.

113. Intensive French I (4) FREN 113 is
the equivalent of FREN 101 and FREN 102.
(Note: FREN 113 “Intensive” covers the same
materials as FREN 112 “Accelerated,” which is
offered summer only.) P, knowledge of another
foreign language at the 305b level or consult
department before enrolling.

177. Eroticism and Love in the Middle Ages (3)
I II (Identical with GER 177, which is home).

195. Colloquium
a. Topics in French Culture, Literature, and
Language (1) I

199. Independent Study (1-4) [Rpt.]

201. Intermediate French I (4) CDT Continued
skill development; reinforcement of basic
language skills. P, FREN 102 or placement, does
not count towards French major.

202. Intermediate French II (4) CDT Continued
skill development; reinforcement of basic
language skills. P, FREN 201 or placement.

212. Accelerated French II (6) S FREN 212 is
the equivalent of FREN 201 and FREN 202.
Credit is allowed for FREN 212, or for FREN
201 and FREN 202, but not for both.

213. Intensive French II (4) II FREN 213 is
equivalent to FREN 201 and FREN 202. (Note:
213 “Intensive” covers the same materials as 212
“Accelerated,” which is offered summer only.) P,
knowledge of another foreign language at the
305b level or consult department before
enrolling.

245. African Literature in Translation (3) II
Introduction to Francophone African literature
coming from the Western part of the African
continent, which forms a geographical and
cultural entity. Taught in English. French majors
will read French texts in the original and will
write assignments in French. (Identical with
AFAS 245, ENGL 245).

249. Images of Africa (3) I Introduction to
African life and culture through explorations in
the following areas: history, geography,
institutions, the arts, and language and literature.
Taught in English. French majors will read
French texts in the original and will write
assignments in French. (Identical with
AFAS 249).

280. Introduction to French Language,
Linguistics and Culture (3) I Introductory

course to key concepts in French language,
linguistics and culture through a variety of
media (textbook, comics, films, Web). No
previous knowledge of French necessary. Taught
in English.

282. The French Novel and Society (3) I
French literature in translation. Does not count
toward fulfillment of language requirement, or
the major or minor in French. Taught in English.

283. Existentialism and the Absurd: The
French Foundations (3) II French literature in
translation. Does not count toward fulfillment of
language requirement, or the major or minor in
French. Taught in English.

284. French Theater in Translation (3) I II
Representative masterpieces of French theater
from its origins in the Middle Ages to the
contemporary. Includes medieval religious and
prophetic pieces, classical theater of 16th and 17th
centuries, etc. Taught in English. Does not count
toward fulfillment of language requirement, or
the major or minor in French.

285. Introduction to Humanities Computing
(3) S (Identical with GER 285, which is home).

299. Independent Study (1-4) [Rpt.]

299H. Honors Independent Study (1-3) [Rpt.]}
305. Introduction to French Literature (3) I II Definitions and illustrations of the principal types and genres of French literature (poetry, essay, narrative fiction, theater). P, FREN 305B.

306. Advanced Composition and Conversation (3) S Students at advanced and high intermediate levels. Materials for discussion and writing exercises are derived from current activities in Paris (films, plays, and other cultural events). Under certain conditions, FREN 355 can be substituted for FREN 375A if a FREN 375A level supplement is taken at the final exam or a grade of B or better is obtained. Offered in Paris program only. P, FREN 204 or two years of college French.

370A-370B. Business French (3) I The basic workings of the French economy and the essential vocabulary and style specific to French business. P, FREN 370A is prerequisite to FREN 370B.


375A-375B. Advanced Composition and Conversation (3) I II Practice in formal writing and formal oral communication. Both FREN 375A and FREN 375B. P, FREN 305B.

393. Internship (1-5) [Rpt./]

396. Proseminar a. Honors Proseminar (3) I II

399. Independent Study (1-4) [Rpt./]

401. French Literature of the 19th and 20th Centuries (3) I II Survey of French literature of the period with focus on main literary genres and intellectual currents since Romanticism. P, FREN 350.

402. French Literature of the 17th and 18th Centuries (3) I II Survey of French literature of the period with selected readings of major authors, textual analysis and discussion of historical, social and cultural background. P, FREN 350.


411. Topics in Literary History, Criticism, and Theory (3) I II Current, recent, and traditional ways of analyzing and interpreting literary texts and the cultural contents in which they are produced, with emphasis on French, and attention to understanding various means by which knowledge of literary issues is transmitted to others. May be repeated when topics vary.

415. Teaching of Modern Languages (3) II (Identical with TTE 414, which is home).

416. Translation (3) I II Theory and practice of translation (French/English; English/French). Literary and technical. P, FREN 375B or FREN 370B.

425. Paris: Capsule/Capital of French Cultural History (3) S The cultural history of France surveyed through selected works of literature, art, and architecture. Readings and discussions, in conjunction with faculty-guided visits to historical sites in Paris. Offered in Paris program only. P, FREN 202 or two years of college French.

430A-430B. French Civilization (3-3) I II Historical, social, economic, literary, and artistic elements in the development of the French nation. P, FREN 305B, FREN 430A is not prerequisite to FREN 430B.

440. French Poetry (3) I The evolution of poetic form and content from the Middle Ages to the present. P, FREN 350.

448. The Theory and Practice of Writing (3) I An experiment in writing, concerning the means, the raw material at our disposal, and the different literary devices that allow us to achieve it. French students will write in French and English students will write in English. (Identical with ENGL 448). May be convened with FREN 548.


452. French Literature of Quebec (3) II Comprehensive study of the most significant literary expression in Quebec. P, FREN 350. May be convened with FREN 552.

453. Culture and Civilization of North Africa (3) I II Historical, religious, social, literary and artistic influences on the civilization of North Africa. Taught in English. (Identical with RELI 453). May be convened with FREN 553.

454. Francophone Literature of the Maghreb and Lebanon (3) II Francophone literature of Algeria, Lebanon, Morocco and Tunisia. P, FREN 350. May be convened with FREN 554.

455. Introduction to Romance Philology (3) I (Identical with SPAN 455, which is home).

456. Literature of Belgium (3) I Historical and intellectual currents in Belgium. Taught in French. P, FREN 350. May be convened with FREN 556.

470. Advanced Grammar and Usage (3) II Structural analysis of spoken and written French, with emphasis on structural patterns and attention to contrasts with English. P FREN 305B.

498H. Honors Thesis (3) [Rpt./2] I II

499. Independent Study (1-4) [Rpt./]
Italian (ITAL)

101. Elementary Italian I (4) [CDT] Listening, speaking, reading, and writing; introduction to the basic structures and vocabulary of Italian. Taught in English. May be convened with FREN 453.

102. Elementary Italian II (4) [CDT] Listening, speaking, reading, and writing; an introduction to the basic structures and vocabulary of Italian. P, ITAL 101 or placement exam. (Does not count toward the Italian major or minor.)

102Z. Intensive Elementary Italian (4) I S P, language majors or demonstrated language proficiency.

177. Eroticism and Love in the Middle Ages (3) II (Identical with GER 177, which is home).

199. Independent Study (1-4) [Rpt./]

201. Intermediate Italian I (4) [CDT] Continued skill development; reinforcement of basic language skills. P, ITAL 102 or placement exam.

202. Intermediate Italian II (4) [CDT] Continued skill development; reinforcement of basic language skills. P, ITAL 201 or placement exam.

202Z. Intensive Intermediate Italian (4) I S P, language majors or demonstrated language proficiency.

230B. Western Culture: The Italian Perspective from the Renaissance to the Present (3) II From the Renaissance to the Present. Taught in English.

250A. Literature in Translation: The Middle Ages (3) I II Thé Middle Ages. Taught in English.


250C. Literature in Translation: Italian Theater (3) I II Italian Theater. Taught in English.


299H. Honors Independent Study (1-3) [Rpt./] I II

305A. Advanced Italian: Composition and Conversation (3) I Composition and Conversation. Emphasis on improving listening, comprehension, speaking, and writing. P, ITAL 202 or consult department before enrolling.

305B. Advanced Italian: Advanced Composition and Conversation (3) II Advanced Composition and Conversation. P, ITAL 202 or consult the department before enrolling. Counts toward the major or minor in Italian or Italian Studies. Taught in Italian.

305C. Advanced Italian: Business Italian (3) I II Business Italian. P, ITAL 202 or consult department before enrolling. Counts toward the major or minor in Italian or Italian Studies. Taught in Italian.

330A. Italian Studies: Fascism, Resistance and Reconciliation (3) I II Comprehensive study of a particular aspect of Italian culture: Fascism, Resistance, and Reconciliation. Counts toward the major or minor in Italian or Italian Studies. Taught in English.

330B. Italian Studies: Italian Americana in Fiction and Film: Crossing Oceans (3) I II Comprehensive study of a particular aspect of Italian culture: Italian Americana in Fiction and Film: Crossing Oceans. Counts toward the major or minor in Italian or Italian Studies. Taught in English.

330C. Italian Studies: Italian Cinema and Literature (3) I Comprehensive study of a particular aspect of Italian culture: Italian Cinema and Literature. Counts toward the major or minor in Italian or Italian Studies. Taught in English.

330D. Italian Studies: Women in Italian Society (3) I II Comprehensive study of a particular aspect of Italian culture: Women in Italian Society. Counts toward the major or minor in Italian or Italian Studies. Taught in Italian.

400A. Main Currents of Italian Literature: The Middle Ages and Renaissance (3) I P, ITAL 202 or consult department before enrolling. May be convened with ITAL 500A. Counts toward the major or minor in Italian or Italian Studies. Taught in Italian.

400B. Main Currents of Italian Literature: The 17th through 20th Centuries (3) II P, ITAL 202 or consult department before enrolling. May be convened with ITAL 500B. Counts toward the major or minor in Italian or Italian Studies. Taught in Italian.
systems, symbolic representation of the world, judgment and decision making), personal identity, individual freedom and social control, ethical and moral principles, and others.

**Language.** Survey of linguistic concepts and methods: communication among animals, physiology of human speech, elementary phonetics, syntax, language and thought, language change, language and the brain.

**Philosophical Perspectives on the Individual.** Philosophical perspectives on the individual addresses the individual person construed as a cognitive agent.

The **Politics of Difference.** This course will examine the politics (understood broadly as differential access to material and symbolic resources) of difference (understood as institutionalized social hierarchies that oppress individuals). We will focus on three key structures of difference and their interaction: ethnicity/race, class, and gender.

**Problem Solving for Daily Life.** A study of the manner in which structured knowledge, and structured approaches to decision making, is brought to bear on problems of daily life.

**The Structure of Mind and Behavior.** An introduction to mind and behavior. Broad coverage of wide-ranging issues including how minds reflect social influence and how neural systems underlie thoughts and conscious awareness.

**INDV 102. Social Interactions and Relationships (3) I II** Explores the central questions about the nature of human beings in social context. Course topics may include group identity; family and kinship structures; religious, political, economic, and legal institutions; individual freedom and social control; ideas of social justice, and others.

**American Design on the Land.** This course is broad exploration of individuals from diverse backgrounds who have helped shape the American landscape. Examination of original writings, and built environments including cities, parks, gardens, vernacular expressions, and preserves of wild, scenic, and cultural landscapes will provide the framework for discussion about landscape design as a comprehensive art form and dialog between man and nature.

**Black and White: The Causes and Consequences.** Race remains, as Thomas Jefferson feared and Alexis de Tocqueville predicted, the most incendiary and intractable issue in American politics. It was a divisive issue when the Constitution was drafted in 1787; it was the central issue in a series of compromises that ultimately failed to hold the nation together in 1860; it was the most visible issue in the Civil War and the worst riots in the nation's history that followed in the present century. In his Second Inaugural speech on January 20, 1997, President Bill Clinton correctly described racism as America's "constant curse." The purpose of this course is to identify and explain why this is so.

**Business in Modern Society.** This course examines the place of business in the larger context of a society's multiple endeavors with an emphasis on three major roles: the creation of society's wealth, the creation of goods and services society needs to support an acceptable standard of living, and the creation of jobs that permit the society's members to claim a share of its wealth in order to partake of that standard of living. We will evaluate the extent to which business has achieved each of these goals throughout history, with special emphasis on present-day America.

**Gender and Contemporary Society.** This course will encourage students to consider the ways in which gender influences issues of self-identity, social differences, and social status. It will provide students with an understanding of the connections between the individual and institutions such as mass media, the disciplines of science, and political and economic systems.

**Human Geography and Global Systems.** This course introduces students to fundamental issues and concepts pertinent to the study of individuals and societies. In focusing on models and explanations of how things are interrelated in earth space. Students are given a clearer understanding of the economic, social, and political systems with which individuals live and operate.

**Many Ways of Being Human: Anthropological Perspectives.** This course introduces the student to anthropological perspectives on cultural diversity. The course focuses on gender, race, ethnicity and class through readings by and about peoples of the non-western world.

**Modern Latin America: A Social Science Perspective.** An interdisciplinary introduction to the people, place and cultures of Latin America and to the political, economic and social institutions and conditions of the region. The course examines how and why environmental quality, economic development, living conditions, democracy, migration, trade, religion and US policy vary across different countries and social sectors.

**Philosophical Perspectives on Society.** This course addresses the fundamental moral questions regarding society.

**INDV 103. Societal and Institutional Relationships: An Economic Perspective (3) I II** Explores the nature of human beings and their individual experiences in a social context. Course topics may include personal identification within a social identity, personal ethics and morality versus social standard, and others.

**An Economic Perspective.** The study of the interactions of individuals and societies from the viewpoint of economics. The course examines a series of important social problems that lie on the intersections of economics and disciplines such as law, history, anthropology, political science, psychology, and so forth.

**Environment and Society.** This course introduces students to the study of relation-
ships between people and the environment from a social science perspective, and provides a context for thinking about the social causes and consequences of environmental changes in different parts of the world. It focuses on how and why the human use of the environment has varied over time and space; analyzes different approaches to decision-making about environment issues and examines the relative roles of population growth, energy consumption, technology, culture and institutions in causing and resolving contemporary environmental problems around the world.

**Europe in the Modern World.** Europe in the Modern World 1600-1989 presents student with the opportunity to inquire into the origins and development of the modern Western world. The goal is to instill a sense of the past as a viable part of any student's heritage, with all its diverse problems and rewards, and allow them to enrich their understanding of European culture through critical interaction with history.

**Modern Latin America.** An interdisciplinary introduction to Latin American societies from the 1820s to the present that gives special emphasis to diversity within Latin America and to dynamic and, hence, historical processes of social, political, cultural, and economic change over time.

**What is Politics?** Issues in contemporary political analysis, human values and political goals, how governments differ and why they change, how nations differ from one another.

**World Food Issues.** This course will describe the prominent characteristics of the world food system in terms of the utilization of land, water and energy resources, the role of different technologies in world agricultural production, and the nutritional requirements of consumers. The primary focus of the course is on developing countries, however, important interactions between wealthy and poor countries will be emphasized. The course will include foundational knowledge about individuals and societies.


**Natural Science (NATS)**

**NATS 101. The Earth and Its Environments (3) I II** An overview of the key concepts in physical and chemical processes, including Newton's laws governing force and motion, the laws of thermodynamics governing energy and entropy, the role of electromagnetism in nature, and the atomic structure of matter. The course will explore these concepts in an inter-disciplinary context, drawing from areas such as environmental sciences, atmospheric sciences, engineering/technological sciences, and others.

**Basic Concepts in Water-Related Applications.** This course develops an understanding of natural science concepts and ideas and how they can be used to understand and analyze processes and objects in the everyday world. Water is a central theme. Students examine how it is obtained, stored, distributed, used, polluted, and cleaned. They learn to estimate its quality, quantity, energy, and movement. It is a broad introductory course.

**Connections: A Study of Science, Technology and Innovation.** Basic aspects of physics, chemistry, and astronomy are integrated to show how technology evolves from science, interconnecting events, and accidents of time. Who would have imagined that modern communications, movies, printing presses, and computers have their roots in the stirrup, cannon, 12th century underwear, and the water wheel. We explore the science and technology that has given us today's society and examine opportunities for today and the future.

**Earth's Environment: Introduction to Physical Geography.** Introduction to fundamental laws of nature as expressed physical processes that govern the spatial distribution of Earth's land, sea, air, and biological environments. Focus on fluxes and feedbacks among these systems, and interactions with humans.

**Earth Resources and the Environment.** This is a course about the mineral resources of the Earth, our demand and use of these resources for material goods and energy, and the environmental consequences of our use of these resources.

**A Geological Perspective.** Students will learn that a few universal laws describe the behavior of our physical surroundings, from the universe to every action in our daily lives. This interdisciplinary course will cover aspects of the scientific process, astronomy, physics, chemistry, and Earth sciences, with an emphasis on geosciences and society, including earthquakes, mass extinctions in geologic history, and global warming. It will give students the ability to read and appreciate popular accounts of major discoveries and important public issues in the physical sciences.

**Introduction to Environmental Science.** This course will not be confined to one discipline but rather will include information from physics, chemistry, biology and the social sciences such as economics and anthropology. The central theme of the course will be that of change as a normal and natural process. It will consist of four major focus areas: Biodiversity, Pollution, Population, and Resources. Within each major focus area we shall explore how change has and is occurring at the local, regional and global scales. To facilitate the learning process we shall analyze local, national and international case histories. The case histories would include air pollution at the Grand Canyon, TCE groundwater contamination in Tucson, landfill and leaking underground storage tanks in Tucson, Chernobyl, and the Mt. Graham controversy.

**Introduction to Global Change.** The basics of physical science are presented within the context of global environmental change processes (climatic change, global warming, deforestation, etc.) that impact Earth and its inhabitants. Includes hands-on activities, discussions, computer exercises, and a personal interest project.

**Introduction to Weather and Climate.** An introduction to the science of weather processes and climate, including the genesis of fronts and cyclones, precipitation processes, the wind systems of the world, severe storms, and weather forecasting. Special emphasis will be given the natural phenomena which have strong impacts on human activities including tornadoes, hurricanes, El Niño, global warming, ozone depletion, and air pollution. The fundamental importance of physics, chemistry, and mathematics to atmospheric science will be stressed.

**Science, Technology and Environment.** The scientific method, technology, motion, energy, gases, heat, chemistry, electricity and magnetism are covered in class lectures. In laboratories, students will use physical principles to assess environmental problems and technology: e.g., CAP water, air pollution, solar cookers and water use in the arid southwest.

**NATS 102. Beyond the Earth in Space and Time (3) I II** Introduction to the study of the planetary and geological sciences and their application to events in the everyday world. The course examines Newton's laws governing force and motion, the laws of thermodynamics governing energy and entropy, the role of electromagnetism in nature, and the atomic structure of matter, in the context of current issues in planetary and geological sciences.

**The Concepts of Physical Science.** This is a course inquiring into basic concepts used by every physical science in its exploration of the world. The concepts originate in physics, which offers the framework on which other disciplines are built. Applications of the concepts are made in the course, not just to traditional physics problems, but to problems in many other scientific disciplines. In the course we will explore the development of the concepts from their intuitive beginnings to their present forms. In the process, we will see how science searches for a logically consistent explanation of the world, and how the creation of these concepts has influenced our perception of that world.

**Life in the Universe.** The course will emphasize to the student how information from different fields of science can be brought together to address a problem and, most importantly, how the scientific method can be used to attach problems which at first may seem intractable. One major goal of the course will be to impart to the student the wonder, uniqueness, and fragility of life on Earth.

**The Physical Universe.** The Physical Universe presents the astronomical phenomena of the universe in the context of physical science.
The Role of Time in Science. The central theme in the course is time; how we decide what it is, how we measure it, and how our view of it has changed as we learn more about the natural world. The course will discuss many sorts of natural clocks, both cyclic (atoms, planet orbits, neutron stars) and non-cyclic growth and decay (chemical and nuclear reactions, radioactive, geological processes, the birth and death of stars), and the time scales on which each can be used. We will see how a few central principles keep recurring in our attempt to understand the working of these clocks. Ultimately, we will discuss how Einstein had to change our ideas about time measurement in order to accommodate these principles, and how the accommodation has lead to our present view of the universe.

The Universe and Humanity: Origin and Destiny. Formation and evolution of the universe, the solar system and life; events which led to our existence; the future for life in the solar system; life elsewhere. Designed for non-scientists.

NATS 104. Biological Sciences (3) I II
Introduction to the study of biology and its application to events in the everyday world. Areas examined include 1) the evolution and diversification of life, 2) cells, 3) structure and function or organisms at the multi-cellular level, 4) genetics and development, 5) health and disease, and 6) interaction and interdependence between organisms.

Biology in Medicine, Engineering and Applied Science. This course will cover the fundamental concepts and principles of biology and directly link them to applications in medicine, engineering and other applied sciences. A typical class week will consist of two one-hour lectures on biological concepts and principles and one three-hour application session. Each applications session will consist of a one-hour seminar on biological applications in medicine, engineering and other applied sciences and a two-hour problem session.

Evolution of Modern Biology. This course is designed to introduce students to concepts in modern biology, with an emphasis on the processes that created the current status of life on earth. Students should leave the course with the understanding of the relationship between DNA, RNA, proteins, genes the phenotypes. They will be introduced to basic metabolism, and the kinds of regulatory networks that control our cells. Students also will look at the ways that different types of reproductive strategies are utilized by populations of organisms. Finally, we will talk about the ways that humans are changing the rules—the impact of recombinant DNA technology on present and future human life.

Nutrition, Food and You. Nutrition, Food and You covers the principles of human nutrition. Topics include digestion, absorption, metabolism, vitamins, minerals, life cycle nutrition and food safety.

Plants and Our World. Plants and Our World will cover the principles of plant growth, development, and reproduction from the cellular to the whole organism levels, explore how plants are affected by their environment, and their ecology and evolution. The emphasis of the course is on what makes plants uniquely interesting and different from other organisms, and their importance to life and society.

Traditions and Cultures (TRAD)

TRAD 101. Non-Western Cultures and Civilizations (3) I Historical development and fundamental concepts of a nonwestern culture. Examines how members of a particular culture are shaped by a distinct heritage of ideas, values, and artistic expressions that may be in sharp contrast to traditional western ideas and values.

Chinese Civilization. Introduces you to traditional Chinese civilization for the purposes of this course defined as: "the totality of a culture's perception of itself and the world it occupies and the ways in which that self-perception is expressed in society, politics, religion, philosophy, and the arts." The content of the course is arranged in thematic units, each unit being placed in the context of a specific historical period. We will examine the religious symbolism of ancient Chinese bronze vessels, Chinese theories of nature based on concepts like Yin and Yang, the great medieval religions of Taoism and Buddhism, and other topics. Over the semester you will learn to think more like the Chinese of centuries past to exercise your imagination, and to explore a world that is different from your own.

Colonial Latin America. This course examines 1) the history of Spanish and Portuguese exploration, conquest, settlement, and state-building in the Americas; 2) the impact of European colonization on indigenous American cultures and civilizations, especially the acts of native resistance, accommodation and adaptation that shaped the consequences of this cultural encounter; 3) the forced migration of African peoples to the Americas, including the development of slave societies, and the emergence of regional African-Latin American cultural traditions; and 4) the growth of multiracial social groups who developed new and distinctive cultural forms of their own and eventually came to challenge the cultural and political hegemony of Spain and Portugal.

Colonialism and Native Peoples. Cultural studies of indigenous groups in the Americas, Eurasia, Africa and the Pacific Rim and how these have been shaped by the colonial process.

The French-Speaking World. This course will consider the development of the French-speaking world from the Renaissance to the twentieth century. The first half of the course will present a historical perspective on the evolution and exportation of French language and culture from 1500 to 1900, while the second half will emphasize the cultural and artistic expressions of modern French-speaking countries other than France.

African Diaspora Religion and Culture. This course surveys continental African religions and their manifestations in the African Diaspora. Brazil, Jamaica, Trinidad, Cuba, Haiti and the U.S.A. are highlighted. The epistemologies and practices of the Fon, Yoruba, and Bantu peoples are analyzed to understand their continued impact on the contemporary world.

Many Nations of Native America. An interdisciplinary survey of native peoples in North and Central America, from their origins to present. This course is structured around the themes of sovereignty, cultural diversity, native epistemologies, the Columbian exchange, and cultural transformation and survival. These themes integrate our examination of seven native Nations, ranging from the Aztec of Central Mexico to the Inuit of the Canadian Arctic. The course focuses on homelands and origins, intercultural exchange, demography, ecological transformation, the impacts of introduced epidemic diseases, processes of colonialism, social organization and culture, education, and contemporary issues.

Middle Eastern Humanities. Introduces students to the values, traditions, and development of Middle Eastern (Islamic) culture and civilization. This course is designed to familiarize students with the principal achievements in art, architecture and literature of Islamic civilization, to help students understand these achievements in their social and cultural contexts, and to consider the historical evolution of our knowledge and understanding of these achievements.

The Worlds of Buddhism. An introduction to Buddhism as both a religion and an array of cultural traditions, with emphasis on its various contributions to the formation of the South, Central, Southeast, and East Asian civilizations.

TRAD 102. Western Cultures and Civilizations: Classical to Renaissance (3) I Historical development and fundamental concepts of western civilization, from ancient times to the Renaissance. Examines the heritage of ideas, values, and artistic expressions that shaped western tradition during that time.

Books in Dialogue: Classical and Medieval. This course aims to provide solid grounding in the Western intellectual and cultural tradition through pairing of central literary, philosophical, and theological works. The second week in each pair will be studied as a response to the first: e.g., The Aeneid to The Odyssey and Aristotle's Ethics to Plato's. Students will be encouraged to deal with each of the paired texts individually and comparatively and to compare members of different pairs, e.g., Augustine with Plato, and non-scriptural works of the Christian era with the selections from the Bible.
Democracy in Theory and Practice: The Greek Experience. Investigation of the history and growth of democratic institutions, values and ideas in ancient Greece, with some reference to contemporary relevance.

Drama and Dance in Western Cultures: Origins to 1603. Drama and dance are modes of creative expression used to communicate ideas, values, stories and myths which help define a community or culture. Both art forms employ the human body as the medium through which an audience may be engaged. Through ever-changing conventions, drama and dance reshape human experience into patterns which help us order our perceptions about the world in which we live. This course will focus primarily on principal themes in western culture as expressed in drama and dance.

History of Western Civilization: From the Rise of Cities to the Counter Reformation. This course explores the civilizations of the West by considering the development of the ideas and ideologies that shaped the institutions of the West, development directed by human interaction and conflict on a social, political, religious, and cultural level, in addition to the intellectual. Themes of particular interest include the structure and dynamics of power, competing configurations of deity and ritual, image and architecture as tools in the acquisition of authority, and the construction of a social normative on the grounds of class, culture and gender.

Humanities: Ancient Times to Renaissance. Chronological survey of human civilizations from pre-history to the renaissance. Students will be introduced to the critical analysis of the literacy and artistic expressions that constitute the ideas and values of our collective heritage. Emphasis will be placed on the interrelation of Western and non-Western cultures and on the interperspectives including science, gender and psychology, politics, social conditions, religion and philosophy.

In the Beginning: Roots of Western Culture. The roots of “western” tradition(s) are often traced to the Classical Greeks. However, by the time that work on the Parthenon had begun, the peoples of the Near East and Northeastern Africa had already witnessed the rise and fall of a series of great civilizations for over ten thousand years. In fact, many of the elements of “classical” civilization can be traced to experiments made in this distant past.

Western Culture: The Italian Perspective: Antiquity through the Middle Ages. From Antiquity through the Middle Ages. Taught in English.

World History to 1600. Survey of topics in world history to 1600.

TRAD 103. Western Cultures and Civilizations: Renaissance to Present (3) II Historical development and fundamental concepts of western civilization, from the Renaissance to the present. Examines the heritage of ideas, values, and artistic expressions that have shaped western tradition since the Renaissance.

The Americas -Renaissance to the Present Day. This course will expose students to major movements in the Americas from the Renaissance to contemporary times.

Architecture and Society. The built environment has, 'a permanent and profound impact on (our) personal health, productivity and happiness, and on community life.' The purpose of this course lay the foundation of architectural literacy. The basis of this knowledge is found in understanding the relationship between a society and the forms it creates. This is accomplished through studying the major components that affect architecture: region, culture, and technology. The course follows these factors through the history of western civilization, from ancient Greece to contemporary Europe and America. Greater emphasis is given to the contemporary period because radical changes in technology and resources make this information more pertinent to the present.

The Arts and Politics in Latin America. A study of the interrelationships between cultural forms and their socio-historical contexts in the development of Latin America from pre-colonial times to the present.

Books in Dialogue: Early Modern and American. This course will study four pairs of works: Thomas More's *Utopia* and Machiavelli's *The Prince*; Shakespeare's *Tempest* and Swift's *Gulliver's Travels*; Benjamin Franklin's *Autobiography* and Thoreau's *Walden*; and Twain's *Huckleberry Finn* and Ralph Ellison's *The Invisible Man*. The aim will be to explore the ways in which the works respond to one another. Such exploration will entail the study of the satire, autobiography, and novel—and how the author develops his thematic interests through the manipulation of the literary forms.

Democracy and Its Limits: The Modern Experience. This course examines some difficulties stemming from the theory and practice of modern democratic life, especially in the context of American democracy. The course examines such issues by a careful and intensive reading of some classic writings on democracy. In addition, attention will be paid to the historical circumstances and contemporary conditions of democracy in the United States. The aim is for the student to acquire a more well-rounded and critical perspective on the situation of democracy in modern life.

Drama and Dance in Western Cultures: 1603 to Present. Drama and dance are modes of creative expression used to communicate ideas, values, stories and myths which help define a community or culture. Both art forms employ the human body as the medium through which an audience may be engaged. Through ever-changing conventions, drama and dance reshape human experience into patterns which help us order our perceptions about the world in which we live. This course will focus primarily on principal themes in western culture as expressed in drama and dance.

Humanities: Renaissance to Present. Chronological survey of human civilization from the eve of the New World and African colonization, concluding with the contemporary world.

Technology and Society: Introduction to Science, Technology and Society. This course is an introduction to the social, historical, and ethical contexts of knowledge, science and technology. Although science and technology are perhaps the defining features of contemporary Western society, all cultures have distinct forms of knowledge and technical practices, which reflect their relationships to the natural world and other peoples. In this course, we will discuss a range of questions relevant to scientists, engineers, and the general public, about the causes and contents of scientific and technical information, basing these discussions on a broad historical understanding of science and technologyn various cultures.

The Making of American Cultures, 1600-1877. This course introduces students to the history of the United States before 1877. It focuses on the creation of a distinctive set of American cultures. Central themes include the colonial meeting of Spanish, French, English, native American, and African American cultures; the development of distinctly American Creole cultures in the eighteenth century; race and conquest; the American Revolution and the creation of a republican political culture; the transformation of that political culture through struggles over industrialization and wage labor, slavery, and women's rights; and the revolution in American political culture and social relations during the Civil War and Reconstruction.

Russia: From Empire to Federation. This course is designed to familiarize students with Russia—its culture, history, politics, economy, peoples, languages, traditions, and role in the world today. Upon completion of the course, students will be able to understand and discuss intelligently past and current events relating to Russia. They also will have gained a familiarity with the many perspectives available for studying a country that continues to play a significant role in world events. And beyond all this, they should have a good background for discussion of major events relating to Russia and problems in the twentieth-century world.

TRAD 104. Topics in Culture and Civilization (3) I Explores select topics in human culture in the context of how humans, as historical beings, are shaped by the thoughts and actions of our predecessors; and that we will influence the lives of those who follow us. The course examines culture as a distinct heritage of ideas, values, and artistic expressions that undergo continual adaptation due to social changes.
Comparative Religions. A study of Judaism, Christianity and Islam, including both ancient and modern developments in their cultural contexts.

Critical Cultural Concepts. This course examines—through literature, film, art, and philosophy—different concepts critical to the shaping of primarily “Western” culture(s), with a glance at similar concepts in “non-Western” cultures. This course is also “critical” in the sense that it asks students, through virtually weekly take-home quizzes, to critique these concepts, taking the wheat and letting the chaff be still. Topics may include the ideology of war or human rights; the problem of evil; the figure of the Trickster; and others.

Eroticism and Love in the Middle Ages. Courtly love was a discovery of the High Middle Ages and became the dominant theme in literature, the arts, philosophy, and even in religion. This course will examine the concept of love as discussed by medieval poets from the 11th through the 15th centuries and cover the wide spectrum of European history culture seen through the lenses of the theme of “love.”

Intellectual Foundations of International Relations: Classic Theories and Modern Debate. Addresses the origins and context of international relations theory in an historical context as well as referring to recent disputes.

Mind, Matter and God. Mind, Matter and God is a historical survey of the western philosophical conceptions of mind, matter and God starting with the ideas of the ancient Greeks and advancing to include primary figures in the medieval, early modern and, possibly, contemporary periods. The primary aims of the course are to acquaint students with a set of ideas that are fundamental to western culture and to foster critical thinking on abstract questions of profound intellectual and cultural importance.

Oral and Spiritual Roots of Traditional Cultures. Exploration of the cultural insights in two mythological traditions: Ancient Mediterranean, origin or Western rationality and monothestic belief; Native American, influences now being recognized.

Science and Inquiry. The effects of modern science on western civilization have been profound. A moment’s thought will reveal applications of science that have transformed our way of life. But aside from its practical benefits (and costs!), modern science has had an equally profound intellectual impact. An educated man or woman at the close of the twentieth century has a vastly different view of the world, from the views of Aristotle, of Dante or even of Newton. This transformation has been brought about in large part by the development of scientific thought. In this course we shall examine the distinctive features of scientific inquiry. We shall aim to understand the power and also the limitations of scientific methods.

Approved Tier 2 Courses

Arts

AR H 201. Survey of Western Art in Society: Pre-history through Gothic (3) I A survey of the art and architecture of Western civilization from pre-historic cultures through the Gothic period utilizing interdisciplinary methods. The lectures will focus on the major monuments of art and will examine the relationship between the social function of art and its form and content.

AR H 202. Survey of Western Art in Society: Renaissance through Modern (3) II A survey of the art and architecture of Western Civilization from Renaissance through modern times utilizing interdisciplinary methods. The lectures will focus on the major monuments of art and will examine the relationship between the social function of art and its form and content.

DNC 100. Looking at Dance (3) I Origins of dance as human expression in ritual, social, and theatrical context. Twentieth century developments in ballet, modern dance, movie, and show dancing. Open to non-dance majors only.

DNC 112A. Introduction to Ballet (1)
DNC 112B. Ballet for Beginners with Limited Experience (1) P, DNC 112A.
DNC 112C. Intermediate Ballet (2)
DNC 143. Improvisation (1) II Improvisation for non-majors and those students in education desiring certification for teaching dance K-12.

DNC 144A. Introduction to Jazz Dance (2) [Rpt./ 2 units] I II
DNC 144B. Jazz Dance for Beginners with Limited Experience (1) [Rpt./ 1] I II
DNC 144C. Intermediate Jazz Dance (2) [Rpt./ 1] I II
DNC 152A. Beginning Modern Dance (1)
DNC 152B. Modern Dance for Beginners with Limited Experience (1) P, DNC 152A.
DNC 152C. Intermediate Modern Dance (2)
DNC 175. Theatre Dance (1) Jazz movement styles for the beginning dancer; basic steps, phrases, and performing techniques for musical comedy and media dance entertainment.

DNC 176A. Introduction to Tap Dance (1) I
DNC 176B. Tap Dance for Beginners with Limited Experience (1) [Rpt./ 1] II Tap dance basic skills and new rhythmic challenges incorporated to advance the beginner to a high performance level. Explores a variety of music styles. P, DNC 176A or enrollment by audition only.

DNC 200. History of Dance (3) II History of dance in western civilization from ancient Egypt to the present.

GER 273. Tradition and Revolution: German Romanticism (3) I II An introduction to major 19th century artists, writers, and composers of German speaking countries. Focuses on their works and their responses to them. P, freshman composition.

GER 379. Religion in German Culture (3) I II Introduction to major cultural figures of German speaking countries who have seen, imagined, or experienced what role religion may or can play in human life. (Identical with RELI 379).

Approved Tier 2 Courses

Arts

AR H 201. Survey of Western Art in Society: Pre-history through Gothic (3) I A survey of the art and architecture of Western Civilization from pre-historic cultures through the Gothic period utilizing interdisciplinary methods. The lectures will focus on the major monuments of art and will examine the relationship between the social function of art and its form and content.

AR H 202. Survey of Western Art in Society: Renaissance through Modern (3) II A survey of the art and architecture of Western Civilization from Renaissance through modern times utilizing interdisciplinary methods. The lectures will focus on the major monuments of art and will examine the relationship between the social function of art and its form and content.

DNC 100. Looking at Dance (3) I Origins of dance as human expression in ritual, social, and theatrical context. Twentieth century developments in ballet, modern dance, movie, and show dancing. Open to non-dance majors only.

DNC 112A. Introduction to Ballet (1)
DNC 112B. Ballet for Beginners with Limited Experience (1) P, DNC 112A.
DNC 112C. Intermediate Ballet (2)
DNC 143. Improvisation (1) II Improvisation for non-majors and those students in education desiring certification for teaching dance K-12.

DNC 144A. Introduction to Jazz Dance (2) [Rpt./ 2 units] I II
DNC 144B. Jazz Dance for Beginners with Limited Experience (1) [Rpt./ 1] I II
DNC 144C. Intermediate Jazz Dance (2) [Rpt./ 1] I II
DNC 152A. Beginning Modern Dance (1)
DNC 152B. Modern Dance for Beginners with Limited Experience (1) P, DNC 152A.
DNC 152C. Intermediate Modern Dance (2)
DNC 175. Theatre Dance (1) Jazz movement styles for the beginning dancer; basic steps, phrases, and performing techniques for musical comedy and media dance entertainment.

DNC 176A. Introduction to Tap Dance (1) I
DNC 176B. Tap Dance for Beginners with Limited Experience (1) [Rpt./ 1] II Tap dance basic skills and new rhythmic challenges incorporated to advance the beginner to a high performance level. Explores a variety of music styles. P, DNC 176A or enrollment by audition only.

DNC 200. History of Dance (3) II History of dance in western civilization from ancient Egypt to the present.

GER 273. Tradition and Revolution: German Romanticism (3) I II An introduction to major 19th century artists, writers, and composers of German speaking countries. Focuses on their works and their responses to them. P, freshman composition.

GER 379. Religion in German Culture (3) I II Introduction to major cultural figures of German speaking countries who have seen, imagined, or experienced what role religion may or can play in human life. (Identical with RELI 379).
in anthropology, sociology or economics.

ANTH 207. Material Culture Studies (3) I Material culture studied as an essential component of individual and social activities. Objects to be read as evidence based on consciously introduced attributes and objects as metaphors. (Identical with MSE 207).

AREC 350. Economics, Ethics and Environmental Policies (3) I Critical analysis of environmental issues using political economy models. Integrates economic, ethical and political concepts in discussing conflicts surrounding food safety, endangered species, land use, and pollution issues. P, ECON 200 or ECON 210A or 6 units of Individuals & Societies general education.

CLAS 240. Ancient Athletics (3) II Comparative study of ancient and modern athletics in their cultural contexts. Readings in English translation.

CLAS 306. The Transformation of Society: Christianity in the Greco-Roman World (3) I Investigates the emergence of Christianity in the first four centuries of the Greco-Roman milieu. (Identical with RELI 306).

#CLAS 362. Women and Gender in Antiquity Women and gender in ancient literature, archaeology and history from the Bronze Age to the Roman Empire.

ECON 200. Basic Economic Issues (3) National and international economic issues. An introduction to economic analysis. P, not available to students who have completed or are enrolled in ECOL201A, 201B, or ECOL210.

ECON 210A. Principles of Economics (3) Nature of economics, price theory for the product market, factor prices, international economics. P, not available to students who have completed or are enrolled in ECOL200 or ECOL210.

ECON 210. Survey of Economic Theory (3) Introduction to micro- and macro-economic theory and the application of theory to situations involving individuals, society, and institutions. P, 6 units of calculus, not available to students who have completed or are enrolled in ECON 200, ECON 201A or 201B.

GER 274. Dialogue of the Sexes: Men and Women in German Society (3) I To view a closely related culture from the standpoint of our own lives; to get a critical perspective on the spontaneous assumptions we make about gendered individuals and their societies. Tier I course.

#MAS 365. Latinos and Latinas: Emerging contemporary issues using a comparative and multi-disciplinary focus this course critically examines major issues in Latina/o scholarship. Major topics include: immigration, political economy, class, the politics of ethnic identity creation and maintenance, the construction of race, gender, sexuality, and policy issues.


PSYC 277. Law and Society (3) II Interdisciplinary consideration of the origins, definitions, operations, theories, and trajectories of law and legal systems in contemporary society. Excellent preparation for upper-division courses on law and related topics in the social and behavioral sciences or public administration. (Identical with SOC 277).

RUSS 275. Balkanization: Contact or Conflict (3) A cultural-historical overview of the cultures of the Balkans focusing on the development of national identity as seen by the people themselves and others.

#RUSS 328. Women in Russian Literature and Culture (3) I Images of Russian women as reflected in literary, historical, and religious texts. Cultural attitudes revealed help to understand the status and role of women in today's Russia. (Identical with W S 328).

Natural Science

ENTO 205. The Universe of Insects (4) I Learn about biology from the point of view of the most diverse and fascinating animals on earth.

GEOG 220. Our Diverse Biosphere This course has been designed to be similar to Our Diverse Biosphere in structure and strategy. The strategy is to immerse non-science majors in the biological aspects of Physical Geography and, through lively debate and discussion, to enhance critical thinking skills students need to make intelligent decisions about the world around them.

GEOS 218. Geological Disasters and Society (3) II Geological catastrophes (earthquakes, meteorite impacts, flooding) are important processes in shaping the Earth. This course will acquaint students with the scientific principles governing these catastrophes.

MSE 257. Materials Science of Art and Archaeological Objects (3) II The methods, content and practice pertinent to the study of art and archaeology. Materials science provides one of the keys for interpreting objects in their historical and cultural context. 3ES. (Identical with ANTH 257, ENGR 257).

MSE 258. Materials Science of Art and Archaeological Objects Laboratory (1) I Laboratory exercises involving the materials science of art and archaeological objects. 1ES. (Identical with MSE 258, ENGR 258).

NRSC 282. Biology of Sensation (3) I Touch, hearing, vision, olfaction and taste are examined to illustrate scientific methods in biology, development of science in a social context and sensory phenomena in health and disease. (Identical with SP H 282). 2R, 1D.

GENETICS (GENE)

Forbes Bldg., Rm. 319A
The University of Arizona
PO Box 210036
Tucson AZ 85721-0036
Phone: (520) 621-7511
May be convened with GENE 416.

520. History of Genetics (1) I Experiments and discoveries which have led to the present state of knowledge in the various areas of genetics. P, ECOL 320 or ECOL 321.

524. Theoretical Population Genetics (3) I (Identical with ECOL 524, which is home). May be convened with GENE 424.

525. Speciation (2) [Rpt. 1] II (Identical with ECOL 525, which is home).

533. Human Genetics (3) I For a description of course topics see GENE 433. Graduate-level requirements include an in-depth research paper on a current problem in human genetics. (Identical with ECOL 533). P, ECOL 320 or ECOL 321. May be convened with GENE 433.

535. Evolution II (4) I (Identical with ECOL 535, which is home). May be convened with GENE 435.

545. Concepts in Genetic Analysis (3) I (Identical with MCB 545, which is home).

555. Molecular Mechanisms of Development (3) II (Identical with MCB 555, which is home).

568. Nucleic Acid (4) I (Identical with BIOC 568, which is home).

570. Molecular Genetics and Evolution (3) I (Identical with MBIM 570, which is home).

574. Advances in Mammalian Genetics (2) [Rpt./1] I (Identical with BIOC 574, which is home).

581. Genetic Counseling (2) [Rpt./7 units] I II Principles of genetic counseling, general topics related to issues raised during genetic counseling (such as coping with chronic illnesses), and specific genetic counseling issues related to unique disorders encountered in the genetics clinic and other genetic counseling situations. Such disorders include prenatal, pediatric and adult genetic conditions. Limited to students in the genetic counseling training program except by consent of instructor.

589. Cancer Genetics (3) [Rpt./1] I (Identical with CBIO 589, which is home).

595. Colloquium
a. Genetics (1) [Rpt./1] I II

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

GEOGRAPHY AND REGIONAL DEVELOPMENT (GEOG)

Harvill Bldg., Room 409
The University of Arizona
PO Box 210076
Tucson AZ 85721-0076
Phone: (520) 621-1652
FAX: (520) 621-2889
E-mail: head@geog.arizona.edu
URL: http://geog.arizona.edu/

Baccalaureate Degrees
Bachelor of Arts (B.A.)
Bachelor of Science (B.S.)
Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Geography (B.A., M.A., Ph.D.)
Regional Development (B.S.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/minors/. For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Geography (GEOG)

102A. Human Geography (3) I Introduction to the main fields of human geography, with emphasis on world patterns of distribution and regional examples.

102B. Human Geography (3) II Introduction to the main fields of human geography, with emphasis on world patterns of distribution and regional examples. P, GEOG102A is not prerequisite to GEOG102B.

103A. Physical Geography (3) I Treats the atmosphere, biosphere, hydrosphere, and lithosphere as interrelated and geographically variable components of the earth's physical landscapes and the natural environment of humans.

103B. Physical Geography (3) II Treats the atmosphere, biosphere, hydrosphere, and lithosphere as interrelated and geographically variable components of the earth's physical landscapes and the natural environment of humans. P, GEOG103A is not prerequisite to GEOG103B.
104A. Physical Geography Laboratory (1) I Field observation and laboratory analysis of data and map interpretation. P, GEOG 103A or GEOG 103A.

104B. Physical Geography Laboratory (1) II Field observation and laboratory analysis of data and map interpretation. P, GEOG 103B or GEOG 103B.

110. Regional Land Use (3) I (Identical with PLAN 110, which is home).

151. World Regional Geography (3) I II Geographic concepts and information organized by conventional region and nation. Appropriate for elementary and secondary teaching.

171. Introduction to Meteorology and Climatology (3) I II (Identical with ATMO 171, which is home).

171L. Introduction to Meteorology and Climatology Laboratory (1) I II (Identical with ATMO 171L, which is home).

195. Colloquium a. Topics in Geography and Regional Development (1) I II

199H. Honors Independent Study (1-3) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./] I

301. Introduction to Regional Planning (3) I II (Identical with PLAN 301, which is home).

305. Economic Geography (3) I II Analysis and modeling of the spatial structure of primary, secondary, and tertiary economic activities; location theory and regionalization in economic systems. Writing-Emphasis Course.


357. Geographical Research Methods (3) I Formulation and solution of geographic problems; models, research design, and methods of gathering, analyzing, and portraying geographic data. Writing-Emphasis Course.


367. Population Geography (3) I Fertility, mortality, and migration as agents of demographic change. Topics include fertility control and LDCs; working mothers and NDCs; aging societies; legal/illegal immigration in the U.S.; population policies. (Identical with SOC 367).

369. Geography of the Middle East (3) I Physical environments and cultural areas of Southwest Asia, with emphasis on people-environment interrelationships, settlement systems, and impact of Islam. Writing-Emphasis Course. (Identical with NES 369).

371. Principles and Practices of Regional Development (3) I Introduction to basic concepts, objectives, practices and techniques of regional and industrial development as a professional activity, with emphasis on development problems and solutions. Writing-Emphasis Course. Field trips.

373. Political Geography (3) I II Explores links between global economic and political processes, national affairs and local politics. Designed to foster participation; assessment is via essays and assignments. Writing-Emphasis Course. (Identical with POL 373).

375. Metropolitan Tucson (3) I Physical and cultural basis of Tucson's geographic patterns, with emphasis on the city's site, situation, settlement patterns and problems of growth and change. Field trips.

379. Urban Growth and Development (3) I II Location patterns in urban areas and processes of growth; historical development of U.S. cities, rent theory, housing markets, commercial and industrial location, the role of transportation and planning. Student development teams create a model city using the ACRES real estate simulation game. (Identical with PLAN 379).

381. Cartography (3) Tools and techniques, properties and construction of projections, design and preparation of maps for publication.

393. Internship (1-6) [Rpt./]

396. Proseminar

399. Honors Proseminar (3) I

399H. Honors Independent Study (1-3) [Rpt./]

401. Introduction to Planning (3) I (Identical with PLAN 401, which is home). May be convened with GEOG 501.

407. The American Landscape (3) I II Origin and character of the visual aspects of places viewed individually and regionally; changes in habitat, vernacular structures and landscapes, townscapes, countrysides and special features. May be convened with GEOG 507.

408. Arizona and the Southwest (3) I The changing character of the land and man's occupancy of it, with emphasis on Arizona; historically and problem oriented. Writing-Emphasis Course. Field trips. May be convened with GEOG 508.


411. Middle America (3) I II Land, people, and culture in the major natural and cultural regions of Mexico, Central America, and West Indies. Writing-Emphasis Course. (Identical with LA S 411). May be convened with GEOG 511.

412. South America (3) I Physical and cultural bases of South America's geographic patterns, with emphasis on human settlement and problems of resource development. Writing-Emphasis Course. (Identical with LA S 412). May be convened with GEOG 512.

413. Africa (3) I Physical and human bases of regional contrasts, with emphasis on tropical environmental systems and changing patterns of resource utilization and development. Writing-Emphasis Course. May be convened with GEOG 513.

415. Introduction to Water Resources Policy (3) I II (Identical with HWR 415, which is home). May be convened with GEOG 515.

416. Geographic Information Systems for Geographic and Regional Development (3) I II Introduction to the use of computers for map production, with emphasis on cartographic principles and practical experience with several user-oriented mapping programs. (Identical with PLAN 416, RNR 416). May be convened with GEOG 516.

417. Geographic Information Systems for Natural Resources (3) I II (Identical with LA S 412). May be convened with GEOG 517.

419. Cartographic Modeling for Natural Resources (3) I (Identical with RNR 419, which is home). May be convened with GEOG 519.

420. Advanced Geographic Information Systems (3) I II (Identical with RNR 420, which is home). May be convened with GEOG 520.

421. Physical Climatology (3) I (Identical with ATMOS 421, which is home).

430. The Climate System (3) I II Systematic examination of processes and circulations comprising Earth's climate. Emphasis on circulations influencing geographic processes using examples of atmospheric environmental issues. P, GEOG 103A or ATMOS 171 or GEOG 171.

431. Global and Regional Climatology (3) I II Description and analysis of the atmospheric circulation process that produces differences in climates throughout the world. Emphasis on the earth's problem climates and climatically sensitive zones most susceptible to floods, droughts, and other environmental stresses due to global change. P, ATMOS 171 or GEOG 171. May be convened with GEOG 531.

446. Health and the Global Economy (3) I II The interconnection of the global economy, local social structures, political economies, and health. Examines theoretical approaches and case studies as well as strategies for ameliorating ill health. (Identical with W S 446). May be convened with GEOG 546.

450. Geomorphology (4) I (Identical with GEOS 450, which is home).

453. Locational Analysis (3) I Industrial location theory and location factors, consumer travel behavior and market areas, geography of economic impacts, location of public facilities. Writing-Emphasis Course. (Identical with PLAN 453). May be convened with GEOG 553.

454. Regional Analysis (3) I II Regionalization and geographic scale; spatial variation and well being and development; multiplier and analysis; demographic-economic models; theories of regional growth; regional policy. May be convened with GEOG 554.

456. The American City (3) I An integrated approach to the built environment with special...
emphasize on the historical, social, and political aspects of American urban development. Writing-Emphasis Course. (Identical with PLAN 456).

457. Statistical Techniques in Geography, Regional Development and Planning (3) I Methods of gathering and analyzing data for the solution of geographical, urban, and regional planning problems, with emphasis on quantitative and statistical techniques used in spatial analysis and cartography, on the one hand, and program planning, on the other. P, MATH 117 or equivalent. (Identical with PLAN 457). May be convened with GEOG 557.

459. Land Use and Growth Controls (3) II Current planning and legal techniques to regulate the rate of growth, the sequence of growth, and the eventual total size of towns, regions, and states: concentration on case studies. (Identical with PLAN 459). May be convened with GEOG 559.

460. Southwest Studies (3) II (Identical with L AS 460, which is home.) May be convened with 560.

461. Environmental and Resource Geography (3) II Examines physical resources (e.g., distribution, quantities, and availability) and the human factors which may contribute to their completion and deterioration as well as protection and maintenance. Writing-Emphasis Course. (Identical with HWR 461, LA S 461, PLAN 461).

464. Arid and Semiarid Lands (3) I Past, present and future of settlement and resource utilization in the world's arid lands; spatial interrelationships of environmental, demographic, socioeconomic and political systems. Writing-Emphasis Course. May be convened with GEOG 564.

465. Physical Aspects of Arid Lands (3) II The climate, landforms, hydrology, soils and vegetation of deserts, with special emphasis on processes and distribution at micro-to-macro scales. Writing-Emphasis Course. May be convened with GEOG 565.

466. The Middle Eastern City and Islamic Urbanism (3) I (Identical with NES 466, which is home). May be convened with GEOG 566.

471. Problems in Regional Development (3) I II Analysis of population growth trends, market areas, the role of transportation in development, regional specialization and economic structure, interregional migration, and regional policy issues. Writing-Emphasis Course. (Identical with AREC 471, PLAN 471). May be convened with GEOG 571.

476. The Land Development Process (3) [Rpt./ I A case-oriented approach to site selection, rezoning, financing, architectural design, economic feasibility, and other facets of the land development process. P, consult department before repeating this course; Field trips. (Identical with PLAN 476). May be convened with GEOG 576.

478. Global Change (3) II (Identical with GEOS 478, which is home). May be convened with GEOG 578.

483. Geographic Applications of Remote Sensing (3) II Use of aircraft and satellite imagery for monitoring landforms, soils, vegetation and land use, with the focus on problems of land-use planning, resource management and related topics. P, 2 units of remote sensing or equivalent; Field trips. (Identical with PLAN 483, RNR 483, SWES 483). May be convened with GEOG 583.

488. Governing Science and Technology (3) II Historical, cross-cultural, and geographical assessment of strategies societies have employed to govern science and technology; effects of particular strategies in terms of impacts (both positive and negative) of science and technology on people, their lives, and the environment. Writing-Emphasis Course. (Identical with ANTH 488, POL 488).

496. Seminar
   a. Research (3) I P, open to majors and Honors students in geography, GEOG357 or honors status. Writing-Emphasis Course.
   b. Projects in Regional Development (3) [Rpt./ I II P, 6 units of geographic techniques Open to majors only. May be convened with GEOG 597B.

498. Senior Capstone (1-3) I II

499H. Honors Thesis (3) [Rpt./ I II

499L. Independent Study (1-5) [Rpt./I

500. Current Geographical Research (3) I Major trends and issues in human and physical geography.

501. Introduction to Planning (3) I (Identical with PLAN 501, which is home). May be convened with GEOG 501.

505. Principles of Economic Geography (3) II Survey of micro- and macro-level theory in economic geography, location theory, central place theory, spatial behavior and interaction, development issues, impact models, and project evaluation.

507. The American Landscape (3) II For a description of course topics see GEOG 407. Graduate-level requirements include the completion of an essay and annotated bibliography on the work of a specific scholar, place, or region. (Identical with ARS 507). May be convened with GEOG 507.

508. Arizona and the Southwest (3) I For a description of course topics see GEOG 408. Graduate-level requirements include the completion of an original research paper on an approved topic. May be convened with GEOG 408.

509. Russia and the Former Soviet Union (3) II For a description of course topics see GEOG 409. Graduate-level requirements include two research projects. May be convened with GEOG 409.

510. Development of Regional Planning (3) I (Identical with PLAN 510, which is home).

511. Middle America (3) II For a description of course topics see GEOG 411. Graduate-level requirements include three tutorial sessions and a research-review paper. (Identical with LA S 511). May be convened with GEOG 411.

512. South America (3) I For a description of course topics see GEOG 412. Graduate-level requirements include three tutorial sessions and a research-review paper. (Identical with LA S 512). May be convened with GEOG 412.

513. Africa (3) II For a description of course topics see GEOG 413. Graduate-level requirements include the completion and oral presentation of an original research paper on an approved topic. May be convened with GEOG 413.

514. Analytic Methods in Local Planning and Management (3) II (Identical with PA S 514, which is home).

515. Introduction to Water Resources Policy (3) II (Identical with HWR 515, which is home). May be convened with GEOG 415.

516. Geographic Information Systems for Geography and Regional Development (3) II For a description of course topics see GEOG 416. Graduate-level requirements include the completion of a project report. (Identical with PLAN 516, RNR 516). May be convened with GEOG 416.

517. Geographic Information Systems for Natural Resources (3) II (Identical with RNR 517, which is home). May be convened with GEOG 417.

519. Cartographic Modeling for Natural Resources (3) I (Identical with RNR 519, which is home). May be convened with GEOG 419.

520. Advanced Geographic Information Systems (3) II (Identical with RNR 520, which is home). May be convened with GEOG 420.

530. The Climate System (3) I Graduate-level requirements include the completion of a term paper. (Identical with ARL 530).

531. Global and Regional Climatology (3) II For a description of course topics see GEOG 431. Graduate requirements include an additional term paper. May be convened with GEOG 431.

546. Health and the Global Economy (3) II For a description of course topics see GEOG 446. Graduate-level requirements include more substantive research paper. (Identical with W S 546). May be convened with GEOG 446.

550. Metropolitan and Regional Planning (3) I (Identical with PLAN 550, which is home).

553. Locational Analysis (3) I For a description of course topics see GEOG 453. Graduate-level requirements include the completion of an original research paper on an approved topic. (Identical with PLAN 553). May be convened with GEOG 453.

554. Regional Analysis (3) II For a description of course topics see GEOG 454. Graduate-level requirements include a term paper. May be convened with GEOG 454.

557. Statistical Techniques in Geography, Regional Development and Planning (3) I For a description of course topics see GEOG 457. Graduate-level requirements include three tutorial sessions and a research-review paper. (Identical with PLAN 557). May be convened with GEOG 457.
583. Geographic Applications of Remote Sensing (3) For a description of course topics see GEOG 483. Graduate-level requirements include the completion of a project report. (Identical with PLAN 583, RNR 583, SWES 583). May be convened with GEOG 483.

593. Internship (1-5) [Rpt./]

596. Seminar
k. Risk and Society (3) I (Identical with ANTH 596K, HWR 596K).

597. Workshop
a. Geography for Teachers (3) S For a description of course topics see GEOG 497A. May be convened with GEOG 497A.

599. Independent Study (1-5) [Rpt./]

605. Planning Theories and Perspectives (3) I (Identical with PLAN 605, which is home).

611. Projects in Regional Planning (1-5) [Rpt./ 5 units] I (Identical with PLAN 611, which is home).

617. Spatial Analysis (3) II Formal analysis and modeling of spatial structures and processes; conceptual evaluation of pattern networks, surfaces and interaction. P, GEOG 557. (Identical with PLAN 657).


695. Colloquium
a. Current Research (1) [Rpt./ 6] I II

696. Seminar
a. Economic Geography (3) [Rpt./ 2] I II
b. Cultural Geography (3) [Rpt./ 2] I II
c. Physical Geography (3) [Rpt./ 2] I II
e. Area Study (3) [Rpt./ 3] I II
f. Research Methods (3) [Rpt./ 2] I II
g. Urban Geography (3) [Rpt./ 9] I II

699. Independent Study (1-5) [Rpt./] I II

700. Research (2-4) [Rpt./]

709. Master’s Report (3) [Rpt./] II

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

**GEOLOGICAL ENGINEERING (G EN)**

For information about geological engineering, see the entry for the Department of Mining and Geological Engineering in this manual.

**GEO SCIENCES (GEOS)**

Gould-Simpson Bldg., Rm. 208
The University of Arizona
PO Box 210077
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Phone: (520) 621-6024
FAX: (520) 621-2672
E-mail: chair@geo.arizona.edu
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**GEO SCIENCES (GEOS)**

Bachelor of Science in Geosciences (B.S.G.)

**Graduate Degrees**

Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

**Majors and Degrees**

Geosciences (B.S.G., M.S., Ph.D.)

**B.S.G. Options:**
- environmental geology
- geophysics

**Program Requirements**

For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are also available online at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

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**Geosciences (GEOS)**

101. Introduction to Planet Earth (3) I II Earth's materials; surface and internal geologic processes; development of plate tectonics model. CR, GEOS 101.


103. Introduction to Geosciences Lab (1) Practical experience in rock and mineral identification, topographic and geologic maps, and applied problems in geosciences. CR, GEOS 101Special Fee; Field trips.

104. Historical Geology Laboratory (1) An introduction to fossil identification, principles of paleoecology, stratigraphy, and applied problems in geosciences. P, GEOS 101; CR, GEOS 102 Special Fee; Field trips.

106. Survey of the Solar System (3) I II (Identical with PTYS 106, which is home).

107B. Introduction to Global Change (4) II (Identical with HWR 107B, which is home).

109L. Exploration and Discovery in Planetary Science (1) I II (Identical with PTYS 109L, which is home).

110. Introduction to Environmental Geology (3) I II Introduction to geologic studies and their application to current environmental problems, their causes and possible solutions. Focuses on surface geologic processes and geohazards, natural resources and global systems. P, primarily for non-majors; Field trips.

112. Introduction to Oceanography (3) II
Introduces the oceans and their geological, physical, chemical, and biological processes with emphasis on their history and formation and the interactions of humans with the marine environment. Students are encouraged to take 103 as a related laboratory.


194. Practicum (1-4) [Rpt./]

195. Colloquium

a. Evolution and History of the Earth (1) II d. A Sense of Place (1) II

199. Independent Study (1-4) [Rpt./]

203. Stratigraphy and Paleontology (4) I II GRD Principles of paleontology and sedimentary geology. Classification of fossils and sedimentary rocks. Paleoenvironments, geological time, stratigraphy, fossil occurrence and evolution. P: GEOS 102 or consent of instructor, GEOS 101; Field trips.

204. Structure and Physics of the Earth (4) I II Integration of structural geology and geophysics, viewed in the context of plate tectonics. Emphasis includes the relationship of earth dynamics to energy, water, and metals resources and to natural hazards. P: MATH 124 or MATH 125A; GEOS 201; Field trips.


210. Environmental Geology (3) I II A geological perspective on current environmental problems, their causes and possible solutions. Focus on surface processes, geohazards, natural resources, and global systems. Field trips. 2R, 3L.

212. Introduction to Oceanography (3) I II Introduces the oceans and their geological, physical, chemical, and biological processes with emphasis on their history and formation and the interactions of humans with the marine environment.

218. Geological Disasters and Society (3) II Geological catastrophes (earthquakes, meteorite impacts, flooding) are important processes in shaping the Earth. This course will acquaint students with the scientific principles governing these catastrophes.

251. Physical Geology (4) I II Introduction to Earth’s materials; surface and internal geologic processes; plate tectonics; and geologic time. Includes practical experience in rock and mineral identification, topographic maps, and supplied problems in geosciences. 3R, 3L. Field trip. Fee.

256. Computer Applications in Geosciences (3) I II Emphasizes computer skills in the Macintosh and Unix environments specific to geosciences. Students will become familiar with spreadsheets, graphics applications, mathematical tools and geologic databases.

294. Practicum (1-4) [Rpt./]

299. Independent Study (1-4) [Rpt./]

302. Principles of Stratigraphy and Sedimentation (4) I II GRD Basic principles and methods of stratigraphic analysis; sedimentation and depositional environments, facies relations, evaluation of unconformities, stratigraphic classification and nomenclature, correlation, and dynamics of basin fill. P: GEOS 209; Field trips.

304. Structural Geology (4) I II Description and analysis of geologic structures of deformational origin; stereographic and experimental work in lab; structure and mapping in the field.


308. Paleontology (3) I Basic principles and concepts; morphology and classification of fossils; their occurrence, distribution, geologic and evolutionary significance. 2R, 3L. Field trips. P: 101 and ECOL 182. (Identical with ECOL 308).

310. Geosciences Communication (1-3) II Basic writing and/or speaking skills in the geosciences. Writing and rewriting and/or speaking assignments and/or participation in Geodaze. Must take writing portion first/concurrently. Writing-Emphasis Course.

312. Introduction to Field Methods (1) II Introduction to methods of field geology. Review of basic mapping techniques. Construction and interpretation of geologic maps, cross-sections and geological histories from limited observations. P: GEOS 321; Field trips.

312. Introduction to Geophysics (3) I GRD Physical principles applied to problems in earth science including seismology, gravity, magnetics, heat flow, plate tectonics. P: PHYS 182, PHYS 241.

330. Introduction to Remote Sensing (3) I (Identical with GEOG 330, which is home).


346H. Mineral and Energy Resources (3) I History of the impact of minerals and metals on development of society and civilization, uniqueness of resources, current situation and problems. P: junior standing.


380. Global Agriculture and International Relations (3) (Identical with AGTM 380, which is home).

391. Preceptorship (2) [Rpt./]

391. Preceptorship

b. Honors Preceptorship (2) [Rpt./]

393. Internship (1-15) [Rpt./]

394. Practicum (1-4) [Rpt./]

396. Proseminar

h. Honors Proseminar (3) I

397. Workshop

a. Teaching Geosciences (2-3) [Rpt./ 12 units] II P, consult department before enrolling.

399. Independent Study (1-4) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./]

400. Introduction to Geochemistry (3) I Nuclear systemsatics and thermodynamics with applications to geologic processes. P: GEOS 101, GEOS 103, CHEM 103B, CHEM 104B. May be convened with GEOS 500.

401. Earth Science Teaching Methods and Materials (3) II Instructional methods in laboratory and classroom, resources development, curriculum planning and assessment. P: 22 units in earth sciences. May be convened with GEOS 501.

402A. Statistical Analysis of Geological Data (3) I Application of statistical methods to the analysis of and description of geologic data. Geologic similarity, estimation, classification of geologic objects, and structure of data on multiple features. Examples and case studies from major subdisciplines of geoscience. P: MATH 124, MATH 125B. May be convened with GEOS 502A.

402B. Statistical Analysis of Geological Data (3) II An advanced treatment of the topic: covering important additional techniques in dealing with multivarite geologic problems. P: GEOS 402A or equivalent. May be convened with GEOS 502B.

403. Physics of the Solar System (3) I (Identical with PTYS 403, which is home). May be convened with GEOS 503.

406. Conservation Biology (3-4) II (Identical with ECOL 406, which is home). May be convened with GEOS 506.

406L. Conservation Biology in the Field (1) II (Identical with ECOL 406L, which is home). May be convened with GEOS 506L.

409R. Conservation Biology (3) II (Identical with ECOL 409R, which is home). May be convened with GEOS 506R.

407. Photogeology (3) II (Identical with GEN 407, which is home). May be convened with GEOS 507.

411. Geology of the Solar System (4) [Rpt./] (Identical with PTYS 411, which is home). May be convened with 511.

412. Geology Field Camp I (3) S Field methods in geology; preparation of geologic reports. P: GEOS 302, GEOS 315, GEOS 321; Special Fac.
instructor. Writing-Emphasis Course. 476b: Explores approaches to studying biological diversification, integrating phylogenetic biology, ecology, population genetics, developmental biology and molecular biology. P. 355 or consent of instructor. (Identical with ECOL
476a-476b and MCB 476a-476b). May be convened with 576a-576b.

478. Global Change (3) II Analysis of the entire Earth system through an examination of how its component parts and their interactions have changed in the past and may be expected to change in the future. P. upper-division standing, introductory course work in biological and physical sciences. (Identical with ECOL 478, GEOG 478, HWR 478, RNR 478). May be convened with GEOS 578.

481. Quaternary Paleoecology (3) II Theory and techniques of identification and interpretation of pollen, spores, seeds, leaves, and wood of plants from lakes, marshes, caves, and archaeological sites. P. ECOL 472. (Identical with ANTH 481). May be convened with GEOS 581.

482. Paleoclimatology (3) I Topics in paleoclimatology including prediction of paleoclimatic patterns, proxy paleoclimatic indicators, and paleoclimatic cycles. May be convened with GEOG 582.

488. Soil Geochemistry (3) I Soil mineralogy and organic matter, weathering and mass balance, stable isotopic tracers and impact on atmospheric and oceanic chemistry. P. GEOG 101, GEOG 103, CHEM 103B, CHEM 104B. May be convened with GEOG 588.

489. Quaternary Geochronology (3) II Review of quantitative dating techniques for Quaternary geologists, including 14C, U-series, in situ cosmogenic radionuclides, TL, amino acids and others. P. GEOG 101, GEOG 103, CHEM 103B, CHEM 104B. May be convened with GEOG 589.

490. Remote Sensing for the Study of Planet Earth (3) II (Identical with REM 490, which is home). May be convened with GEOG 590.

493. Internship (3) [Rpt./]

494. Practicum (3) [Rpt./]

497. Workshop

c. Dendrochronology (1-4) II Field trips. (Identical with ANTH 497C, WS M 497C). May be convened with GEOG 597C.

d. Geosciences Communication (1-3) [Rpt./ 3 units] II P. satisfaction of upper-division proficiency examination.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ 2] II

499. Independent Study (1-4) [Rpt./]

499H. Honors Independent Study (3) [Rpt./] I II

500. Introduction to Geology (3) I For a description of course topics see GEOG 400. Graduate-level requirements include an independent research report. May be convened with GEOG 400.

501. Earth Science Teaching Methods and Materials (3) II For a description of course topics see GEOG 401. Graduate-level requirements include two additional projects. May be convened with GEOG 401.

502A. Statistical Analysis of Geological Data (3) I For a description of course topics see GEOG 402A. Graduate-level requirements include an additional term project on an approved topic. May be convened with GEOG 402A.

502B. Statistical Analysis of Geological Data (3) II For a description of course topics see GEOG 402B. Graduate-level requirements include an additional term project on an approved topic. May be convened with GEOG 402B.

503. Physics of the Solar System (3) II (Identical with PTYS 503, which is home). May be convened with GEOG 403.

505. Applied Multispectral Imagery (3) II (Identical with G EN 505, which is home).

506. Conservation Biology (3-4) II (Identical with ECOL 506, which is home). May be convened with GEOG 406.

506L. Conservation Biology in the Field (1) II (Identical with ECOL 506L, which is home). May be convened with GEOG 406L.

507. Photogeology (3) I (Identical with G EN 507, which is home). May be convened with GEOG 407.

599. Advanced Petrology (3) I An advanced treatment of the topic based primarily on the principles of classical thermodynamics, reaction-order-disorder- and diffusion-kinetics, and heat transfer. P. 583 or consent of instructor.

510. Principles of Cosmochemistry (3) I (Identical with PTYS 510, which is home).

511. Geology of the Solar System (4) [Rpt./1] (Identical with PTYS 511, which is home). May be convened with GEOG 411.

514. Late Quaternary Geology (3) I Paleoenvironment and geochronology of Late Quaternary alluvium as read from the stratigraphic records and geomorphology at key localities in North America, including selected archaeological sites. The interaction of fluvial and aeolian processes in the eastern Sahara will be evaluated using enhanced LANDSAT and Shuttle Imaging Radar. P. GEOG 102, GEOG 104; Field trips. (Identical with ANTH 514).

516. Field Studies in Geophysics (3) II (Identical with G EN 516, which is home). May be convened with GEOG 416.

517. Sedimentary Basin Analysis (3) II For a description of course topics see GEOG 417. Graduate-level requirements include a term paper. May be convened with GEOG 417.

518. Advanced Mineralogy (3) II For a description of course topics see GEOG 418. Graduate-level requirements include an independent research report. P. 306. May be convened with GEOG 418.

519. Physics of the Earth (3) II For a description of course topics see GEOG 419. Graduate-level requirements include a term paper in publication format on some aspect of a major course topic. (Identical with PTYS 519). May be convened with GEOG 419.

520. Meteorites (3) II (Identical with PTYS 520, which is home).

521. Structural Geology (4) I II For a description of course topics see GEOG 421. Graduate-level requirements include a research project. May be convened with GEOG 421.

522. Well Logging Interpretation (3) II (Identical with G EN 522, which is home).

523. Regional Structural Geology (3) [Rpt./3] I For a description of course topics see GEOG 423. Graduate-level requirements include additional reading assignments on structural processes and regional geology. May be convened with GEOG 423.

525. Regional Tectonics (3) I For a description of course topics see GEOG 425. Graduate-level requirements include a research paper on topical or regional tectonics. May be convened with GEOG 425.

526. Cordilleran Tectonics (3) II For a description of course topics see GEOG 426. Graduate-level requirements include final report concerning some aspect of the tectonic evolution of the westernmost part of North America. May be convened with GEOG 426.

527. Orogenic Systems (3) II An analysis of the geology, geophysics, and geochemistry, and the tectonic evolution of selected world mountain systems ranging from currently active belts in both oceanic and continental settings back through Phanerozoic, Proterozoic, and into Archean time.

528. Geologic Characteristics of Ore Occurrence (3) I Geological, geochemical and geophysical signatures of ore occurrence at the scales of tectonic settings, provinces, district mines. P. GEOG 446 or GEOG 546 or GEOG 446 or GEOG 546.

530. The Chemical Evolution of Earth (3) I For a description of course topics see GEOG 430. Graduate-level requirements will include an additional paper. (Identical with PTYS 530). May be convened with GEOG 430.

531. Hydrogeology (4) I II (Identical with HWR 531, which is home). May be convened with GEOG 431.

532. Introduction to Seismology (3-5) II For a description of course topics see GEOG 432. Graduate-level requirements include a term paper. May be convened with GEOG 432.

533. Mine Investment Analysis (3) I For a description of course topics see GEOG 433. Graduate-level requirements include an in-depth research paper on a single aspect of mineral investment to be approved by the instructor. May be convened with GEOG 433.

535. Advanced Subsurface Hydrology (3) II (Identical with HWR 535, which is home).

536. Ground-Water Resource Evaluation (3) II (Identical with HWR 536, which is home).
537. Economics of Mineral Resource Development and Production (3) II For a description of course topics see GEOS 437. Graduate-level requirements include an independent research project or term paper in publication format. May be convened with GEOS 437.

538. Biogeography (3) II (Identical with ECOL 538, which is home). May be convened with GEOS 438.

539. Analytical Methods in Geophysics (3) II Transform theory, spectral analysis, asymptotic series, special functions, probability. Applications to geophysical problems. P, MATH 422B.

540. Geodynamics and Paleomagnetism (3) [Rpt./1] I For a description of course topics see GEOS 440. Graduate-level requirements include an independent research project in one aspect of geodynamics and a publication-format paper. P, 20 units of geosciences, MATH 254. May be convened with GEOS 440.

541. Soil Genesis (3) II (Identical with SWES 541, which is home).

542. Ore Deposit Petrology (3) II Genomagmatic, porphyry base metal, skarn, and black-capped lithologic-mineralogic studies by petrographic microscope, electron probe, and advanced techniques.

543. Advanced Physical Sedimentology (3) II First half of course deals with mechanics of flows and sediment transport, oscillatory and unidirectional flows, waves and wave theory, bedforms and flow regimes, sediment gravity flows, liquefaction and fluidization. Second half covers physical processes and facies in alluvial fan, fluvial, eolian, nearshore, shelf, slope and turbidite fan systems. Emphasis is on elastic systems. P, 203, MATH 254 or consent of instructor. May be convened with 444.

546. Economic Mineral Deposits (3) II GRD For a description of course topics see GEOS 446. Graduate-level requirements include an independent study project. P, 304, 306. May be convened with GEOS 446.

547. Industrial Minerals and Rocks (3) I For a description of course topics see GEOS 447. Graduate-level requirements include a term paper. May be convened with GEOS 447.

548. Geophysical Exploration and Engineering (3) I (Identical with G EN 548, which is home). May be convened with GEOS 449.

549. Mineral Exploration (3) I (Identical with G EN 549, which is home). May be convened with GEOS 449.

550. Geomorphology (4) I For a description of course topics see GEOS 450. Graduate-level requirements include panel leaderships on environmental discussion sessions, and additional lab exercise questions. (Identical with ARL 550). May be convened with GEOS 450.

551. Strategies in Environmental Hydrogeochemistry (3) I For a description of course topics see GEOS 452. Graduate-level requirements include a term paper regarding some aspect of a major course topic. May be convened with GEOS 452.

553. Glacial and Quaternary Geology (3) I For a description of course topics see GEOS 453. Graduate-level requirements include an independent research project or term paper in publication format. May be convened with GEOS 453.

554. Evolution of Planetary Surfaces (3) II (Identical with GEOS 554, which is home).

555. Remote Sensing of Planetary Surfaces (3) II (Identical with GEOS 555, which is home).

556. Thrust Belts and Synorogenic Sediments (3) I For a description of course topics see GEOS 456. Graduate-level requirements include an in-depth research paper on a single aspect of the course topic. May be convened with GEOS 456.

558. Geochronology (3) I For a description of course topics see GEOS 458. Graduate students will be required to present projects at the end of the semester. May be convened with GEOS 458.

559. Thermochronology (3) II For a description of course topics see GEOS 459. Graduate students will be required to present projects at the end of the semester. May be convened with GEOS 459.

560. Electrical Exploration Methods (3) I (Identical with G EN 560, which is home).

561. Paleolithic Origins (3) I (Identical with ANTH 561, which is home).

562. Introduction To Quaternary Ecology (3) I II For a description of course topics see GEOS 462. Graduate-level requirements include a term paper in publication format. May be convened with GEOS 462.

563. Environmental Isotope Hydrology and Low Temperature Geochemistry (3) I II Theory and application of light stable and cosymmetric isotopes to hydrological and paleoenvironmental problems. Radiometric dating of ground water. (Identical with HWR 563).

564. Introduction to Dendrochronology (4) I For a description of course topics see GEOS 464. Graduate-level requirements include a research paper reviewing critically some aspect of dendrochronology. (Identical with ANTH 564, WS M 564). May be convened with GEOS 464.

565. Phylogenetic Biology (3) I (Identical with ECOL 565, which is home). May be convened with GEOS 465.

567. Inverse Problems in Geophysics (3) I II Linear and nonlinear inverse theory, including least squares, generalized and maximum likelihood methods. P, experience with linear algebra and computer programming recommended. (Identical with ATMO 567, PTYS 567).

568. Advanced Seismology (3) II Computational techniques in seismology. The application of synthetic seismograms to model source processes and complex structure. P, GEOS 432 or GEOS 532; MATH 422B.

569. Seismic Data Processing (3) I For a description of course topics see GEOS 469. Graduate-level requirements include a special research project. May be convened with GEOS 469.

571. Terrestrial Planets (3) I (Identical with PTYS 571, which is home).

572. Global Biogeochemical Cycles (3) I (Identical with GC 572, which is home).

573. Geology and the Urban Environment (3) II For a description of course topics see GEOS 473. Graduate-level requirements include a research paper on a topic related to geologic hazards but not covered in lectures. (Identical with PLAN 573). May be convened with GEOS 473.

576a-576b. Analysis of Biological Diversification (3-3) I II [Rpt./1] For a description of course topics see GEOS 476a-476b; (Identical with ECOL 576a-576b and MCB 576a-576b). May be convened with 476a-476b.

578. Global Change (3) II For a description of course topics see GEOS 478. Graduate-level requirements include an in-depth research paper on a topic selected by the student and instructor. (Identical with ECOL 578, GEOG 578, HWR 578, RNR 578). May be convened with GEOS 478.

581. Quaternary Palynology and Plant Macrofossils (2-4) II For a description of course topics see GEOS 481. For a description of course topics see 481. (Identical with ANTH 581). May be convened with GEOS 481.

582. Paleoclimatology (3) I For a description of course topics see GEOS 482. Graduate-level requirements include an additional research project. May be convened with GEOS 482.

583. Physical Geochemistry (3) I II Principles of classical and elementary statistical thermodynamics. Thermo-chemical and physical properties; equations of states for solids and gases; solutions; phase equilibrium; nonideal multicomponent systems with emphasis on geological and planetary problems. P, MATH 125B or MATH 124; MATH 125A. (Identical with PTYS 583).

588. Soil Geochemistry (3) I For a description of course topics see GEOS 488. Graduate-level requirements include an in-depth research paper project on a single aspect of the course topic. May be convened with GEOS 488.

589. Quaternary Geochronology (3) II For a description of course topics see GEOS 489. Graduate-level requirements include an in-depth research paper project on a single aspect of the course topic. May be convened with GEOS 489.

590. Remote Sensing for the Study of Planet, Earth (3) II (Identical with REM 590, which is home). May be convened with GEOS 490.

594. Practicum (1-4) [Rpt./] 5 121

595. Colloquium 5

596. Seminar 5
a. Mineralogy-Petrology-Geochemistry (1-4) [Rpt./ 6 units] I II
b. Economic Geology (1-4) [Rpt./ 6 units] I II
c. Geomorphology-Quarternary Geology (1-4) [Rpt./ 6 units] I II
d. Paleontology-Sedimentary Geology (1-4) [Rpt./ 6 units] I II
e. Structure-Tectonics (1-4) [Rpt./ 6 units] I II
f. Geophysics (1-4) [Rpt./ 6 units] I II
g. Dendrochronology (1-4) [Rpt./ 6 units] I II
h. Geosciences (1-4) [Rpt./ 6 units] I II
p. Macroevolution (2) [Rpt./ 2] I II (Identical with ECOL 596P, which is home).

597. Workshop
b. Phylogenetic Inference (2) (Identical with ENTO 597B, which is home).
c. Dendrochronology (1-4) II For a description of course topics see GEOS 497C. (Identical with ANTH 597C, WS M 597C). May be convened with GEOS 497C.
d. Technical Writing in Geosciences (1-3) I

599. Independent Study (1-4) [Rpt./]

646A. Advanced Ore Deposit Geology (4) I Geology, characteristics and origins of ore deposits in igneous, sedimentary, and metamorphic rocks. Laboratories include field trips, analytical techniques, problem solving. P, GEOS 446 or GEOS 546.

646B. Advanced Ore Deposit Geology (4) II Geology, characteristics and origins of ore deposits in igneous, sedimentary, and metamorphic rocks. Laboratories include field trips, analytical techniques, problem solving. P, GEOS 446 or GEOS 546.

650. Problems in Geomorphology (3) II Application of quantitative methods to field problems, P, GEOS 450; Field trips.

651. Climatic Geomorphology (3) I Effects of climatic changes on geomorphic processes, landforms, and soils; paleoclimatic and earthquake-hazards interpretations. Field trips.

652. Tectonic Geomorphology (3) II Effects of tectonic movements on geomorphic processes and landforms; earthquake-hazards interpretations. P, GEOS 450; Field trips.

900. Research (1-6) [Rpt./]

909. Master's Report (1-9) [Rpt./]

910. Thesis (1-6) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

GERMAN STUDIES (GER)
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Baccalaureate Degree
Bachelor of Arts (B.A.)
Graduate Degree
Master of Arts (M.A.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs are available online on the GEOS 497C website.

For graduate program requirements, consult the Graduate Catalog and the departmental office listed above.

German (GER)

101. Beginning German I (4) I II CDT
102. Beginning German II (4) I II CDT
111. Beginning Intensive German (6) S CDT

177. Eroticism and Love in the Middle Ages (3) Introduces the student to the culture and mentality of the Middle Ages focusing on attitudes toward love, sex and marriage. Concepts of the body, of human relationship, and eroticism will be highlighted. (Identical with ENGL 177, FREN 177, ITAL 177, PORT 177, and SPAN 177).

195. Colloquium
a. Learning Foreign Languages: Windows to the World (1) I II (Identical with LING 195A).

199. Independent Study (1-3) [Rpt./]

201. Beginning German III (4) I II CDT
202. Intermediate German II (4) I II CDT

203. Intermediate German II (4) I II CDT Speaking, understanding, writing, and reading P, GER 102 or GER 111.

204. Intermediate Intermediate German (8) I GRD Intensive intermediate German for students to proceed at an accelerated pace to cover a greater variety of materials and topics than offered in German 103 and 202 An honors section is available. Enrollment is contingent upon personal interview and an exam given in the first week of class. 8R, 2L, P, see honors Program Requirements for honors section, consult department before enrolling.

211. Intermediate Intensive German (6) S CDT

272. Staging Twentieth-Century Germany (3) I Explores the many changes in German society during the past century through the lens of twentieth-century German plays and theater productions.

273. Tradition and Revolution: German Romanticism (3) I II An introduction to major 19th century artists, writers, and composers of German speaking countries. Focuses on their works and their responses to them. P, freshman composition.

274. Dialogue of the Sexes: Men and Women in German Society (3) I To view a closely related culture from the standpoint of our own lives; to get a critical perspective on the spontaneous assumptions we make about gendered individuals and their societies. Tier I course.

275. Creative Minds: the German Classical Heritage (3) I From Apollo to Dionysus and beyond: Weimar Classicism and its reception in German literature, philosophy and art history. Lectures and readings in English.

276. Challenges to Traditions (3) Examines texts from the turn of the 20th century to the Third Reich which reveal an explosion of creativity across boundaries: literature, fine arts, pop culture, architecture, film.

278. Medieval Answers to Modern Questions (3) II Discussion of essential texts from the Middle Ages which offer fundamental answers to existential problems people have faced at all times.


299H. Honors Independent Study (1-3) [Rpt./]

300. Encounters in Language and Culture (6) I II Crossing borders and expanding horizons; geographic, thematic, cultural, and disciplinary. Advanced work on speaking, reading, writing, and understanding. P, GER 204 or equivalent.

301. Voices Past and Present (3) [Rpt./ 1] I II Prerequisite to all upper-division courses: expanding knowledge of the cultural history of the German speaking countries; advances oral and written proficiency in German. P, GER 204 or equivalent.

310. Introduction to German Linguistics (3) [Rpt./ 1] I II Overview of current topics in the analysis of German, including phonetics/phonemes, morphology, syntax, the lexicon, pragmatics, and sociolinguistics.

311. Dealing with the Past (3) [Rpt./ 1] I II Examines how German writers, artists, or filmmakers have sought to come to terms with the past.

312. Tales of Love (3) [Rpt./ 1] I II Focuses on a wide range of narratives from various historical periods dealing with representations of love.

313. Stories in Genre (3) [Rpt./ 1] I II Focuses on a literary genre and its historical development from its beginnings to the present through a close study of representative texts.

314. German for Economics (3) [Rpt./ 1] I II Development of language and cultural proficiency skills dealing with various aspects of
German 151

315. German for Business (3) [Rpt./ 1] I II Development of language and cultural proficiency skills. Covers topics such as corporate strategies, marketing, and management. Emphasis on practical, career-usable competence.

316. “Minority” Views in German Culture (3) [Rpt./ 1] I II Germany as a multicultural society, critical exploration of “minority” voices and the construction of identity within a dominant culture, through literature, film, and essays.

325. History of German Cinema (3) I The important films in the development of German cinema from the pre-1945 period and the cinema of the Federal Republic of Germany after 1945 to the present. (Identical with MAR 325).

373. Women’s Fictions in Twentieth-Century Germany (3) I II Introduction to a variety of twentieth-century women writers and filmmakers in German-speaking countries. Texts will range from literary works to essays, films, and videos of theater performances. Readings and class discussions in English. (Identical with WS 373).

375. Love, Madness and Decay in fin-de-siècle Vienna (3) I II Explores the themes of love, madness, decay and death as they appear in the works of major writers, artists, composers and thinkers associated with Vienna at the turn of the century, 1880-1920. P, completion of Tier I.

376. German-Jewish Writers (3) I Focuses on the contributions of Jewish writers to German culture. P, completion of Tier I. (Identical with JUS 376).

379. Religion in German Culture (3) I II Introduction to major cultural figures of German-speaking countries who have seen, imagined, or experienced what role religion may or can play in human life. (Identical with RELI 379).

399. Independent Study (2-4) [Rpt.]

400. History of the English Language (3) I II (Identical with ENGL 405, which is home). May be convened with GER 505.

410. The Enlightenment and its Legacies (3) [Rpt./ 1] I II Historical, cultural, and ideological background of the Enlightenment introduced through a study of major texts; examines the impact on later German cultural and political history.

420. Romanticism and its Legacies (3) [Rpt./ 1] I II Historical, cultural, and ideological background of Romanticism through a study of major texts; examines the impact on later German cultural and political history.

425A. Old English (3) I (Identical with ENGL 425A, which is home). May be convened with GER 525A.

425B. Old English (3) II (Identical with ENGL 425B, which is home). May be convened with GER 525B.

430. Crossing Borders/Crossing Cultures (3) [Rpt./ 1] I II Focuses on the topic of cultural boundaries: investigates such themes as travel writing, unification, postmodernism, and cross-cultural dialogue.

440. Jews and Judaism in German Culture (3) [Rpt./ 1] I II Ways in which Jews, Judaism, and Jewishness have been represented in German texts. (Identical with JUS 440).

450. Construction of Identity (3) [Rpt./ 1] I II Explores constructions of personal, cultural, religious, social, gender, and national identity in German culture by looking at a variety of texts.

455. Music and German Literature (3) I The interrelationship between music and German literature from the 18th through the 20th century. Concentrates on major works of German drama, poetry, prose, and their musical settings. Lectures in English. Readings primarily in English, some German. (Identical with MUS 455). May be convened with GER 555.

475. Advanced German Usage (3) I CDT May be convened with GER 575.

479. Issues in Foreign Language Teaching Acquisition and Teaching (3) I Modern methods of language teaching with emphasis on German as a foreign language. May be convened with GER 579.

480. Applied Linguistics for German as a Foreign language (3) I II Issues in and methods of applied linguistics with emphasis on Germanic languages. May be convened with GER 580.

494. Practicum

a. German Studies (3) [Rpt./ 1] I II

b. Pedagogy (3) [Rpt./ 2] I

c. Culture and Civilization of North Africa (3) [Rpt./ 2] II

d. Linguistics (3) [Rpt./ 2] I

e. Translation (3) [Rpt./ 2] I II

f. Theatre (3) [Rpt./ 2] I II

g. Business (3) [Rpt./ 2] I II

497. Workshop

a. Literature (1-5) [Rpt./ 5 units] I II May be convened with GER 597A.

b. Pedagogy (1-5) [Rpt./ 5 units] I II May be convened with GER 597B.

c. Culture (1-5) [Rpt./ 5 units] I II May be convened with GER 597C.

498. Senior Capstone (1-3) I II

499. Independent Study (2-6) [Rpt./ 1] I II

500. Intensive Reading German for the Sciences and Humanities (4) I Rapid acquisition of reading proficiency in German. No prior knowledge of German is necessary. Proficiency certification obtained from this course fulfills graduate foreign language requirement in some departments (consult department for information). P, credit available for non-majors only.

501. Appropriating and Reshaping the Past (3) I II Examines the creative reception of cultural artifacts found in oral traditions, religion, politics, historical events and the arts in German-speaking cultures. P, 6 units of upper-division German.

502. Genre as a Category for Organizing Experience (3) I Examination of individual texts in relation to theories of genre, with attention to shifting definitions of genre and resistance to generic categories. P, 6 units of upper-division German.

503. Erziehung und Bildung in German Culture (3) I II Investigates theories of education and their reflection in literary works. The Bildungsroman, for instance, discloses central elements of German culture and society. P, 6 units of upper-division German.

505. History of the English Language (3) I II (Identical with ENGL 505, which is home). May be convened with GER 405.

506. Representing the “Other” (3) I II Explores narratives that construct the Other, the foreigner, and the outsider; discusses the politics of racism, sexism and exclusion using texts from various fields. P, 6 units of upper-division German.

507. Criticism and Creativity in German Culture (3) I II Examines the relationship between theories of literature and literary practice, and the question of the nature of writing in general. P, 6 units of upper-division German.

508A-508B. Approaches to German Studies (3-5) I II An overview of research materials, methods, theories and issues from which individuals, interests, and concentrations in German studies can develop. Provides for the selection of faculty mentors. P, 6 units of upper-division German.

509. Traditions and Modernism (3) I Provides a critical overview of literary and intellectual currents of the “modern” period; explores the changing status and social function of literature. P, 6 units of upper-division German.

510. Repression, Revolution, Revision (3) I Maps various movements and literatures that resist the repressing of history and stories. Focuses on narrative, memory and the construction of personal and national identities. P, 6 units of upper-division German.

511. Communication and Miscommunication in Medieval, High and Later German Literatures (3) I Explores the way German writers of the Middle Ages have dealt with basic issues of human communications.

520. History of the German Language (3) I II Examination of the semantic, socio-historical and structural development of German from the time of migrations to the present. (Identical with ENGL 520).

525A-525B. Old English (3) I (Identical with ENGL 525A-525B, which is home). May be convened with GER 425A-425B.

555. Music and German Literature (3) I For a
description of course topics see GER 455.
Graduate-level requirements include two oral reports or lectures-recitals on a specific topic. P, GER 202. (Identical with MUS 555). May be convened with GER 455.

575. Advanced German Usage (3) I For a description of course topics see GER 475. May be convened with GER 475.

579. Issues in Foreign Language Teaching Acquisition and Teaching (3) I For a description of course topics see GER 479. Graduate-level requirements include an in-depth research paper on an important issue of foreign language teaching. May be convened with GER 479.

580. Applied Linguistics for German as a Foreign language (3) II For a description of course topics see GER 480. Graduate-level requirements include an in-depth research paper on an aspect of applied linguistic research. May be convened with GER 480.

585. Linguistic and Computer-Assisted Approaches to Literature (3) II Graduate-level requirements include an additional oral report and an in-depth research paper. P, 3 units of literature at the 300 level or above. (Identical with CLAS 585, ENGL 585, FREN 585, LING 585, RUSS 585).

587. Testing and Evaluation in Foreign/Second Language Programs (3) I For a description of course topics see GER 487. Graduate-level requirements include an additional oral report and an in-depth research paper. P, 3 units of literature at the 300 level or above. (Identical with CLAS 587, EAS 587, ENGL 587, FREN 587, RUSS 587, SPAN 587).

594. Practicum

a. Literature (1-5) [Rpt./ 5 units] I II P, competency at 4th year undergraduate level or pass departmental placement exam.

b. L2 Acquisition and Teaching (1-5) [Rpt./ 5 units] I II P, competency at 4th year undergraduate level or pass departmental placement exam.

c. Culture (1-5) [Rpt./ 5 units] I II P, competency at 4th year undergraduate level or pass departmental placement exam.

d. Linguistics (1-5) [Rpt./ 5 units] I II P, competency at 4th year undergraduate level or pass departmental placement exam.

e. Translation (1-5) [Rpt./ 5 units] I II P, competency at 4th year undergraduate level or pass departmental placement exam.

596. Seminar

a. Literature (1-5) [Rpt./ 5 units] I II P, competency at 4th year undergraduate level or pass departmental placement exam.

b. L2 Acquisition and Teaching (1-5) [Rpt./ 5 units] I II P, competency at 4th year undergraduate level or pass departmental placement exam.

c. Culture (1-5) [Rpt./ 5 units] I II P, competency at 4th year undergraduate level or pass departmental placement exam.

d. Linguistics (1-5) [Rpt./ 5 units] I II P, competency at 4th year undergraduate level or pass departmental placement exam.

e. Translation (1-5) [Rpt./ 5 units] I II P, competency at 4th year undergraduate level or pass departmental placement exam.

GERONTOLOGICAL STUDIES (GERO)

Geronimo Hotel, 800 E. University Blvd., Ste. 340
The University of Arizona
PO Box 210432
Tucson AZ 85721-0432
Phone: (520) 622-9092
Fax: 622-0866
E-mail: gero@u.arizona.edu
URL: http://grad.admin.arizona.edu/idsps/gero/gero.html

Baccalaureate Degree
The program does not offer a baccalaureate degree.

Graduate Degrees
Master of Science (M.S.)

Major and Degree
Gerontology (M.S.)

Certificate Program
A certificate in gerontology is available. Contact the committee for more information.

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Report (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information contact the on-line catalog or contact the department at one of the addresses above.

Gerontology (GERO)

399. Independent Study (1-3) [Rpt./ I II

413. Issues in Aging (3) II (Identical with FS 413, which is home).

424. Gerontology: A Multidisciplinary Perspective (3) I II (Identical with PSYC 424, which is home). May be convened with GERO 524.

427. Aging and Public Policy (3) II (Identical with PA 427, which is home). May be convened with GERO 527.

447. Perspectives in Geriatrics Laboratory (1) II (Identical with PHPR 447, which is home).

448. Perspectives in Geriatrics (2) II (Identical with PHPR 448, which is home).

457. Law of the Elderly (3) II Examining law as it affects the elderly in such areas as legislation, finances, housing, death, guardianship, access to services and ethics. Focuses on the recognition/analysis of legal problems and identification of legal resources. (Identical with PA 457). May be convened with GERO 557.

459. Adult Development and Aging (3) I (Identical with PSYC 459, which is home). May be convened with GERO 559.

470A. Human Adaptability (3) I (Identical with ANTH 470A, which is home). May be convened with GERO 570A.

499. Senior Capstone (1-3) I II

499. Independent Study (1-3) I II

524. Gerontology: A Multidisciplinary Perspective (3) I II (Identical with PSYC 524, which is home). May be convened with GERO 424.

527. Aging and Public Policy (3) II (Identical with PA 527, which is home). May be convened with GERO 427.

530. Aging and Social Sciences (3) I Multidisciplinary overview of aging through the life course within a social, institutional and cultural context. Addresses the changing demographics, social supports and relationships, illness behavior, aging and death, work and retirement, housing and the economic status of the elderly. (Identical with PA 530).

547. Perspectives in Geriatrics (1) II (Identical with PSYC 447, which is home). May be convened with GERO 447.

548. Perspectives in Geriatrics (2) II (Identical with PSYC 448, which is home). May be convened with GERO 448.

550. Biology of Aging (3) I Introductory graduate course focusing on human aging for students with backgrounds in biological sciences.
56. Psychology of Death and Loss (3) Basic concepts in a psychology of death and loss, with emphasis on both the adjustment to death and loss, and the underlying phenomenal, humanistic and current social considerations. (Identical to PSYC 556).

57. Law of the Elderly (3) II For a description of course topics see GERG 457. Graduate-level requirements include an in-depth research paper utilizing legal materials. (Identical with PA 557). May be convened with GERG 457.

58. Adult Development and Aging (3) I (Identical with PSYC 559, which is home). May be convened with GERG 459.

58A-58B. Methods in Aging Research (3-3) I II Emphasizes understanding/application of fundamental methodology concepts in research design, assessment and statistics as they relate to the conduct of research and program evaluation in aging. Application of concepts through critique of articles and development of research and evaluation projects. P. GERG 560A is a prerequisite to GERG 560B.

57A. Human Adaptability (3) I (Identical with ANT 570A, which is home). May be convened with GERG 470A.

57B. Communicative Aspects of Aging (1) I (Identical with SP H 576, which is home).

59. Health of the Older Adult (3) I (Identical with NURS 589, which is home).

59. Colloquium
a. Current Topics in Aging (1) [Rpt. 2] I II
b. Research in Gerontology (3) I II (Identical with PHSC 695A).

63. Family Issues in Aging (3) I II Critical analysis of selected family and social issues, and related current research in Gerontology. (Identical with FS 613).

63E. Economics of Aging (3) I Analysis of economic issues and policy as they affect the aging individual, family and society. (Identical with FS 636).

69. Internship (1-6)
69C. Practicum (1-3) [Rpt.]
69E. Colloquium
a. Research in Gerontology (1) I II (Identical with PHSC 695A).

69F. Independent Study (1-6) [Rpt.]
69G. Research (1-6)
69H. Master’s Report (1-6)
69I. Thesis (1-6)

GLOBAL CHANGE (GC)
Institute for Study of Planet Earth
The University of Arizona
PO Box 210077
Tucson, AZ 85721-0077

Phone: (520) 621-9010
E-mail: roger@hwr.arizona.edu
URL: http://www.ispe.arizona.edu/class.html

Baccalaureate Degree
The program does not offer a baccalaureate degree.

Graduate Degrees
The program offers a Doctor of Philosophy minor.

Program Requirements
For undergraduate academic program requirements, consult the On Course Academic Program Requirements Reports (APRRs). APRRs are also available online at: http://www.arizona.eduacademic/oncecourse/data/interfacer/. Minor requirements are available online at http://www.arizona.eduacademic/oncecourse/data/interfacer/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office specified above.

To learn more about majors, minors, and other departmental information, consult the on-line catalog or contact the department at one of the addresses above.

Global Change (GC)
572. Global Biogeochemical Cycles (3) I Study of processes affecting global chemical fluxes. Particular attention to current global concerns, i.e., ozone hole, carbon cycle, climate warming, atmospheric oxidation, hydrologic cycle. (Identical with GEOS 572, HWR 572).
595 Seminar
h. Topics in Global Change (1-3) I II [Rpt./3 units]

GRADUATE COLLEGE
Administration Bldg., Rm. 322
The University of Arizona
PO Box 210066
Tucson, AZ 85721-0066
Phone: (520) 621-3471
FAX: (520) 621-7112
URL: http://grad.admin.arizona.edu/idps/idp.html

Graduate interdisciplinary programs are offered by the following committees:
American Indian Studies Program
Applied Mathematics
Arid Lands Resource Sciences
Biomedical Engineering
Cancer Biology
Cognitive Science
Comparative Cultural & Literary Studies
Epidemiology
Genetics
Gerontological Studies
Global Change
Insect Science
Neuroscience
Nutritional Sciences
Pharmacology & Toxicology
Physiological Sciences
Planning
Remote Sensing & Spatial Analysis
Second Language Acquisition & Teaching
For course offerings in these programs, refer to the specific program entry in this manual.

Program Requirements
For graduate program requirements, consult...
the Graduate Catalog or contact the offering department.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

GREEK (GRK)
For information about courses in ancient Greek language and literature, see the entry for the Department of Classics in this manual.

HEALTH EDUCATION (HLTH)
For information about health education courses, see the entry for the School of Health Professions below.

SCHOOL OF HEALTH PROFESSIONS (HLTH/MDRT/PSIO)
Gittings Building, Room 102
The University of Arizona
PO Box 210093
Tucson AZ 85721-0093
Phone: (520) 621-6990
FAX: 621-8170
URL: http://www.ahsc.arizona.edu/shrp.shtml

The School of Health Professions educates students for careers in health professions in the university, community, and commercial sectors. Its programs offer science-based preparation for researchers, technicians, community health professionals, and teachers who will advance knowledge of human health, prevent disease, and enhance physical performance. The school also offers courses for graduate and professional study in the health science fields.

Baccalaureate Degrees
Bachelor of Science in Health Science (B.S.H.S.)
Graduate degrees
The school offers no graduate degrees.

Majors and Degrees
Health Education (B.S.H.S.)
Options:
Health Education: Community (B.S.H.S.)
Health Education: School (B.S.H.S.)
Medical Technology (B.S.H.S.)
Physiological Sciences (B.S.H.S.)

Undergraduate Minors
No minor is required.

General Education Program
All undergraduate students are required to complete the university-wide general education program. Designed to provide a foundation for university learning, the program develops students' creative and analytical skills and integrates knowledge across university disciplines.

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Health Education (HLTH)

178. Personal Health and Wellness (3) I II Introduces and analyzes basic personal and community health problems, with emphasis on current scientific information essential to health promotion and maintenance of individual health.


278. Health Science Promotion (2) I II Introductions to basic concepts of health science, optimal health, lifestyle factors and health risks associated with the college-age population; emphasis on health promotion and intervention techniques; practical experience with individual and group health behavior change projects.


330. Human Sexuality (3) I II S Discussion of the basic aspects of human sexuality, including male and female reproductive physiology, congenital defects, sexually transmitted diseases, myths and fallacies, variations of sexual response. Credit allowed for one of these courses: HLTH 330, SOC 324.


393. Internship
a. Introductory Internship in Health Careers (3) [Rpt/]

399. Independent Study (1-4) [Rpt/]

400. Contemporary Community Health Problems (3) I Analysis of the concepts of community health services, human ecology, and conservation of human resources, with emphasis on modern miasmas such as air, water, and noise pollution; the impact of social problems on community health, alcohol and drug abuse. P, HLTH 200, HLTH 178, HLTH 381. Writing-Emphasis Course.

433. Global Health (3) I Examines major health problems of underdeveloped, developed, and emerging nations. Interpretation of health problems among various populations in multicultural settings, both nationally and internationally. P, HLTH 200, HLTH 178, HLTH 381.

435. Safety Education and Accident Prevention (3) S Analysis of accident prevention programs in schools, colleges, communities, and industry, with emphasis on specific protective measures pertaining to athletics, physical education, recreation, highway safety, and vocational training.

475. Behavioral Health Studies (1) S Review of the nature and ramifications of behavioral health problems, as well as analysis of physical, psychological and social implications.

487. Interpretation of Women's Health (1) I (Identical with W S 487, which is home).

493. Internship
a. Field Work in Health Education (3) S Open to majors only.

498. Senior Capstone (1-3) I II

499. Independent Study (1-4) [Rpt/]

530. Theory-based Approaches in Health Education (3) I Analysis of the epidemiological data to determine the health problems of our people, behavioral relationships, and the study and application of theory-based educational strategies designed to prevent health problems.

532. Program Planning and Education in Health Education/Health Promotion (3) I II Principles for planning, implementing, evaluating and creating health education programs utilizing the "PRECEDE Model" as a framework.

535. Multicultural Health Beliefs (3) I Designed to provide sensitivity by health promotion professionals to the varying multicultural health beliefs and needs of our society. Special emphasis on ethnic characteristics of minority populations in Arizona with recommendations for programming strategies.

540. Survey of Health Education/Health Promotion Literature (3) I Examination of health education promotion literature from ancient societies to present, including an analysis of current health literature from various professional, community, voluntary, public, and international health organizations.

593. Internship (1-6) [Rpt/]

599. Independent Study (1-4) [Rpt/]

699. Independent Study (1-4) [Rpt/]

930. Supplementary Registration (1-9) [Rpt/]

Medical Technology (MEDT)

195. Colloquium
a. Introduction to Clinical Laboratory Medicine (1) I Course offered superior/pass/fail.

387. Contemporary Perspectives of the Medical Technology Professions (3) [Rpt/] I History and current social and economic issues facing the profession of medical technology. Effects of recent legislation on laboratory
471. **Fundamental Laboratory Techniques in Clinical Hematology (2)** [Rpt./ 1] II Basic laboratory techniques in clinical hematology with emphasis on manual and automated hematology procedures. Instruction includes proper procedural methodologies, quality control, the use of controls and standards, and interpretation of laboratory test results. P or CR, MEDT 471R, consult program director before enrolling. May be convened with MEDT 571L.

472. **Fundamental Laboratory Techniques in Clinical Immunology and Immunohematology (2)** [Rpt./ 1] I Basic laboratory techniques in serological procedures and blood banking. Emphasis will be placed on procedural methodologies, quality control, the use of controls and standards, and interpretation of laboratory test results. P, MEDT 472R, MEDT 472L, MEDT 572R, consult program director before enrolling; CR, MEDT 572R. May be convened with MEDT 572L.

473. **Fundamental Laboratory Techniques in Clinical Chemistry (2)** [Rpt./ 1] II Basic laboratory techniques in clinical chemistry. Emphasis will be placed on procedural methodologies, quality control, the use of controls and standards, and interpretation of laboratory test results. P or CR, MEDT 473Ror MEDT 573R, consult program director before enrolling. May be convened with MEDT 573L.

474. **Fundamental Laboratory Techniques in Clinical Bacteriology (2)** I Basic laboratory techniques used in the isolation and identification of bacteria pathogenic for humans. Standard and specialized media/biochemical tests are utilized. P or CR, MEDT 474R or MEDT 574R, consult program director before enrolling. May be convened with MEDT 574L.

475. **Topics in Clinical Microbiology: Clinical Parasitology (2)** [Rpt./ 1] Clinical Parasitology. Diagnostic methodologies with emphasis on the laboratory identification of clinically relevant parasites. P, consult program director before enrolling. May be convened with MEDT 575A.

476. **Principles of Laboratory Science (3)** [Rpt./ 1] II Basic principles of laboratory mathematics, biostatistics, body fluids analysis, urinalysis, quality control and laboratory safety. P, consult program director before enrolling. May be convened with MEDT 575C.


574R. Lectures in Clinical Bacteriology (5) [Rpt./] 1 I For a description of course topics see MEDT 474R. Graduate-level requirements include a research paper on selected topics related to clinical laboratory bacteriology. May be convened with MEDT 474R.

575A. Topics in Clinical Microbiology: Clinical Parasitology (2) [Rpt./] 1 For a description of course topics see MEDT 475A. Graduate-level requirements include a research paper on selected topics relating to clinical parasitology, virology, mycology or mycobacteriology. May be convened with MEDT 475A.

575B. Topics in Clinical Microbiology: Clinical Virology (1) [Rpt./] 1 II For a description of course topics see MEDT 475B. Graduate-level requirements include a research paper on selected topics relating to clinical parasitology, virology, mycology or mycobacteriology. May be convened with MEDT 475B.

575C. Topics in Clinical Microbiology: Clinical Mycology and Mycobacteriology (1) [Rpt./] 1 For a description of course topics see MEDT 475C. Graduate-level requirements include a research paper on selected topics relating to clinical parasitology, virology, mycology or mycobacteriology. May be convened with MEDT 475C.

576. Principles of Laboratory Science (3) [Rpt./] 1 II For a description of course topics see MEDT 476. Graduate-level requirements include a research paper on selected topics that focus on the use of statistical analysis for biological systems, or on selected topics relating to new techniques in body fluid analysis or urinalysis. May be convened with MEDT 476.

581. Clinical Laboratory Hematology (4) [Rpt./] 1 II S For a description of course topics see MEDT 481. Graduate-level requirements include a research paper relating to advanced laboratory methodologies in clinical hematology. May be convened with MEDT 481.

582. Clinical Laboratory Immunology and Immunohematology (5) [Rpt./] 1 I II For a description of course topics see MEDT 482. Graduate-level requirements include a research paper relating to advanced laboratory methodologies in clinical serology or blood banking. May be convened with MEDT 482.

583. Clinical Laboratory Chemistry (5) [Rpt./] 1 I II For a description of course topics see MEDT 483. Graduate-level requirements include a research paper relating to advanced laboratory methodologies in clinical chemistry. May be convened with MEDT 483.

584. Clinical Laboratory Microbiology (5) [Rpt./] 1 I II For a description of course topics see MEDT 484. Graduate-level requirements include a research paper relating to advanced laboratory methodologies in clinical microbiology. May be convened with MEDT 484.

599. Independent Study (1-6) [Rpt./]

Occupational Safety and Health (OSH)

402. Industrial Hygiene Instrumentation and Analysis (2-4) I Introduction to field sampling instruments and strategies, quality control, and statistical analysis, with emphasis on instrument selection and calibration. 2R, 3L, P. OSH 486, CHEM 322, CHEM 323, writing emphasis course.

410. Physical Exposures (3) II Recognition, evaluation, and control of physical exposures, including radiation, noise, vibration, and heat stress. Student is required to recognize potential exposures, use correct instrumentation to collect and evaluate data, and develop controls. 2R, 3L, P. OSH 486. (Identical with PCOL 410). May be convened with OSH 510.

454. Industrial Toxicology and Chemical Exposure (2-4) I S Principles of toxicology related to industry, dose response, mechanisms of toxicity, hazard evaluation principles, toxicology of major classes of industrial chemicals. P. CHEM 486.

460. Introduction to Epidemiology (3) I II Introduction to the purposes, principles, and methods of epidemiology.

484. Fundamentals of Industrial and Environmental Health (3) I Introduction to the principles of occupational and environmental health, with emphasis on the anticipation, recognition, evaluation, and control of health hazards. (Identical with C E 484, PCOL 484). May be convened with OSH 584.

485. Industrial Ventilation (3) II Design and evaluation of industrial ventilation systems. Emphasis is on level evaluation of industrial contaminants. Five laboratory exercises and course design project. 3R, 1L. (Identical with PCOL 485). May be convened with OSH 585.

487. Advanced Industrial and Environmental Health (3) II An in-depth coverage of the professional practice of occupational and environmental health. Contaminant behavior and assessment are emphasized. A comprehensive environmental health assessment of an industrial site is required. P. OSH 486. (Identical with C E 487, PCOL 487). May be convened with OSH 587.

495. Colloquium
a. Occupational Safety and Health (3) [Rpt./] 2 P. OSH 486.

498. Senior Capstone (1-3) I II

499. Independent Study (1-3) [Rpt./]

502. Environmental Monitoring and Analysis (2-4) I Introduction to air sampling instruments and strategies, quality control, and statistical analysis, with emphasis on instrument selection and calibration. P. OSH 586. (Identical with PCOL 502).

510. Physical Exposures (3) II For a description of course topics see OSH 410. Recognition, evaluation and control of physical exposures, including radiation, noise, vibration, and heat stress. Student will be able to recognize potential exposures, use correct instrumentation to collect and evaluate data, and develop controls. P. OSH 586. (Identical with PCOL 510). May be convened with OSH 410.

553. Toxicology and Chemical Exposure (2-4) I Graduate-level requirements include a comprehensive paper detailing hazards associated with a particular chemical. (Identical with PCOL 553).

584. Fundamentals of Industrial and Environmental Health (3) I For a description of course topics see OSH 484. Graduate-level requirements include a comprehensive paper detailing hazards associated with a particular health hazard. (Identical with C E 584, PCOL 584). May be convened with OSH 484.

585. Industrial Ventilation (3) II For a description of course topics see OSH 485. Design and evaluation of ventilation systems used for environmental control. Emphasis is on local exhaust system design and evaluation. The importance of ventilation in indoor air quality is also addressed. Five laboratory exercises and course design project. (Identical with PCOL 585). May be convened with OSH 485.

587. Advanced Industrial and Environmental Health (3) II For a description of course topics see OSH 487. Graduate-level requirements include participation in an industrial hygiene assessment of a plant and completion of a formal report describing the results of the survey. (Identical with C E 587, PCOL 587). May be convened with OSH 487.

599. Independent Study (1-3) [Rpt./]

900. Research (1-6) [Rpt./]

HIGHER EDUCATION (H ED)

For information about higher education courses see the entry for the Department of Educational Administration and Higher Education in this manual.

HISTORY (HIST)

Social Sciences Bldg., Rm. 215
The University of Arizona
PO Box 210027
Tucson AZ 85721-0027
Phone: (520) 621-1586
FAX: (520) 621-2422
E-mail: history@abelard.arizona.edu
URL: http://w3.arizona.edu/~history/

Baccalaureate Degree
Bachelor of Arts (B.A.)
Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)
Major and Degrees
History (B.A., M.A., Ph.D.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/onscourse/data interface/. Minor requirements are available online at http://www.arizona.edu/academic/onscourse/data interface/minors/.
History (HIST)

101. History of Western Civilization: Backgrounds and Formation to 1648 (3) I II GRD The western heritage of ideas, values, and artistic expression in interaction with economic, social, and political processes and experiences.

102. History of Western Civilization: Emergence of the Modern World-Since 1648 (3) I II GRD The western heritage of ideas, values, and artistic expression in interaction with economic, social, and political processes and experiences.

103. Topical Approaches to Civilization (3) [Rpt./] II Topical approaches (e.g., slavery, imperialism) to issues in civilization. Consult department for details.

106. History of the United States from 1607 to 1877 (3) I II CDT Political, economic, and social history of the American people from the founding of colonial Jamestown to 1877.

107. History of the United States from 1877 to the Present (3) I II CDT Political, economic, and social history of the American people from the end of Reconstruction to the present.

117. History of England from 1607 to 1877 (3) I II GRD The western heritage of ideas, values, and artistic expression in interaction with economic, social, and political processes and experiences.

118. History of England from 1877 to the Present (3) I II Survey of English history from pre-history to 1800, with emphasis on legal and constitutional history.

119. History of England from 1800 to the Present (3) I II Survey of English history from 1800 to the present; the course will emphasize the political, cultural, and religious bases of Irish history.

120. Colonial Latin America (3) I Survey of the history of Spanish America and Brazil from the Age of Discovery to Independence.

160. Colonial Latin America (3) I Survey of the history of Spanish America and Brazil from the Age of Discovery to Independence.

161. Modern Latin America (3) II Survey of Latin American history from Independence to the present.

170. Indian Civilizations (3) I II (Identical with NES 170, which is home).

171. Ancient Civilizations of the Near East (3) I (Identical with NES 171, which is home).

172. Islamic Civilization: Traditional and Modern Middle East (3) II (Identical with NES 172, which is home).

190. Introduction to African History (3) I Introduction to the major themes and social, political, cultural, and economic developments in sub-Saharan African history. Will cover pre-colonial, colonial, and postcolonial periods. (Identical with CLAS 190).

195. Colloquium
a. Debates With Historians (2) I P, freshmen only.

204. Ancient History: Greek History (3) I A political, social, and cultural history of Greek civilization from the Bronze Age to the death of Alexander the Great. (Identical with CLAS 204).

205. Ancient History: Roman History (3) I A survey of Roman civilization from the founding of the monarchy to the emperors of Constantine the Great. (Identical with CLAS 205).

214A. European Cultural History: Ancient Europe to Absolutism (3) I Ancient Europe to Absolutism. P, HIST214A is not prerequisite to HIST214B.

214B. European Cultural History: Age of Revolution to Present (3) I II Age of Revolution to Present. P, HIST214A is not prerequisite to HIST214B.

224. Models of Resistance: Post 16th Cent. African Liberation Movements in Southeast (3) I (Identical with AFAS 224, which is home).

236. Indians in U.S. History (3) I II History of Indians in U.S. development from 1500 to the present with emphasis on relations between competing Indian groups and between Indians and whites.

244. Western America (3) I II Survey of the patterns of American expansion and settlement in the western United States.

245. Frontier America (3) I II Survey of the patterns of frontier expansion and settlement in the eastern and mid-western United States.

249. Technology and The Growth of Civilizations (3) II (Identical with ANTH 249, which is home).

253A. History of Women in the United States (3) I Changing role of women in American society from colonial times to the present. (Identical with W S 253A).

253B. History of Women in the United States (3) II Changing role of women in American society from colonial times to the present. (Identical with W S 253B).

270. Modern East Asia (3) II Introductory survey of recent histories of China, Japan and Korea, focusing on the major watershed in these countries' modern experiences. The roles of indigenous culture and forces of change as well as foreign influences will be considered. (Identical with EAS 270).

271. The History of Christianity (3) S The history of Christianity is presented with its many shifts, shadows and differing stages, from the Apostle's Council in 48, through Vatican II (1962-65). (Identical with RELI 271).

272. Japanese Civilization (3) I (Identical with JPN 272, which is home).

275. History of China (3) I (Identical with CHN 275, which is home).

276. History of China (3) II (Identical with CHN 276, which is home).

277A. History of the Middle East (3) I (Identical with NES 277A, which is home).

277B. History of the Middle East: Modern Middle East (3) II (Identical with NES 277B, which is home).

299. Independent Study (1-3) [Rpt./] I

299H. Honors Independent Study (1-3) [Rpt./] I

312. Economy and Society in Historical Discourse (3) I Compares historical narratives about economic theories in their contexts.

314. Twentieth Century Europe (3) II History of twentieth century Europe, examining global processes including imperialism and the two world wars interacting with ongoing changes in domestic politics, society and culture.

315. United States Military History (3) I Survey of American wars from colonial times to the present; military institutions, doctrine, application of the principles of war, campaign strategies and tactics, technology, and leadership.

317. History of Modern Ireland (3) I II Survey of Irish history from the Union in 1800 to the present; the course will emphasize the political, cultural, and religious bases of Irish history.

318. English Legal and Constitutional History (3) I II Survey of the origins and development of the English common law from the Anglo-Saxons to the present.

320. Tudor-Stuart England (3) I An intensive study of English history from the accession of Edward IV to the Hanoverian dynasty. (Identical with RELI 320).

321. History of Modern England (3) I II An intensive study of English history from the accession of George III to the present.

325. History of France: Development of the Modern French State, 1815-Present (3) I Political, socio-economic, and cultural history of modern France from 1815 to the present day, with emphasis placed on French politics and self-identity. P, 3 units of any European history course.


339. Cultural Traditions, Technology and Business (3) I II Traces the technological aspects of North Atlantic civilization and culture with emphasis on the role of technology in nineteenth and twentieth century capitalist development.

343. History of the Mexican American (3) I Survey from the 16th century to the present, with emphasis on social, political and economic trends in their historical context. (Identical with MAS 343).

345. New American West (3) The major social, political, and economic changes in the twentieth century American West; the commonalities and conflicts within the region.

347. The Old South (3) I II Social, economic, cultural and political history from Jamestown to Secession. (Identical with AFAS 347).

348. The South Since the Civil War (3) I II From the Civil War to the present. (Identical with AFAS 348).

351. Race and Class in Latin America (3) II The impact of commercial expansion, urbanization, industrialization, and ideological change on race and class relations in Latin America from the 16th to early 20th century. (Identical with AFAS 351, LA S 351).

352. Slavery in Latin America (3) I A broadly comparative introduction to slavery in Latin
361. The U.S.-Mexico Border Region (3) I Evolution of the borderlands since the mid-nineteenth century, with emphasis on bi-national interaction and interdependence. (Identical with LA S 361, MAS 361).

368. Colonial Mexico (3) I From discovery through the War for Independence. (Identical with LA S 368, MAS 368).

369. Mexico Since Its Independence (3) II Struggle for political, economic and social stability; international relations, cultural patterns. (Identical with LA S 369, MAS 369).

370A. History of the Jews: Modern Jewish History (3) I II (Identical with JUS 370A, which is home).

370B. History of the Jews: The Jew in the Medieval World (to the 17th Century) (3) I II (Identical with JUS 370B, which is home).

372A. History and Religion of Israel in Ancient Times: Biblical Period through the Babylonian Exile (3) I (Identical with JUS 372A, which is home).

372B. History and Religion of Israel in Ancient Times: Ezra-Nehemiah to the Roman Empire (3) II (Identical with JUS 372B, which is home).

374. The Holocaust (3) II Socio-economic and intellectual roots of modern anti-Semitism, evolution of Nazi policy, the world of death camps, responses of Axis and Allied governments, and responses of the Jews. (Identical with JUS 374, RS S 374, RELI 374).

375. History of China (3) I (Identical with CHN 375, which is home).

376. History of China (3) II (Identical with CHN 376, which is home).

377. Modern Israel (3) I (Identical with JUS 377, which is home).

379. The Ottoman Turkish Empire (3) I (Identical with NES 379, which is home).

381A. History of Muslim Societies (3) I Rise of Islam, creation of Islamic society, relationship of religion and politics. (Identical with NES 381A).

381B. History of Muslim Societies (3) II Evolution and global spread of Muslim societies, modernization and its problems. (Identical with NES 381B).

383. Religion and State in Islam (3) I Examines the changing relationship between Islam and politics from the time of the Prophet to the present day. (Identical with NES 383).

384. Topics in African History (3) [Rpt./J 1 Regional and/or thematic topics in pre-colonial, colonial and post-colonial African history, including oral tradition, slavery, religious movements, health and healing, imperialism, and political economy. P, HIST 190 or consent of instructor. (Identical with AFAS 384).

396. Proseminar


b. Honors Proseminar (3) I

399. Independent Study (1-5) [Rpt./] 399H. Honors Independent Study (1-3) [Rpt./ I

401. Ancient Mesopotamia (3) I II (Identical with NES 401, which is home). May be convened with HIST 501.

403A. History of Greece: From Prehistoric Times to the Outbreak of the Peloponnesian War (3) I From prehistoric times to the outbreak of the Peloponnesian War. P, HIST403A is not prerequisite to HIST403B. (Identical with CLAS 403A).

403B. History of Greece: From the Outbreak of the Peloponnesian War to the End of the Hellenistic Age (3) II From the outbreak of the Peloponnesian War to the end of the Hellenistic Age. P, HIST403A is not prerequisite to HIST403B. (Identical with CLAS 403B).

404A. History of Rome: The Republic to the Death of Caesar (3) I The Republic to the death of Caesar. P, HIST404A is not prerequisite to HIST404B. (Identical with CLAS 404A). May be convened with HIST 504A.

404B. History of Rome: The Empire through the Reign of Constantine the Great (3) II The Empire through the reign of Constantine the Great. P, HIST404A is not prerequisite to HIST404B. (Identical with CLAS 404B). May be convened with HIST 504B.

405A. Medieval Europe (3) I Major institutions and trends in Europe from the breakup of the Roman World to the 14th century. P, HIST405A is not prerequisite to HIST405B, 3 units of lower-division European history. (Identical with RELI 405A). May be convened with HIST 505A.

405B. Medieval Europe (3) II Major institutions and trends in Europe from the breakup of the Roman World to the 14th century. P, HIST405A is not prerequisite to HIST405B, 3 units of lower-division European history. (Identical with RELI 405B). May be convened with HIST 505B.

406. Medieval England (3) II From the Norman conquest to the Hundred Years War, with emphasis on political, social, and cultural developments. P, 3 units of lower-division European history. (Identical with RELI 406). May be convened with HIST 506.


407B. Intellectual History of Medieval Europe: Late Medieval/Early Modern Europe (3) II Major medieval cultural and intellectual trends: Late Medieval/Early Modern Europe. P, 3 units of lower-division European history. HIST407A is not prerequisite to HIST407B. (Identical with RELI 407B). May be convened with HIST 507B.

408. The Renaissance (3) I Europe between the 14th and 16th centuries with special emphasis on Italy as the seat of the Renaissance. Topics include the city states, humanism, the Church in an age of Schism and secularization, Renaissance art, the New Monarchs and European exploration and imperialism. P, 3 units of European history. (Identical with RELI 408). May be convened with HIST 508.

409. The Reformation (3) II The Reformation in thought and action both from the perspective of its religious origins and of the political and social conditions. Analysis of its impact on sixteenth century Europe including the spread of Protestant reformation and its companion movement, counter-reformation. (Identical with RELI 409). May be convened with HIST 509.

410. History of Hell in Early Europe (3) II The concept of punishment after death in Western Europe from the Bible to Dante. Includes the Hebrew, Greco-Roman, Germanic, and Christian traditions. P, 3 units of European history. (Identical with RELI 410). May be convened with HIST 510.

411. European Social and Intellectual History to 1750 (3) I Dominant themes in European intellectual history from the end of the Middle Ages to the period of the Enlightenment. Reading and discussions of texts from Petrarch to Locke. P, 3 units of any history course. May be convened with HIST 511.

412a-412b. European Intellectual History: 1600 to Present (3-3) 412a: 1600-1800. Topics include philosophy, science, Enlightenment, Romanticism, Realism, political economy. 412b: 1870-present. Intellectual and cultural movements from the fin-de-siecle to the collapse of communism.

414. Cultural History of Germany to 1714 (3) I The political, social, economic and cultural history of Germany from the late Middle Ages to about 1800. P, 3 units of any history course. May be convened with HIST 514.

415. Cultural History of Germany from 1714 to 1839 (3) II The political, social, economic and cultural history of Germany from the period of the French Revolution to the present. P, 3 units of any history course. May be convened with HIST 515.

418. France Under the Old Regime (3) I French political development, institutions, and culture from Henry IV to the eve of the French Revolution. May be convened with HIST 518.

419. The French Enlightenment (3) I Cultural history of France in the 18th century, with emphasis on the works of the philosophers. May be convened with HIST 519.

420. The French Revolution and Napoleon (3) II The origins and progress of the Revolution in France. May be convened with HIST 520.

421. History of Russia: Early Period (3) I Political, socio-economic, and cultural history of Russia in medieval and early modern times. (Identical with RELI 421).

422. History of Russia: Modern Period (3) II Political, socio-economic, and cultural history of Russia in the modern era until the Bolshevik
423. Intellectual History of Russia (3) II
Historical significance of social, political, and intellectual thought in 19th- and 20th-century Russia. P, 3 units of any history course. (Identical with R SS 423).

424. The Modernization of Russia (3) I
Social and political developments in Russia from the emancipation of the serfs to the establishment of the Stalinist system. P, 3 units of any history course. (Identical with R SS 424). May be convened with HIST 524.

425. History of the Soviet Union (3) I
The Bolshevik Revolution and problems of Soviet and Russian history from 1917 to the present. P, 3 units of any history course. (Identical with R SS 425).

427. Work, Culture and Power (3) I
Labor and social history: changes in work, daily life, gender and social relations, and political movements, interacting with broad historical processes such as commercialization, industrialization, colonialism, and war. May be convened with HIST 527.

428. Anti-Semitism (3) II
Exploration of broad range of social, cultural, political, economic and religious issues with a specific emphasis on questions of ethnicity and race as they appeared in German Central Europe and in an often multinational context in the period 1860-1920. (Identical with RELI 428).

431. Colonial America (3) I
The experience and evolving institutions of the North Atlantic colonists from the first landings to the end of the French and Indian War. P, 3 units of any U.S. history survey course. May be convened with HIST 531.

432. The Era of the American Revolution (3) II
Origins, progress, and character of the struggle against Great Britain; internal political, constitutional, social, and economic developments; the problems of the "Critical Period" and the making of the Constitution. P, 3 units of any U.S. history survey course. May be convened with HIST 532.

433. Jefferson and the New Nation, ca. 1790-1828 (3) I
Major ideological, political, economic, and social conflicts and developments, North and South, during the first decades of the American nation. P, 3 units of any U.S. history survey course, junior or senior status. May be convened with HIST 533.

434. Jacksonian Era, 1828-1856 (3) II
Political, economic and social developments from the "reign" of Andrew Jackson through the collapse of the Whig Party in the 1850s. P, junior or senior status, 3 units of any U.S. history course. May be convened with HIST 534.

435. The Coming of the Civil War, U.S.
1845-1861 (3) I
Political, constitutional, social and economic developments in the U.S. from the Mexican War through the Civil War. (Identical with AFAS 435). May be convened with HIST 535.

436. Civil War and Reconstruction, U.S. 1861-1878 (3) II
An examination of American interaction with Japan and China since the Opium Wars, with special attention given to economic, cultural, and military relations and conflicts. P, 3 units of any U.S. history course. (Identical with EAS 451). May be convened with HIST 551.

Examination of economic, social and political developments in years of rapid industrialization from the end of Reconstruction through World War I. P, 3 units of any U.S. history course. May be convened with HIST 537.

438. U.S. 1918-1945: From World War I through World War II (3) I
Prosperity, Depression and the New Deal in peace and war. May be convened with HIST 538.

439. History of North Africa from the Islamic Conquest to Modern Independence, 700-1962 (3) II
(Identical with NES 439, which is home). May be convened with HIST 540.

440. United States: 1945 to Present (3) I
American society and the role of the United States in world affairs from the Yalta Conference to the present. P, 3 units of any U.S. history course. May be convened with HIST 540.

441. History of American Society and Thought: Pre-Civil War (3) I
American political, religious, cultural and philosophical ideas as expressed in colonial, revolutionary, and pre-Civil War society. May be convened with HIST 542.

442. History of American Society and Thought: Since the Civil War (3) II
The transformation of American minds since the Civil War as expressed in literary, philosophic, religious, and other cultural forms. May be convened with HIST 543.

444. Women in Islamic History (3) I
Examination of the roles women have played throughout Islamic history and of the changing discourse in the Islamic community about women and their roles. (Identical with NES 445, W 445). May be convened with HIST 545.

445. Women in Islamic History (3) II
Examination of the roles women have played throughout Islamic history and of the changing discourse in the Islamic community about women and their roles. (Identical with NES 445, W 445). May be convened with HIST 545.

446. History of Arizona and the Southwest (3) I
Economic, social and political development of the state and region from Spanish times to present. May be convened with HIST 546.

447. History of American Foreign Relations to 1914 (3) I
Examinations of the rise of America from a struggling colony to a world class power, including its relations with Europe, Latin America and Asia. P, 3 units of any U.S. history course. May be convened with HIST 549.

448. History of American Foreign Relations Since 1914 (3) II
Examination of the pivotal role played by the United States in world affairs since WWI, focusing on America's struggle with revolutionary movements in Europe, Asia and Latin America. P, 3 units of any U.S. history course. May be convened with HIST 550.

449. The United States and East Asia: 1840 to the Present (3) II
An examination of American interaction with Japan and China since the Opium Wars, with special attention given to economic, cultural, and military relations and conflicts. P, 3 units of any U.S. history course. (Identical with EAS 451). May be convened with HIST 551.

450. American Ethnic History (3) I
A history of the various ethnic minorities in America from Colonial times to the present, with emphasis on adjustment, acculturation and degrees of assimilation. P, 3 units of any U.S. history course. May be convened with HIST 552.

451. History of Women and Work (3) I
History of women and work in western and non-western nations from prehistoric times to the present. P, 3 units of any U.S. history or women's studies courses. (Identical with W S 453). May be convened with HIST 553.

452. Spanish Inquisition (3) I
The Inquisition in Spanish, European, and ethnic history; its bureaucracy and procedures; its festivities, its victims; New and Old Christians, and witches. (Identical with JUS 454, RELI 454). May be convened with HIST 554.

453. History of Women in Europe (3) I
History of women in Europe covering topics such as women's work in family-based economic systems and in religious, political and cultural life, and the impact of larger historical changes. P, junior status. (Identical with W S 455). May be convened with HIST 555.

454. The Mexican Revolution (3) S
A detailed examination of Mexico's social upheaval of 1910, and its implications for contemporary Mexican society. Offered in Guadalajara only. May be convened with HIST 557.

455. Topics in Comparative Women's History (3) I
International history of a topic of the instructor's choice. P, 3 units of any history or women's studies course. P, 3 units of any U.S. history or women's studies courses. (Identical with W S 458). May be convened with HIST 558.

456. The Ethnology of Mesoamerica and the Andes (3) I
The impact of conquest and Spanish rule on the native peoples of Mexico, Central America, Peru, Bolivia, and Ecuador. Topics include: conquest and ecology; land and labor; religion and culture; adaptation and resistance. P, HIST 160 or HIST 351 or HIST 368. May be convened with HIST 561.

457. History of Argentina (3) I
A survey of Argentine history and culture from the colonial era to the present. P, junior or senior status, 3 units of any lower-division Latin-American history course. (Identical with LA S 464). May be convened with HIST 564.

458. History of Brazil (3) I
A history of Brazil from 1500 to the present. (Identical with LA S 466). May be convened with HIST 566.

459. Contemporary Latin America (3) I
Revolution, social change and reaction in Latin America from 1930 to the present. P, junior or senior status. (Identical with LA S 467). May be convened with HIST 567.
468A. Asia and the West (3) I Processes of interaction between Europeans and the peoples and cultures of the Middle East, South Asia, and East Asia, from the Portuguese explorations to the present. P. Writing-Emphasis Course for general major. (Identical with NES 468A). May be convened with HIST 568A.

468B. Asia and the West (3) II Processes of interaction between Europeans and the peoples and cultures of the Middle East, South Asia, and East Asia, from the Portuguese explorations to the present. P. Writing-Emphasis Course for general major. (Identical with NES 468B). May be convened with HIST 568B.

469. History of Women in Latin America (3) II Women's history in Latin America from the Conquest to the present. P, junior or senior status, 3 units of any lower-division Latin-American history or women's studies course. (Identical with LA S 469). May be convened with HIST 569.


472. History of Medieval India (3) I Survey of Indian history from the 7th century to 1750. (Identical with NES 472). May be convened with HIST 572.

473. History of Modern India and Pakistan: 1750-Present (3) I Survey of political, social and economic developments in South Asia from the mid-18th century to the present. P. Writing-Emphasis Course for India-Pakistan specialization. (Identical with NES 473). May be convened with HIST 573.

474A. History of Japan: from Earliest Times to 1500 (3) I II Social, cultural, economic and political history of Japan: From earliest times to 1500. P, junior or senior status, 3 units of any history course. (Identical with JPN 474A). May be convened with HIST 574A.

474B. History of Japan: from 1500-1800 (3) I II Social, cultural, economic and political history of Japan: 1500-1800. P, junior or senior status, 3 units of any history course. (Identical with JPN 474B). May be convened with HIST 574B.

474C. History of Japan: from 1800-Present (3) I II Social, cultural, economic and political history of Japan: 1800-present. P, junior or senior status, 3 units of any history course. (Identical with JPN 474C). May be convened with HIST 574C.

475A. Periods in Chinese History (3) [Rpt./ 1] I II (Identical with CHN 475A, which is home). May be convened with HIST 575A.

475B. Periods in Chinese History (3) [Rpt./ 1] I II (Identical with CHN 475B, which is home). May be convened with HIST 575B.

475C. Periods in Chinese History (3) [Rpt./ 1] I II (Identical with CHN 475C, which is home). May be convened with HIST 575C.

475D. Periods in Chinese History (3) [Rpt./ 1] I II (Identical with CHN 475D, which is home). May be convened with HIST 575D.

475E. Periods in Chinese History (3) I II (Identical with CHN 475E, which is home). May be convened with HIST 575E.

476. Modern China (3) I II Survey of political, social, economic and cultural transformations undergone by China from ca. 1800 to the present. Provides students with a sense of both the major themes and the substance of the last two centuries of history of one of the world's major civilizations, as well as a better understanding of China's prominent position in the world today. (Identical with CHN 476). May be convened with HIST 576.

479. The Ottoman Empire to 1800 (3) I II History of Ottoman Empire from its origins through the direct Western European impact, focusing on the political and social history of the empire in Europe and Asia. (Identical with NES 479). May be convened with HIST 579.

480. The Middle East in the Twentieth Century (3) I (Identical with NES 480, which is home). May be convened with HIST 580.

481. Work, Motherhood, and Female Identity in America: 1945 to the Present (3) I (Identical with W S 481, which is home). May be convened with HIST 581.

482. Social History of China (3) I II (Identical with CHN 482, which is home). May be convened with HIST 582.

483. Gender and African History (3) I The history of men, women, gender relations, and gender meanings in sub-Saharan Africa. The importance of gender analysis, both sociological and symbolic, to understanding African history. P, 3 units of any history course or consent of instructor. (Identical with W S 483). May be convened with HIST 583.

484. History of the Arab-Israeli Conflict, 1800 to Present (3) I II (Identical with NES 484, which is home). May be convened with HIST 584.

485A. Social, Cultural and Political History of Iranian Plateau from the 7th Century to the Present (3) I (Identical with NES 485A, which is home). May be convened with HIST 585A.

485B. Social, Cultural and Political History of Iranian Plateau from the 7th Century to the Present (3) II (Identical with NES 485B, which is home). May be convened with HIST 585B.

487. Islamic Mysticism (3) I I II Origins and development of Sufism and its impact on Muslim and non-Muslim worlds. (Identical with NES 487). May be convened with HIST 587.

488. History of Byzantium (3) I II Political, social, and cultural history of Byzantium from A.D. 325 to 1453, including the Byzantine legacy in Europe and the Middle East. P, 3 units of any history course. (Identical with CLAS 488, RELI 488). May be convened with HIST 588.

489. Women in East Asia (3) I II Women in traditional China and Japan; analysis of changes occurring in the modern period. P, junior or senior standing. P, junior or senior status. (Identical with EAS 489, W S 489). May be convened with HIST 589.

490. Philosophy of History (3) I Introduction to historical thinking from antiquity to the present, with emphasis on ideas in European and North American historical writings during the modern and contemporary eras. May be convened with HIST 590.

493. Internship (1-6) [Rpt./]

499. Independent Study (1-3) [Rpt./]

499H. Honors Thesis (3) [Rpt./ 2]

501. Ancient Mesopotamia (3) I II (Identical with NES 501, which is home). May be convened with HIST 501.

504A. History of Rome: The Republic to the Death of Caesar (3) I II (Identical with NES 504, which is home). May be convened with HIST 504A.

504B. History of Rome: The Empire through the Reign of Constantine the great (3) II For a description of course topics see HIST 404B. Graduate-level requirements include an additional in-depth research paper. May be convened with HIST 504B.

505A. Medieval Europe (3) I II For a description of course topics see HIST 405A. Graduate-level requirements include additional work with primary and foreign language secondary sources. May be convened with HIST 505A.

505B. Medieval Europe (3) II For a description of course topics see HIST 405B. Graduate-level requirements include additional work with primary and foreign language secondary sources. May be convened with HIST 505B.

506. Medieval England (3) I II For a description of course topics see HIST 406. Graduate-level requirements include additional work with primary and foreign language secondary sources. May be convened with HIST 506.
507A. Intellectual History of Medieval Europe: High Medieval Europe (3) I For a description of course topics see HIST 407A. Graduate-level requirements include additional work with primary and foreign language secondary sources. May be convened with HIST 407A.

507B. Intellectual History of Medieval Europe: Late Medieval/Early Modern Europe (3) II For a description of course topics see HIST 407B. Graduate-level requirements include additional work with primary and foreign language secondary sources. May be convened with HIST 407B.

508. The Renaissance (3) I For a description of course topics see HIST 408. Graduate-level requirements include an in-depth research paper. May be convened with HIST 408.

509. The Reformation (3) II For a description of course topics see HIST 409. Graduate-level requirements include an in-depth research paper. May be convened with HIST 409.

510. History of Hell in Early Europe (3) II For a description of course topics see HIST 410. Graduate-level requirements include additional work with primary and foreign language secondary sources. May be convened with HIST 410.

511. European Social and Intellectual History to 1750 (3) I For a description of course topics see HIST 411. Graduate-level requirements include more advanced readings and an in-depth research paper. May be convened with HIST 411.

512a-512b. European Intellectual History: 1600 - Present (3-3) II For a description of course topics see HIST 412a-412b. Graduate-level requirements include an in-depth research paper. May be convened with 412a-412b.

514. Cultural History of Germany to 1714 (3) I For a description of course topics see HIST 414. Graduate-level requirements include a research paper. May be convened with HIST 414.

515. Cultural History of Germany from 1714 to 1899 (3) II For a description of course topics see HIST 415. Graduate-level requirements include a research paper. May be convened with HIST 415.

518. France Under the Old Regime (3) I For a description of course topics see HIST 418. Graduate-level requirements include substantial additional independent reading. May be convened with HIST 418.

519. The French Enlightenment (3) I For a description of course topics see HIST 419. Graduate-level requirements include substantial additional independent reading. May be convened with HIST 419.

520. The French Revolution and Napoleon (3) II For a description of course topics see HIST 420. Graduate-level requirements include substantial additional independent reading. May be convened with HIST 420.

521. History of Russia: Early Period (3) I Graduate-level requirements include a research paper.

522. History of Russia: Modern Period (3) II For a description of course topics see HIST 422. Graduate-level requirements include a research paper. May be convened with HIST 422.

523. Intellectual History of Russia (3) II Graduate-level requirements include a research paper.

524. The Modernization of Russia (3) I For a description of course topics see HIST 424. Graduate-level requirements include additional readings and meetings with the instructor and more rigorous writing requirements. May be convened with HIST 424.

525. History of the Soviet Union (3) I Graduate-level requirements include a research paper.

527. Work, Culture and Power (3) I For a description of course topics see HIST 427. Graduate-level requirements include additional readings and meetings with the instructor and more rigorous writing requirements. May be convened with HIST 427.

531. Colonial America (3) I For a description of course topics see HIST 431. Graduate-level requirements include different, additional reading and reports thereon. May be convened with HIST 431.

532. The Era of the American Revolution (3) II For a description of course topics see HIST 432. For a description of course topics see 432. Graduate-level requirements include different, additional reading and reports thereon. May be convened with HIST 432.

533. Jefferson and the New Nation, ca. 1790-1828 (3) I For a description of course topics see 433. Graduate-level requirements include an additional, substantial research or historiographical paper, to be decided on in consultation with the instructor. May be convened with HIST 433.

534. Jacksonian Era, 1828-1856 (3) II For a description of course topics see HIST 434. Graduate-level requirements include an additional, substantial research or historiographical paper, to be decided on in consultation with the instructor. May be convened with HIST 434.

535. The Coming of the Civil War, U.S. 1845-1861 (3) I For a description of course topics, see HIST 435. Graduate-level requirements include a research exercise. May be convened with HIST 435.

536. Civil War and Reconstruction, U.S. 1861-1878 (3) II Graduate-level requirements include a research exercise.

537. U.S. 1876-1919: The Gilded Age and Progressive Era (3) I For a description of course topics see HIST 437. Graduate-level requirements include an in-depth research paper. May be convened with HIST 437.

538. U.S. 1918-1945: World War II through World War II (3) II For a description of course topics see HIST 438. Graduate-level requirements include taking examinations which consist entirely of essay questions, completing a research paper on a topic chosen in consultation with the professor, assisting the professor in leading discussion groups with undergraduates, and possibly presenting a lecture to the class if the student is nearing completion of graduate work. May be convened with HIST 438.

539. History of North Africa from the Islamic Conquest to Modern Independence, 700-1962 (3) II (Identical with NES 539, which is home). May be convened with 439.

540. United States: 1945 to Present (3) I II For a description of course topics see HIST 440. For a description of course topics see 440. Graduate-level requirements include an in-depth research paper and an additional course reading. May be convened with HIST 440.

542. History of American Society and Thought: Pre-Civil War (3) I For a description of course topics see HIST 442. Graduate-level requirements include an in-depth research paper. May be convened with HIST 442.

543. History of American Society and Thought Since the Civil War (3) II For a description of course topics see HIST 443. Graduate-level requirements include an in-depth research paper. May be convened with HIST 443.

544. Women in Islamic History (3) I For a description of course topics see HIST 445. Graduate-level requirements include additional readings and meetings with the instructor and an additional research paper. (Identical with NES 545, W S 545). May be convened with HIST 445.

545. History of Arizona and the Southwest (3) I II For a description of course topics see HIST 446. Graduate-level requirements include an additional research paper. May be convened with HIST 446.

549. History of American Foreign Relations to 1914 (3) I For a description of course topics see HIST 449. Graduate-level requirements include an in-depth research paper and additional course readings. May be convened with HIST 449.

550. History of American Foreign Relations Since 1914 (3) II For a description of course topics see HIST 450. Graduate-level requirements include an in-depth research paper and additional course readings. May be convened with HIST 450.

551. The United States and East Asia: 1840 to the Present (3) II For a description of course topics see HIST 451. Graduate-level requirements include an additional research paper and an additional research paper. (Identical with EAS 551). May be convened with HIST 451.

552. American Ethnic History (3) II For a description of course topics see HIST 452. Graduate-level requirements include an in-depth research paper and a topic approved by the instructor. May be convened with HIST 452.

553. History of Women and Work (3) I For a description of course topics see HIST 453. Graduate-level requirements include a topic chosen in consultation with the professor, assisting the professor in leading discussion groups with undergraduates, and possibly presenting a lecture to the class if the student is nearing completion of graduate work. May be convened with HIST 453.
lengthy research paper demonstrating a familiarity with basic secondary works as well as investigating primary sources on a pertinent topic. May be convened with HIST 453.

554. Spanish Inquisition (3) I For a description of course topics see HIST 454. Graduate-level requirements include an in-depth research paper and additional course readings. May be convened with HIST 454.

555. History of Women in Europe (3) I II For a description of course topics see HIST 455. Graduate-level requirements include an additional historiographical project. (Identical with W S 555). May be convened with HIST 455.

557. The Mexican Revolution (3) S For a description of course topics see HIST 457. Graduate-level requirements include extra readings and an in-depth research paper. Offered in Guadalajara only. May be convened with HIST 457.

558. Topics in Comparative Women’s History (3) II For a description of course topics see HIST 458. Those graduate students seeking credit will be required to read and write about the field in more depth than is required for undergraduates. May be convened with HIST 458.

561. The Ethnohistory of Mesoamerica and the Andes (3) II For a description of course topics see HIST 461. Graduate-level requirements include an additional essay. May be convened with HIST 461.

564. History of Argentina (3) I For a description of course topics see HIST 464. Graduate-level requirements include an in-depth research paper on an approved topic. (Identical with LA S 564). May be convened with HIST 464.

565A-565B-565C-565D. History of Spain: Spanish Politics, Society and Culture Since 711 (3-3-3-3) I For a description of course topics see HIST 465A-465B-465C-465D. Graduate-level requirements include additional readings and meetings with instructor to develop topics for a historiographical or bibliographic essay. May be convened with HIST 465A-465B-465C-465D.

566. History of Brazil (3) II For a description of course topics see HIST 466. Graduate-level requirements include a paper on the role of Carlos Lacerda. (Identical with LA S 566). May be convened with HIST 466.

567. Contemporary Latin America (3) I For a description of course topics see HIST 467. Graduate-level requirements include an in-depth paper on a topic approved by the instructor. (Identical with LA S 567). May be convened with HIST 467.

568A. Asia and the West (3) I For a description of course topics see HIST 468A. Graduate-level requirements include additional research or writing; see instructor for details. (Identical with NES 568A). May be convened with HIST 468A.

568B. Asia and the West (3) II For a description of course topics see HIST 468B. Graduate-level requirements include additional research or writing; see instructor for details. (Identical with NES 568B). May be convened with HIST 468B.

569. History of Women in Latin America (3) II For a description of course topics see HIST 469. Graduate-level requirements include an in-depth research paper on a topic approved by the instructor. (Identical with LA S 569). May be convened with HIST 469.

570. Religious History of India (3) I For a description of course topics see HIST 470. Graduate-level requirements include additional research or writing; see instructor for details. (Identical with NES 570). May be convened with HIST 470.

572. History of Medieval India (3) I For a description of course topics see HIST 472. Graduate-level requirements include additional research or writing; see instructor for details. (Identical with NES 572). May be convened with HIST 472.

573. History of Modern India and Pakistan: 1750-Present (3) II For a description of course topics see HIST 473. Graduate-level requirements include additional research or writing; see instructor for details. (Identical with NES 573). May be convened with HIST 473.

574A. History of Japan: from Earliest Times to 1500 (3) I II For a description of course topics see HIST 474A. Graduate-level requirements include an additional research paper. (Identical with JPN 574A). May be convened with HIST 474A.

574B. History of Japan: from 1500-1800 (3) I II For a description of course topics see HIST 474B. Graduate-level requirements include an additional research paper. (Identical with JPN 574B). May be convened with HIST 474B.

574C. History of Japan: from 1800-Present (3) I II For a description of course topics see HIST 474C. Graduate-level requirements include an additional research paper. (Identical with JPN 574C). May be convened with HIST 474C.

575A. Periods in Chinese History (3) Rpt./1 I II (Identical with CHN 575A, which is home). May be convened with HIST 475A.

575B. Periods in Chinese History (3) Rpt./1 I II (Identical with CHN 575B, which is home). May be convened with HIST 475B.

575C. Periods in Chinese History (3) Rpt./1 I II (Identical with CHN 575C, which is home). May be convened with HIST 475C.

575D. Periods in Chinese History (3) Rpt./1 I II (Identical with CHN 575D, which is home). May be convened with HIST 475D.

575E. Periods in Chinese History (3) Rpt./1 I II (Identical with CHN 575E, which is home). May be convened with HIST 475E.

576. Modern China (3) I II For a description of course topics see HIST 476. Graduate-level requirements include an in-depth research paper and additional readings. (Identical with CHN 576). May be convened with HIST 476.

579. The Ottoman Empire to 1800 (3) I II For a description of course topics see HIST 479. Graduate-level requirements include an in-depth research paper. (Identical with NES 579). May be convened with HIST 479.

580. The Middle East in the Twentieth Century (3) I (Identical with NES 580, which is home). May be convened with HIST 480.

581. Work, Motherhood, and Female Identity in America: 1945 to the Present (3) I II (Identical with W S 581, which is home). May be convened with HIST 481.

582. Social History of China (3) I II (Identical with CHN 582, which is home). May be convened with HIST 482.

583. Gender and African History (3) For a description of course topics see HIST 483. Graduate-level requirements will include a research paper and additional discussion sessions. (Identical with W S 583). May be convened with HIST 483.

584. History of the Arab-Israeli Conflict, 1948 to Present (3) I II (Identical with NES 584, which is home). May be convened with HIST 484.

585A. Social, Cultural and Political History of Iran Plateau from the 7th Century (3) I II (Identical with NES 585A, which is home). May be convened with HIST 485A.

585B. Social, Cultural and Political History of Iran Plateau from the 7th Century (3) I II (Identical with NES 585B, which is home). May be convened with HIST 485B.

587. Islamic Mysticism (3) I For a description of course topics see HIST 487. For a description of course topics see 487. (Identical with NES 587). May be convened with HIST 487.

588. History of Byzantium (3) I For a description of course topics see HIST 488. Graduate-level requirements include a research paper. (Identical with CLAS 588). May be convened with HIST 488.

589. Women in East Asia (3) I For a description of course topics see HIST 489. For a description of course topics see 489. include an additional research paper. (Identical with EAS 589). May be convened with HIST 489.

590. Philosophy of History (3) I For a description of course topics see HIST 490. Graduate-level requirements include a research paper. May be convened with HIST 490.

593. Internship (1-3) Rpt./

594. Internship

1. Legislative Internship (1-9) Rpt./

595. Colloquium
c. Topics in Modern European History (3) I II [Rpt./9 units] May be convened with 495c.
d. Struggle and Survival in the Modern Middle East and North Africa, c. 1850-Present (3) I II (Identical with NES 595E). May be convened with 495E.
e. Chinese History Since 1949 (3) I II (Identical with CHN 595R, which is home). May be convened with HIST 495R.

596. Seminar
c. Women and the Literature of Identity in Modern Middle East and North Africa (3) II (Identical with NES 596C and W S 596C). May be convened with HIST 496C.
m. Middle East: Topics in History and
History—Honors

FAX: (520) 621-8655
E-mail: pmac@ccit.arizona.edu
URL: http://www.honors.arizona.edu/

The Honors Center provides special opportunities for undergraduate students who demonstrate the highest levels of curiosity, creativity, and academic achievement. Honors courses and discipline-specific advising are offered in departments. The Honors Center is responsible for a variety of academic, social, and cultural activities and programs.

Program Requirements
For undergraduate academic program requirements, consult the On Course Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/ interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/ interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Honors (HONR)

295H. Honors Colloquium (1-3) [Rpt./ 6 units] I II Small group discussions exploring special topics. Introduction to the Spirit of Inquiry. The Examined Life, An Encounter with Poets and their Poetry, Discovering the Brain. Open to all Honors students.

299H. Honors Independent Study (1-3) [Rpt./] Grades available A-B-C-D-E-I-W.

391H. Honors Preceptorship (1-3) [Rpt./] I II Open to select upper-division students interested in gaining teaching or practical experience in a department. (Prior consent required.)

396H. Honors Proseminar (3) I II A small, interdisciplinary class focusing on specialized topics.

399H. Honors Independent Study (1-3) [Rpt./] I II Open to select students who wish to work independently under the supervision of an honors faculty member.

499H. Honors Independent Study (1-3) [Rpt./] I II Grades available A-B-C-D-E-I-W.

DEPARTMENT COURSE OFFERINGS

American Indian Studies

206. Native People of the Southwest (3)

396H. Honors Proseminar (3)

Anatomy

Independent laboratory opportunities available.

Anthropology

101. Introduction to Biological Anthropology and Archaeology (3)
Mathematics
122. Mathematics in Modern Society (3)
124. Calculus with Applications (5)
125a-125b. Calculus (3-3)
115. Introduction to Linear Algebra (3)
223. Vector Calculus (4)
254. Introduction to Ordinary Differential Equations (3)
415. Introduction to Abstract Algebra (3)
473. Automata, Grammar and Language (3)

Material Science and Engineering
110. Solid State Chemistry (4)

Media Arts
100. Fundamentals of Theory and Aesthetics in Media Arts (3)
101. Survey of Media History (4)
103. Professional Practices (1)
104. Beginning Video Production (3)
194. Practicum (1-5)
396H. Honors Proseminar (3)
421. Cultural Theory and Criticism of Media (3)
424. Film Theory and Criticism (3)
426. Sexuality in Media Narratives (3)
427. Feminist Media Theory (3)

Microbiology
181R. Introductory Biology I (4)
182. Introductory Biology II (4)
410. Cell Biology (3)
411. Molecular Biology (3)
419. Immunology (3)

Additional independent laboratory opportunities available.

Molecular and Cellular Biology
181R. Introductory Biology I (3)
182. Introductory Biology II (4)
320. Genetics (4)
404. Contemporary Biology in Human Affairs (3)
410. Cell Biology (4)
411. Molecular Biology (4)
462a-462b. Biochemistry (3-3)

Additional independent laboratory opportunities available.

Music
120a. Musical Skills and Structure I (3)
120b. Musical Skills and Structure (3)
396H. Honors Proseminar (3)

Neuroscience
195h. Honors Colloquium (1)

Nursing
250. Pathophysiology (3)
255. Perspectives of Nursing and Health Care (3)

279. Nurse as Consumer and User of Research (3)
372. Nurse as Care Provider for Developing Families (5)
383. Nurse as Care Provider in Mental Health (5)
396H. Honors Proseminar (3)
481. Nurse as Care Provider of Communities (5)

Nutritional Sciences
102H. Nutrition, Food, and You (3)

Pharmaceutics
462a-462b. Biochemistry (3-3)

Philosophy
111. Introduction to Philosophy (3)

Physics
141. Introductory Mechanics (4)
142H. Introductory Optics and Thermodynamics (2-3)
241H. Introductory Electricity and Magnetism (4)
242. Introduction to Relativity and Quantum Physics (3)
396H. Honors Proseminar (3)

Plant Science
101H. Plant Sciences Lab (1)
410. Cell Biology (3)

Political Science
102. American National Government (3)
120. Introduction to International Relations (3)
140. Introduction to Comparative Politics (3)
250. Contemporary National Politics (3)
377. Modern Israel (3)
396H. Honors Proseminar (3)
407. Congress and American Politics (3)
428H. Problems in Contemporary Political Theory (3)
470. Constitutional Law: Federalism (3)
471. Constitutional Law: Civil Liberties (3)

Psychology
101. Introduction to Psychology (3)
205H. Do Animals Think? (3)
230. Psychological Measurement and Statistics (3)

296H. Honors Proseminar (3)
374. Environmental Psychology (3)
396H. Honors Proseminar (3)
429. Advanced Perception (3)
491. Honors Preceptorship (1-3)

Religious Studies
372a-372b. History and Religion of Israel in Ancient Times (3)

Renewable Natural Resources
493h. Honors Internship (1-6)

Retailing and Consumer Studies
304. Merchandising Analysis (3)
340. Consumer Concepts and Theory (3)
424. Services Retailing (3)
434. Strategic Retail Management (3)
446. International Consumer and Retailing (3)

Russian and Slavic Languages
101a-101b. Elementary Russian (4-4)
201a-201b. Intermediate Russian (4-4)

Sociology
101. Introduction to Sociology (3)
195H. Honors Colloquium (2)
313. Collective Behavior and Social Movements (3)
324. Sociology and Sexuality (3)
396H. Honors Proseminar (3)
457. Bio-Social Determinants of Socialization (3)

Teaching and Teacher Education
300. Classroom Processes and Instruction (4)
322. Teaching Language Arts and Communication in Elementary School (3)
323. Teaching Reading and Decoding in Elementary School (3)
324. Teaching Science and Health in Elementary School (3)
326. Teaching Elementary School Mathematics in a Technological Age (3)
327. Teaching Elementary School Social Studies in a Multicultural Society (3)
338g. The Teaching of Secondary School Family and Consumer Sciences Education (4)
342. Middle School Curriculum and Teaching (3)
394. Practicum (1-4)
396H. Honors Proseminar (3)
410. Teaching English Composition (3)
411. Teaching of Literature (3)
412. The Teaching of English Language (3)
493a. Student Teaching in Elementary School (3-12)
493b. Student Teaching in Secondary School (6-12)

Theatre Arts
100. Acting for the General College Student (3)
The college requires a minor.

Undergraduate Minors
(Ph.D.)
Second Language Acquisition & Teaching
Russian and Soviet Studies (B.A.)
Russian (B.A., M.A.)
English (Ph.D.)
Rhetoric, Composition and the Teaching of Religious Studies (B.A.)
Portuguese (B.A.)
Latin (B.A.)
Greek (B.A.)
German Studies (B.A., M.A.)

Majors and Degrees
Classics (B.A., M.A.)
Comparative Cultural and Literary Studies (M.A., Ph.D.)
Creative Writing (B.A., M.F.A.)
East Asian Studies (B.A., M.A., Ph.D.)
English (B.A., M.A., Ph.D.)
English as a Second Language (M.A.)
French (B.A., M.A., Ph.D.)
German Studies (B.A., M.A.)
Greek (B.A.)
Italian (B.A.)
Latin (B.A.)
Portuguese (B.A.)
Religious Studies (B.A.)
Rhetoric, Composition and the Teaching of English (Ph.D.)
Russian (B.A., M.A.)
Russian and Soviet Studies (B.A.)
Second Language Acquisition & Teaching (Ph.D.)
Spanish (B.A., M.A., Ph.D.)

Undergraduate Minors
The college requires a minor.

General Education Program
All undergraduate students are required to complete the university-wide general education program. Designed to provide a foundation for university learning, the program develops students’ creative and analytical skills and integrates knowledge across university disciplines.

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/interfaceminors/. For undergraduate academic program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

HUMANITIES PROGRAM (HUMS)

Harvill Bldg., Rm. 347
The University of Arizona
PO Box 210076
Tucson, AZ 85721-0076
Phone: (520) 621-3933
AX: (520) 621-1809
E-mail: delauer@u.arizona.edu
URL: http://w3.arizona.edu/~dante/

The humanities program provides interdisciplinary courses and programs that focus on human achievements as expressed in works of art, literature, religion, philosophy, and science. Courses are designed to teach students various aspects of distinctive cultural heritages, and to make them aware of ethical and aesthetic concerns raised by such studies so that students, as citizens of the future, may participate in local and world communities with a clear sense of responsibility and purpose.

Baccalaureate Degree
The humanities program does not offer a baccalaureate degree. The program does offer a concentration for the interdisciplinary studies major (IDS).

Graduate Degree
The program offers no graduate degrees.

Minor
The program offers an undergraduate minor.

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/interfaceminors/.
30. Voyage of Discovery (3) S Small group, travel (8-15) to cultural centers of Europe, Asia, and Africa to study the interaction of cultural difference as evidenced in art, architecture, and city structure. P, 6 units from HUMS 250A, HUMS 250B, HUMS 250C, HUMS 250D or HUMS 355.


317A. Nobel Laureates and the 20th Century (3) I

317B. Nobel Laureates and the 20th Century (3) II

320. Women in Antiquity (3) (Identical with CLAS 350, which is home).

340. The Humanities and Medicine: An Interdisciplinary Experience (3) I Multidisciplinary course, team-taught by faculty in Humanities and Medicine, examines modern world literature, visual art and film in light of scientific and modern values relating to medical ethics, disease, suffering, death and healing. P, HUMS 250A or HUMS 250B or HUMS 250C or HUMS 250D. 6 units of English composition.

350. Hindu Mythology (3) II S (Identical with EAS 350, which is home).

355. Contemporary Complexities (3) I II An interdisciplinary survey of contemporary culture and its roots as expressed in literature, art, and philosophy, with particular focus on gender and ethnic issues. Field trips. Emphasizes varying P. 3 units of HUMS 250A, HUMS 250B, HUMS 250C, HUMS 250D or HUMS 260.

365. Journeys - The Culture of Travel (3) I II Interdisciplinary, cross-cultural study of human journeys and representations of travel in art, literature, and philosophy from ancient to modern times. Field trips. P, 6 units of first-year composition.


371A. Nobel Laureates and 20th Century Values (3) I Interdisciplinary survey of major movements in peace, physics, chemistry, physiology and literature in the 20th century from a multi-ethnic perspective: 1901-1945. P, 6 units of 1st-year composition, HUMS 371A is not prerequisite to HUMS 371B.


380. Nature, the Great Mother and Woman (3) II Interdisciplinary survey of the ancient world’s woman-centered or multi-gendered belief systems, social practices, and cultural artifacts from a multi-ethnic perspective. Establishes and examines connections to contemporary literature, the arts, and theories that reconsider “woman and nature,” “nature and culture.” P, 3 units of HUMS 250A, HUMS 250B, HUMS 250C, HUMS 250D or HUMS 260. (Identical with W S 380 and RELI 380).

391. Preceptorship

b. Humanities Honors Preceptorship (1-3) [Rpt./J] II P, Select upper-division Honors undergrad only.

396. Proseminar

399. Independent Study (1-6) [Rpt/J]

399H. Honors Independent Study (1-3) [Rpt/J] II

420. From Orality to Literature: Storytelling in Contemporary Literature (3) I The importance of oral storytelling tradition in the gendered, multi-ethnic literature and art, why this theme arises in ethnic works, and its importance for concepts of gender and ethnic identity. Students will attend 4 cultural events. P, 3 units of HUMS 250A, HUMS 250B, HUMS 250C, HUMS 250D or HUMS 260.

451. Science and the Humanities (3) (Rpt./2) I II Examination of vital issues which occur at the intersection of the sciences and the arts and literature. Topics include the role of computers, space exploration, genetic engineering, fractals, chaos theory, evolution and psychological science. Emphasizes varying P. 3 units of HUMS 250A, HUMS 250B, HUMS 250C, HUMS 250D or HUMS 260.

452. Ancient Egypt: Culture/Language (3) II Examination of the culture of ancient Egypt through an introduction to hieroglyphs and study of selected inscriptions and texts. Topics include Egyptian kingship, art, literature, religion, and gender issues.

454. Irish Revolutionary Literature (3) I Features an aesthetic, feminist, socialist, and political revolution in 20th century Irish literature; complexities of Irish nationalism examined through history, art, and literature. P, 3 units of HUMS 250A, HUMS 250B, HUMS 250C, HUMS 250D or HUMS 260. (Identical with ENGL 454).

467. Social Psychology and the Cinema (3) III (Identical with PSYC 467, which is home).

498. Senior Capstone (1-3) I II

499H. Honors Thesis (3) (Rpt./2)

499H. Independent Study (1-3) [Rpt./J] II

500. Honors Independent Study (1-3) [Rpt./J]

HYDROLOGY AND WATER RESOURCES (HWR)

Harshbarger Bldg., Rm. 122
The University of Arizona
PO Box 210011
Tucson AZ 85721-0011
Phone: (520) 621-3131
FAX: (520) 621-1422
E-mail: programs@hwr.arizona.edu
URL: http://www.hwr.arizona.edu/depinfo.html

Baccalaureate Degree
Bachelor of Science in Hydrology (B.S.Hyd.)

Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Hydrology (B.S.Hyd., M.S., Ph.D.)

Program Requirements
For undergraduate academic program requirements, consult the OnCourse! Academic Program Requirements Reports (APRPs). APRPs for all undergraduate majors are available in college or departmental offices. APRPs are also available online at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Hydrology and Water Resources (HWR)

101A. Water and the Environment (4) I Relation of physical and biological sciences to the understanding of the water cycle; man’s impact on water resources, with emphasis on factors affecting the availability and quality of water in arid and humid regions. HWR 101A is not prerequisite to HWR 101B. Field trips. Fee. For non-majors only. P, ability to carry out fundamental arithmetic manipulation and/or very basic algebra.

101B. Water and the Environment (4) II Relation of physical and biological sciences to the understanding of the water cycle; man’s impact on water resources, with emphasis on factors affecting the availability and quality of water in arid and humid regions. HWR 101A is not prerequisite to HWR 101B. Field trips. Fee. For non-majors only. P, ability to carry out fundamental arithmetic manipulation and/or very basic algebra.

107B. Introduction to Global Change (4) II Examination of the ways humanity alters the global environment; effects of pollution on atmosphere, oceans, fresh waters, and climate (carbon cycle, acid deposition, ozone shield, greenhouse effect). For non-majors only. (Identical with GEOS 107B).

195. Colloquium
a. Water, the Environment and Society (1) I II Limited to Freshmen only.

250. Principles of Hydrology (3) II Introduction to the hydrologic cycle and review of main processes, such as precipitation, evaporation and transpiration, runoff, infiltration, and ground water. Some concepts and tools for water resources management are discussed. Laboratory
445. Statistical Hydrology (3) II Application of statistics and probability to uncertainty in the description, measurement, and analysis of hydrologic variables and processes, including extreme events, error models, simulation, sampling, P, statistics or probability theory. May be convened with HWR 545.

450A. Environmental Hydrology (3) II Chemistry of surface and subsurface water, the predominant chemical processes affecting composition in relation to humanity's use, classification, identification, and mobility of contaminants; introduction to chemical and transport modeling. Focuses on inorganic chemistry. P, HWR 250, CHEM 103A, CHEM 103B, MATH 125B, knowledge of computer language; CR HWR 451. May be convened with HWR 550A.

450B. Environmental Hydrology (3) II Chemistry of surface and subsurface water, the predominant chemical processes affecting composition in relation to humanity's use, classification, identification, and mobility of contaminants; introduction to chemical and transport modeling. Focuses on organic aquatic chemistry. P, HWR 250, CHEM 103A, CHEM 103B, MATH 125B, knowledge of computer language. May be convened with HWR 550B.

451. Environmental Hydrology Lab (1) II Laboratory procedures related to chemistry of surface and subsurface water. Special fees. P or CR, HWR 450A. May be convened with HWR 551.

460. Watershed Hydrology (4) I (Identical with WS M 460, which is home). May be convened with HWR 560.

461. Environmental and Resource Geography (3) II (Identical with GEOG 461, which is home).

466. Soil and Groundwater Restoration (3) I (Identical with SWES 466, which is home). May be convened with HWR 566.

476. Environmental Law and Economics (3) II (Identical with AREC 476, which is home).

478. Global Change (3) II (Identical with GEOG 478, which is home). May be convened with HWR 578.

481. Environmental Policy (3) II (Identical with POL 481, which is home). May be convened with HWR 581.

482. Applied Groundwater Modeling (3) I Introduction to groundwater flow and transport modeling, with emphasis on model construction and simulation. May be convened with HWR 582.

483. Physical Oceanology and Limnology for Hydrologists (2) II Origin, distribution, and characteristics of oceanic water; advective and convective processes; estuarine and shoreline processes; effect on coastal aquifers; classification and hydrologic regime of lakes. P, MATH 125B. May be convened with HWR 583.

490. Remote Sensing for the Study of Planet Earth (3) II (Identical with REM 490, which is home). May be convened with HWR 590.

493. Internship (1-3) [Rpt.]

494. Practicum (1-3) [Rpt.]

496. Seminar

a. Hydrology (1) [Rpt./ 1] II

498. Senior Capstone (1-3) II

498H. Honors Thesis (3) [Rpt./ 2] II

499. Independent Study (1-3) [Rpt./]

499H. Honors Independent Study (1-3) [Rpt./]

500. Ecosystemology for Urban Planning (3) I Introduction to conceptual tools used in complex ecosystems, particularly cities and urban areas; integration of human residents with larger natural systems (human ecology); environmental impact assessment (EIA) and statement (BJS). Water resource planning and impact on regional ecosystems; technical, legal, ethical dimensions of water transfer. (Identical with PLAN 500).

503. Subsurface Fluid Dynamics (3) I Dynamics of immiscible fluids in porous and fractured media; anisotropy and scale; advective solute transport; consolidation and land subsidence; multiaquifer systems; free surface flow and salt water/fresh water interfaces. P, MATH 223 or (preferably) MATH 322 or MATH 422A or MATH 422B, C E 321 or A ME 331. P, MATH 422A or consult department prior to enrolling. (Identical with C E 503).


505. Vadose Zone Hydrology (3) II Fundamentals of flow and transport in the vadose zone, including multiphase flow. Methods for characterization of hydraulic properties. Vadose zone processes relative to ground water contamination. P, HWR 407 or HWR 503 or HWR 518.

506. Water Quality Dynamics (3) II Chemical and physical methods are used to study the quality of ground and surface waters with emphasis on organic contaminants, colloids, and surface processes including sorption phenomena. Equilibrium and dynamic models of water chemistry. P, HWR 517R and HWR 517L.

508. Vadose Zone Monitoring (2) II A description of course topics see HWR 408. Graduate-level requirements include in-depth laboratory reports. P, HWR 407 or HWR 503 or HWR 505 or HWR 518. May be convened with HWR 408.


514. Field Hydrology (Surface Water) (1) S Field methods of collection, compilation, and interpretation of data in surface water. Stream gauging, hydrography and limnology exercises; evaporation studies; micrometeorological instruments and methods; slope-area method of indirect discharge measurement; flood plain mapping; preparation of hydrologic reports. Daily field work. May be convened with HWR 514. Fee. P, HWR 250 or HWR 423 or HWR 440.

414. Field Hydrology (Surface Water) (1) S Field methods of collection, compilation, and interpretation of data in surface water. Stream gauging, hydrography and limnology exercises; evaporation studies; micrometeorological instruments and methods; slope-area method of indirect discharge measurement; flood plain mapping; preparation of hydrologic reports. Daily field work. May be convened with HWR 514. Fee. P, HWR 250 or HWR 423 or HWR 440.


423. Hydrology (3) I (Identical with C E 423, which is home). May be convened with HWR 523.

427. Computer Applications in Hydraulics (3) I (Identical with C E 427, which is home). May be convened with HWR 527.

431. Hydrogeology (4) I II Hydrologic and geologic factors controlling the occurrence and dynamics of groundwater on regional and local scales. (Identical with GEOG 431). May be convened with HWR 531. P, GEOG 251, MATH 125B.

440. Advanced Surface Water Hydrology (3-4) II Theory and selected design problems from fluvial dynamics, flood hydrology, flood routing, and water supply hydrology. Discussion section is mandatory for undergraduates. Field trip. P, HWR 250 or HWR 423 or C E 321. May be convened with HWR 540.

443. Environmental Risk and Economic Analysis in Water Resources (3) I Applications of quantitative methods to water resource management; environmental risk analysis; benefit-cost analysis; optimization; structure and basis of planning process. P, MATH 125A. May be convened with HWR 543.
Graduate-level requirements include an in-depth report on one aspect of the fieldwork or participation and assistance in the preparation and conduction of a field project. Daily field work. Fee. P, HWR 519. May be convened with HWR 414.

515. Introduction to Water Resources Policy (3) II For a description of course topics see HWR 415. Graduate-level requirements include an in-depth term paper. P, MATH 125A. (Identical with GEOG 515). May be convened with HWR 415.

516. Hydrologic Transport Processes (3) I Development and application of equations describing mass and energy transport in the subsurface environment. P, HWR 503 or HWR 555, SIE 270.

517. Fundamentals of Water Quality Laboratory (1) I Field and laboratory methods in water quality sampling and analysis. Includes both wet chemical and instrumental methods of analysis. P, HWR 517R.

517R. Fundamentals of Water Quality (3) I Introduction to chemical processes affecting the behavior of major and minor chemical species in the aquatic environment. Physical, equilibrium, organic, and analytical principles as applied to natural waters. P, CHEM 103B, PHYS 241, MATH 125C, P or CR MATH 254.

518. Survey of Subsurface Hydrology (3) I Survey of physical, mathematical, geologic, and engineering concepts fundamental to subsurface hydrologic processes. P or CR A ME 331 or C E 321; MATH 254, GEOS 101.

519. Survey of Surface Water Hydrology (3) II Survey of main topics in surface water hydrology: hydrometeorology, evaporation, rainfall-runoff, statistical and probabilistic methods, unit hydrograph method, and flood routing. P or CR, C E 321 or SIE 305.

520. Water Resources Management, Planning, and Rights: A Policy Approach (3) II An introduction to basic concepts and issues of water resources management and administration, emphasizing water law and rights, water resources planning, institutional and organizational arrangements, and policy processes such as adjudication and rule-making.

521. Introduction to Water Resources Systems Analysis (3) I Quantitative analytical methods in water resources planning and management; introduction to systems analysis, benefit/cost, multi-objective planning and risk assessment. P, MATH 125A.

522. Well Logging Interpretation (3) II (Identical with G EN 522, which is home).

523. Hydrology (3) I (Identical with C E 523, which is home). May be convened with HWR 423.

524. Hydroclimatology (3) I Precipitation formation processes, the surface and atmospheric branch of the hydrologic cycle, land-surface-atmosphere interaction, surface energy balance, evapotranspiration, heat and moisture fluxes into the soil and atmospheric boundary layer. (Identical with ATM O 524).

525. Water Quality Modeling (3) II (Identical with C E 525, which is home).

526. Water Quality Management (3) II Optimization and systems analysis techniques used in modeling; current models used in formulation and implementation of water quality policy. P, HWR 525. (Identical with C E 526).

527. Computer Applications in Hydraulics (3) I (Identical with C E 527, which is home). May be convened with HWR 427.

530. Hydrogeology (1) I II For a description of course topics see HWR 431. Graduate-level requirements include a research paper on a topic related to hydrogeology but not covered in lectures. Fee. P, GEOS 101. (Identical with GEOS 531). May be convened with HWR 431.

535. Advanced Subsurface Hydrology (3) II Advanced aquifer and well hydraulics; heterogeneity, unsaturated flow; natural and artificial recharge; ground water and surface-water interaction; mass and heat transport. P, MATH 223 or MATH 322 or MATH 422A or MATH 422B. (Identical with GEOS 535).

536. Ground-Water Resource Evaluation (3) II Hydrologic and geologic techniques for evaluating aquifer systems with case studies of ground-water management on local and aquifer scales, their environmental and societal impacts; case studies of ground-water contamination. Fee. Field Methods and Field trips. (Identical with GEOS 536).

540. Advanced Surface Water Hydrology (3-4) II For a description of course topics see HWR 440. Graduate-level requirements include an in-depth paper or project. Discussion section is optional for graduate students. Field trips. P, HWR 519 or HWR 523. May be convened with HWR 440.

543. Environmental Risk and Economic Analysis in Water Resources (3) I For a description of course topics see HWR 443. Graduate-level requirements include a research paper on an applied aspect of the course. P, MATH 125A. May be convened with HWR 443.

545. Statistical Hydrology (3) II For a description of course topics see HWR 445. Graduate-level requirements include an in-depth simulation project. P, knowledge of a computer language, SIE 305 or MATH 160. May be convened with HWR 445.

550A. Environmental Hydrology (3) I II For a description of course topics see HWR 450A. Graduate-level requirements include an in-depth research paper. P, CHEM 103A or CHEM 103B, MATH 125C, knowledge of a computer language. May be convened with HWR 450A.

550B. Environmental Hydrology (3) I II For a description of course topics see HWR 450B. Graduate-level requirements include an in-depth research paper. P, CHEM 103A or CHEM 103B, MATH 125C, knowledge of a computer language. May be convened with HWR 450B.


560. Watershed Hydrology (4) I (Identical with WS M 560, which is home). May be convened with HWR 460.

563. Environmental Isotope Hydrology and Low Temperature Geochemistry (3) I II (Identical with GEOS 563, which is home).

566. Soil and Groundwater Restoration (3) I (Identical with SWES 566, which is home). May be convened with HWR 466.

567. Advanced Watershed Hydrology (3) I (Identical with WS M 567, which is home). May be convened with HWR 467.

569. Spatial Analysis of Hydrology and Watershed Management (2) I (Identical with WS M 569, which is home).

570. Computer Simulation of Hydrochemical Processes (3) I Introduction to the fundamentals of solving complex water chemistry problems using computer codes as tools. Equilibrium, mass transfer, or 1-D transport models with multi-element chemistry, thermodynamic concepts, and use of equations in models; placing natural chemical processes into an interpretable framework, evaluation of error and uncertainty. CR, HWR 506 or HWR 517R.

572. Global Biogeochemical Cycles (3) I (Identical with GC 572, which is home).

576. Advanced Natural Resource Economics (3) I (Identical with AREC 576, which is home).

577. Advanced Topics in the Economics of Environmental Regulation (3) I (Identical with AREC 577, which is home).

578. Global Change (3) I (Identical with GEOS 578, which is home). May be convened with HWR 478.

581. Environmental Policy (3) I (Identical with POL 581, which is home). May be convened with HWR 481.

582. Applied Groundwater Modeling (3) I Graduate-level requirements include an in-depth research paper and/or project. May be convened with HWR 482.

583. Physical Oceanology and Limnology for Hydrologists (2) II For a description of course topics see HWR 483. Graduate-level requirements include an in-depth research report. P, MATH 125C. May be convened with HWR 483.

584. Advanced Applied Groundwater Modeling (3) I II Advanced applied ground-water flow and transport modeling for saturated and unsaturated media using variety of current software packages. P, HWR 482 or HWR 582 or equivalent course.

590. Remote Sensing for the Study of Planet Earth (3) I (Identical with REM 590, which is home). May be convened with HWR 490.

595. Colloquium

b. Global Climate Change (2) [Rpt./ 1] I S (Identical with ATM O 595B, which is home).

c. General Circulation Observations and Modeling (1-3) II S (Identical with ATM O 595C, which is home).

596. Seminar
k. Risk and Society (3) I (Identical with GEOG 596K, which is home).

597. Workshop
a. Computational Tools EOS Hydrology (1-2) [Rpt./ 4 units] I P, some previous knowledge of UNIX desirable.

599. Independent Study (1-3) [Rpt./]

603. Advanced Topics in Subsurface Hydrology (2) II Topics to be selected among (a) geostatistical and stochastic analyses of flow and transport, (b) well hydraulics and pumping test analysis, and (c) flow and transport in fractured rocks. P, HWR 503 or HWR 535.

605. Soil-Water Dynamics (3) II (Identical with SWES 605, which is home).

642. Analysis of Hydrologic Systems (3) I Presentation and evaluation of a variety of mathematical modeling techniques; presentation of theoretical basis of linear/nonlinear systems, advantages and limitations of various approaches, e.g., linear vs. nonlinear, lumped vs. distributed, used in hydrologic modeling; interrelation between function development and model calibration requirements. P, MATH 254.

643. Water Resources Systems Analysis (3) II Applications of mathematical programming to the analysis of interactions of hydrology, engineering, economics, and socio-institutional environment in regional water resources systems. P, HWR 521 or consult department before enrolling.


655. Stochastic Hydrology (3) I Advanced application of statistics and probability to hydrology; multivariate regression, Bayesian techniques, stochastic processes, time series and frequency analysis. P, basic statistics and hydrology.

694. Practicum (1-3) [Rpt./] I II

695. Colloquium
a. Hydrology and Water Resources (1-3) [Rpt./ 6 units] I II For HWR majors, research presentation only, consult department before enrolling.

696. Seminar
a. Advanced Topics in Groundwater Hydrology (1-3) [Rpt./ 6 units] I II
b. Advanced Topics in Vadose Zone Hydrology (1-3) I II
c. Advanced Topics in Subsurface Modeling (1-3)
d. Pollutants in the Hydrologic Environment (1-3) [Rpt./ 3 units] I II
f. Advanced Hydrologic Modeling (1-3) [Rpt./ 6 units] II
g. Interstate Conflict Resolution (3) [Rpt./ 1] II (Identical with SIE 696G, which is home). P, consent of instructor.

i. International Water Resource Management (1-3) [Rpt./ 9 units] I II (Identical with NES 696I, POL 696I).

k. Science and Technology of Radioactive Waste Management (1-3) [Rpt./ 6 units] II
l. Advanced Methods in Hydrometeorology/ Hydroclimatology (1-3) [Rpt./ 6 units] I II

699. Independent Study (3) [Rpt./] I II

900. Research (1-4) [Rpt./]

910. Thesis (1-16) [Rpt./]

920. Dissertation (1-16) [Rpt./]

930. Supplementary Registration (1-16) [Rpt./]

INDIVIDUALS & SOCIETIES (INDV)

For more information about Tier 1 and Tier 2 Individual and Societies courses see the entry for General Education Courses in this manual.

SCHOOL OF INFORMATION RESOURCES AND LIBRARY SCIENCE (IRLS)

1515 East First St.
The University of Arizona
Tucson AZ 85719
Phone: (520) 621-3565, FAX: (520) 621-3279
E-mail: siruls@arizona.edu
URL: http://siruls.arizona.edu/

Baccalaureate Degrees
The program does not offer a baccalaureate degree.

Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major and Degrees
Information Resources and Library Science (M.A., Ph.D.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Information Resources and Library Science (IRLS)

116. Introduction to Microcomputers (3) Examination of microcomputers in the information environment. Emphasis on hardware and software concepts.

195. Colloquium
a. Freshman Colloquium (1)

400. Social Constructs of Information (3) I II Introduction to information as it is used and defined by society. Geography of information, economics of information, and intellectual property concerns. May be convened with IRLS 500.

401. Knowledge Structures I (3) I II Introduction to the theories and practices used in the organization of information. Overview of national and international standards and practices for access to information in collections. May be convened with IRLS 501.

404. Foundations of Library and Information Services (3) I II Elements of librarianship, historical backgrounds, types of libraries, the role of the library in American life, current issues. May be convened with IRLS 504.

411. Information Storage and Retrieval (3) I II Student involvement in on-line interactive systems.

424. Information Resources Evaluation (3) Methods of evaluation of information resources in society. Development of terms and functions for evaluation. May be convened with IRLS 524.

444. Children's Literature in Spanish (3) I (Identical with SPAN 441, which is home).

443. Knowledge and Society (3) II (Identical with PHIL 443, which is home). May be convened with IRLS 543.

460. Information Resource Development (3) Principles of identifying, selecting, acquiring, managing, and evaluating information resources for particular demographic areas. May be convened with IRLS 560.

481. School Library Administration and Organization (3) II Services, finances, personnel, evaluation, quarters, organization and technical services in the school library. May be convened with IRLS 581.

493. Internship (1-6) [Rpt./]

494. Practicum (2-3) [Rpt./]

498. Senior Capstone (1-3) I II

499. Independent Study (1-6) [Rpt./]

500. Social Constructs of Information (3) I II For a description of course topics see IRLS 400. For a description of course topics see 400. Graduate-level requirements include extra readings and in-depth exams. May be convened with IRLS 400.

501. Knowledge Structures I (3) I II For a description of course topics see IRLS 401. For a description of course topics see 401. Graduate-level requirements include additional assignments and a higher level of performance. May be convened with IRLS 401.

504. Foundations of Library and Information Services (3) I II For a description of course topics see IRLS 404. For a description of course topics see 404. Graduate-level requirements include a greater number of assignments and a higher level of performance. May be convened with IRLS 404.

506. Research Methods I (3) I II Research methodology, research design, and elementary statistics.
599. Information Sources for Agricultural Scientists (1) (Identical with PL S 509, which is home).

524. Information Resources Evaluation (3) For a description of course topics see IRLS 424. For a description of course topics see 424. Graduate-level requirements involve extra readings and in-depth exams. May be convened with IRLS 424.


533. Knowledge and Society (3) II (Identical with PHIL 543, which is home). May be convened with IRLS 443.

560. Information Resource Development (3) For a description of course topics see IRLS 460. For a description of course topics see 460. Graduate-level requirements involve extra readings and in-depth exams. May be convened with IRLS 460.

575. Human Factors in Information Systems (3) I II Study of the human-information system interface: computers, human-information processing, physical-psychological factors in design and operation of information systems.

581. School Library Administration and Organization (3) II For a description of course topics see IRLS 481. For a description of course topics see 481. Graduate-level requirements include a greater number of assignments and a higher level of performance. May be convened with IRLS 481.

588. Issues in Information Resources (3) [Rpt./3] I II Examines problems associated with current issues in information resources and other information centers.

589. Scholarly Communication (3) I II Structure and workings of scholarly communication and products in the U.S. Examines the content and technology of scholarly communication in various disciplines. (Identical with COMM 589).

593. Internship I Legislative Internship (1-9) [Rpt./I II]

600. Introduction to Graduate Study in Music (3) I (Identical with MUS 600, which is home).

601. Knowledge Structures I (3) I I II Theory of classification, subject approaches to information, and advanced data coding.

606. Research Methods II (3) I I II Regression and correlation techniques, analysis of variants, advanced techniques. Emphasis on research and problem solving in information agencies.

608. Planning and Evaluation of Information Centers (3) I II The planning/evaluation cycle as an approach to assessing various information center services.

612. Expert Systems in Information Resources (3) II Examines the role and place of expert systems. Emphasis on development of knowledge-based systems.

613. Systems Analysis and Evaluation (3) I II Introduction to quantitative methods for the design, analysis and control of library systems.

614. Information Theory and Transfer (3) I I II Nature of information in the social setting. Examines the use, value, and relevance of information as well as the dispersion of information through open and closed systems.

622. Advanced Information Resources (3) I II Analysis of information needs of subjects specialists. Approaches to evaluation of information exchanges and sources.

624. Health and Medical Informatics (3) I II Information systems used in health and medical settings. Particular attention is given to the integration of traditional and nontraditional methods of information transfer.

688. Advanced Issues in Information Resources (3) [Rpt./2] I II Topics vary. Problems associated with current issues in information resources and information centers.

693. Internship (2-4) [Rpt./]

694. Practicum (1-6) [Rpt./]

695. Colloquium e. Theory of Classification (1-3) I II h. Children's and Youth Services and Literature (2-3) [Rpt./6 units] I


796. Seminar a. Advanced Topics in Information Resources (3) I II 900. Research (1-9) [Rpt./]

910. Thesis (1-6) [Rpt./]

920. Dissertation (1-9) [Rpt./] I II 930. Supplementary Registration (1-9) [Rpt./]

INSECT SCIENCE (INSC)

Forbes Bldg., Rm. 410 The University of Arizona PO Box 210036 Tucson AZ 85721-0036 Phone: (520) 621-1152 FAX: 621-1150 URL: http://grad.admin.arizona.edu/idps/insect/insect.html

Baccalaureate Degrees

The program does not offer a baccalaureate degree.

Graduate Degree

Doctor of Philosophy (Ph.D.)

Major and Degree

Insect Science (Ph.D.)

Program Requirements

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Insect Science (INSC)

404. Physiological Systems (3) I (Identical with ECOL 404, which is home).

411. Insect Behavior (4) I II (Identical with ENTO 411, which is home).

424. Theoretical Population Genetics (3) I (Identical with ECOL 424, which is home). May be convened with INSC 524.

500A. Topics in Ecology and Evolutionary Biology (2) I (Identical with ECOL 500A, which is home).

500B. Topics in Ecology and Evolutionary Biology (3) II (Identical with ECOL 500B, which is home).

503L. Parasitology Laboratory (1) I (Identical with V SC 503L, which is home).

503R. Biology of Animal Parazites (3) I (Identical with V SC 503R, which is home).

505. Aquatic Entomology (3) I II (Identical with ENTO 505, which is home).

507. Insect Physiology (3) I II (Identical with ENTO 507, which is home).

508. Insecticide Toxicology (3) I II (Identical with ENTO 508, which is home).

511. Insect Behavior (4) I II (Identical with ENTO 511, which is home).

515L. Insect Biology Laboratory (1) I (Identical with ENTO 515L, which is home).

515R. Insect Biology (3) I (Identical with ENTO 515R, which is home).

517. Insect Systematics (4) I (Identical with ENTO 517, which is home).


524. Theoretical Population Genetics (3) I (Identical with ECOL 524, which is home). May be convened with INSC 424.

544. Insect Ecology (3) I (Identical with ENTO 544, which is home).

545. Concepts in Genetic Analysis (3) I (Identical with MCB 545, which is home).

552. Medical-Veterinary Entomology (4) [Rpt./3] II (Identical with ENTO 552, which is home).

558. Nucleic Acids (4) I (Identical with BIOC 558, which is home).

570. Biological Control (3) I (Identical with ENTO 570, which is home).

588. Principles of Cellular and Molecular Neurobiology (4) I (Identical with NRSC 588, which is home).

589. Principles of Systems Neurobiology (4) II (Identical with NRSC 589, which is home).

599. Independent Study (1-4)
and knowledge of typing. (Identical with MAR 205.)

399. Independent Study (1-3) [Rpt.] I II

399H. Honors Independent Study (1-3) [Rpt.] I II

403. Advanced Photojournalism (3) I II

411. News Features (3) I II Writing the basic news feature article; specialized reporting and rewriting techniques. P, JOUR 206, consent of department to enroll, Writing-Emphasis Course. May be convened with JOUR 506.

413. Reporting Public Affairs (3) I II Study and practice of newsgathering on executive, legislative, and judicial levels in city, county, state and federal governments, with emphasis on news sources and interpretive writing. Writing-Emphasis Course. P, JOUR 206, JOUR 208, consent of department to enroll. May be convened with JOUR 513.

414. The News Agency: Arizona News Service (1) [Rpt.] I II Role and operations of the news agency, wire service or syndicate. Class members will form staff of Arizona News Service to supply client newspapers from bureaus in Tucson and Phoenix. P, CR, JOUR 411 or JOUR 413, consent of department required before enrolling; Field trips. May be convened with JOUR 514.

417. Sports News Writing (3) I Students will cover sports events and write sports features. Interview and rewriting techniques. P, JOUR 206, Writing-Emphasis Course. May be convened with JOUR 517.

421. Advanced Editing (3) II Study of layout and typography for news, photographs, and feature articles in newspapers. P, JOUR 320, consent of department to enroll. May be convened with JOUR 521.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Repeatable</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>439.</td>
<td>Ethics and the News Media</td>
<td>3</td>
<td>I</td>
<td>Analysis of ethical theory and how it relates to journalists’ roles and responsibilities in a democratic society. Case studies involve questions of bias, accuracy, privacy and national security. (Identical with LA S 459). May be convened with JOUR 539.</td>
</tr>
<tr>
<td>450.</td>
<td>Community Journalism: The Tombstone Epitaph</td>
<td>3</td>
<td>[Rpt./ I ] I II</td>
<td>Class members work as editorial staff to produce the local newspaper for Tombstone, Arizona. Intensive study of problems and responsibilities of community newspapers. P, JOUR 206, JOUR 208, discussion of preparation with instructor. May be convened with JOUR 550.</td>
</tr>
<tr>
<td>451.</td>
<td>Community Journalism: El Independiente</td>
<td>3</td>
<td>[Rpt./ I ] I II</td>
<td>Class members work as editorial staff to produce a publication for the community of South Tucson. Intensive study of problems and responsibilities of journalism. P, JOUR 206, JOUR 208, discussion of preparation with instructor. May be convened with JOUR 551.</td>
</tr>
<tr>
<td>470.</td>
<td>The Press and Society</td>
<td>3</td>
<td>I II</td>
<td>Critical study of press performance in current affairs; changing requirements for socially responsible and professional journalism in a democracy. (Identical with MAR 470). May be convened with JOUR 570.</td>
</tr>
<tr>
<td>471.</td>
<td>Community Journalism: El Independiente</td>
<td>3</td>
<td>[Rpt./ I ] I II</td>
<td>For a description of course topics see JOUR 451. Graduate-level requirements include an in-depth profile of an Arizona newsmaker. May be convened with JOUR 411.</td>
</tr>
<tr>
<td>514.</td>
<td>The News Agency: Arizona News Service</td>
<td>1</td>
<td>I II</td>
<td>For a description of course topics see JOUR 414. Graduate-level requirements include identification, through study and interviews, of a major Tucson issue and completion of a series of articles that suggest resolution of the issue. P, JOUR 206, JOUR 502, and department consent required to enroll. May be convened with JOUR 413.</td>
</tr>
<tr>
<td>522.</td>
<td>Publications Layout and Design</td>
<td>3</td>
<td>I</td>
<td>For a description of course topics see JOUR 521. Graduate-level requirements include critically analyzing a major publication and redesigning it according to newest principles. May be convened with JOUR 422.</td>
</tr>
<tr>
<td>570.</td>
<td>The Press and Society</td>
<td>3</td>
<td>I II</td>
<td>For a description of course topics see JOUR 470. Graduate-level requirements include an in-depth research paper addressing a modern media problem and proposing a solution to it. May be convened with JOUR 470.</td>
</tr>
<tr>
<td>581.</td>
<td>Internet Business and Technology</td>
<td>3</td>
<td></td>
<td>(Identical with MIS 581, which is home). May be convened with JOUR 481.</td>
</tr>
<tr>
<td>593.</td>
<td>Internship</td>
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<td>594.</td>
<td>Practicum</td>
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<td>Seminar</td>
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<td></td>
</tr>
<tr>
<td>a.</td>
<td>History of the Press</td>
<td>3</td>
<td>I II</td>
<td></td>
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<tr>
<td>b.</td>
<td>Latin-American Press</td>
<td>3</td>
<td>I II</td>
<td>(Identical with LA S 596H).</td>
</tr>
<tr>
<td>m.</td>
<td>Directions in News Technology</td>
<td>3</td>
<td>[Rpt./ I ] I II</td>
<td>For a description of course topics see JOUR 496M. May be convened with JOUR 496M.</td>
</tr>
<tr>
<td>599.</td>
<td>Independent Study</td>
<td>1-6</td>
<td>[Rpt./ I ]</td>
<td></td>
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<tr>
<td>699.</td>
<td>Independent Study</td>
<td>1-3</td>
<td>[Rpt./ I ] II</td>
<td></td>
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<tr>
<td>700.</td>
<td>Research</td>
<td>2-4</td>
<td>[Rpt./ I ]</td>
<td></td>
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<tr>
<td>909.</td>
<td>Master’s Report</td>
<td>1-3</td>
<td>[Rpt./ I ]</td>
<td></td>
</tr>
<tr>
<td>910.</td>
<td>Thesis</td>
<td>2-6</td>
<td>[Rpt./ I ]</td>
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<tr>
<td>930.</td>
<td>Supplementary Registration</td>
<td>1-9</td>
<td>[Rpt./ I ]</td>
<td></td>
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</tbody>
</table>

**JUDAIC STUDIES (JUS)**

Franklin Bldg., Rm. 308
The University of Arizona
PO Box 210080
Tucson AZ 85721-0080
Phone: (520) 621-9114
FAX: (520) 621-7841
URL: http://dizzy.library.arizona.edu/branches/judaic/home2.html

**Baccalaureate Degree**
Bachelor of Arts (B.A.)

**Graduate Degree**
The program offers no graduate degrees.

**Major and Degree**
Judaic Studies (B.A.)

**Program Requirements**
For undergraduate academic program requirements, consult the OnCourse Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.
To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

**Judaic Studies (JUS)**

103A. Elementary Modern Hebrew (5) I CDT Intensive introduction to basic oral skills, reading and writing to accomplish simple conversation and read easy Hebrew with comprehension. (Identical with NES 103A).

103B. Elementary Modern Hebrew (5) II CDT Intensive introduction to basic oral skills, reading and writing to accomplish simple conversation and read easy Hebrew with comprehension. (Identical with NES 103B).

194. Practicum (1-3) [Rpt. /]  
199. Independent Study (1-3) [Rpt. /]

203A. Intermediate Modern Hebrew (5) I CDT Instruction to achieve moderate fluency in conversation, reading and writing. P, JUS 103B or qualification by equivalency exams. (Identical with NES 203A).

203B. Intermediate Modern Hebrew (5) II CDT Instruction to achieve moderate fluency in conversation, reading and writing. P, JUS 103B or qualification by equivalency exams. (Identical with NES 203B).

273. Introduction to Judaism (3) I Exploration of Judaism in its diversity to its history and to proponents of its present forms, from Sephardi to Ashkenazi, and from Orthodox to Reform. Focusing on the adaptive answers of Judaism to a variety of challenges, this course will encourage an understanding of the interplay between texts, rituals, symbols and community institutions in the 3,500 years of Jewish adaptations. (Identical with RELI 273).

294. Practicum (1-3) [Rpt. /] II  
299. Independent Study (1-4) [Rpt. /]

299H. Honors Independent Study (1-3) [Rpt. /] II  
303. Advanced Hebrew (3) [Rpt./ I] II  

310. Apocalyptic Imagination (3) II Survey of Jewish and Christian apocalyptic literature which explores the literary features and sociological significance of apocalyptic thought in Western culture from antiquity to the present. (Identical with RELI 310).

321. Women in Judaism (3) II Images of Jewish women in Jewish and other texts. Texts include religious, historical and literary genres from biblical, medieval, and modern sources. The course will deal with Jewish women as mothers, leaders, stereotypes, and current feminist viewpoints. (Identical with RELI 321, W 321).

322. Modern Jewish Thought (3) I Course traces the historical development of the many expressions of modern Jewish philosophy and theology since the seventeenth century. Pass/Fail Option. P, JUS 273.

347. Hebrew Literature in Translation (3) I  
Introduces major ideological trends themes and writers of the last 100 years of Hebrew fiction and poetry.


372B. History and Religion of Israel in Ancient Times: Ezra-Nehemiah to the Roman Empire (3) II Survey of the history and religion of ancient Israel. Ezra-Nehemiah to the Roman Empire, with emphasis on the formation of rabbinic Judaism. (Identical with HIST 372B, NES 372B, RELI 372B).

374. The Holocaust (3) II (Identical with HIST 374, which is home).

376. German-Jewish Writers (3) I (Identical with GER 376, which is home).


382. Archaeology and the Bible (3) II Focuses on the relationship between archaeological investigations and the study of the Bible. In combination with a discussion of how archaeology can assist in reconstructing many aspects of the cultural and social milieu of the Bible, this course will survey major discoveries, which illuminate the Bible. (Identical with NES 382, RELI 382).

396. Proseminar  
h. Honors Proseminar (3) I II  
399. Independent Study (1-3) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II  
409A. Biblical Hebrew: Prose Texts (3) I II (Identical with NES 409A, which is home). May be convened with JUS 409A.

409B. Biblical Hebrew: Poetry (3) II (Identical with NES 409B, which is home). May be convened with JUS 409B.

430. Prophecy in Ancient Israel (3) II Traces the origins and nature of Israelite prophecy within its ancient Near Eastern cultural context. Focus on the literary forms of Israelite and Judaic prophecy and on the philosophical issues addressed by several major prophets. (Identical with RELI 430). May be convened with JUS 530.

435. Jewish Mysticism (3) II Surveys the ideology, symbolism, and major themes of Jewish mysticism as evidenced in several prominent mystical texts. The core of this course will be reading the texts in English translation and the development of skills in reading and understanding a Jewish mystical text. (Identical with NES 435, RELI 435). May be convened with JUS 535.

438. The Book of Psalms (3) I The characteristic features of Hebrew poetry. The literary development of these writings and their function in the Israelite cult. Examples of biblical poetry outside the book of Psalms also considered. (Identical with NES 438, RELI 438). May be convened with JUS 538.

440. Jews and Judaism in German Culture (3) [Rpt./ ] I II (Identical with GER 440, which is home).

454. Spanish Inquisition (3) I (Identical with HIST 454, which is home).

455. Introduction to Rabbinic Literature (3) II Major ethical and legal texts of rabbinic Judaism for critical understanding of the different modes of rabbinic thought and writing through study of different forms of rabbinic literature in English translation. (Identical with RELI 455).

493. Internship (1-4)

494. Practicum (1-3) [Rpt./] II

495. Colloquium

f. Ancient Near East (3) [Rpt./ 4] I II (Identical with NES 495F, which is home). May be convened with JUS 595F.

g. Judaic Studies (3) [Rpt./ 4] II P, consult department before enrolling. May be convened with JUS 595G.

496. Seminar

k. Early Judaism and the Beginning of Christianity (3) II (Identical with RELI 496K). May be convened with JUS 596K.

w. Feminist Approaches in the Bible (3) II (Identical with NES 496W, RELI 496W, W 496W). May be convened with JUS 596W.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ 2] I II

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (1-5) [Rpt./] I II

509A. Biblical Hebrew: Prose Texts (3-4) I CDT (Identical with NES 509A, which is home). May be convened with JUS 509A.

509B. Biblical Hebrew: Poetry (3-4) II CDT (Identical with NES 509B, which is home). May be convened with JUS 509B.

530. Prophecy in Ancient Israel (3) II For a description of course topics see JUS 430.
combines business course work with real world experience. The program's one-year curriculum is designed to prepare students for careers as entrepreneurs and business leaders. Cited as a model program by the U.S. Association for Small Business and Entrepreneurship, listed in Business Week and included in Success Magazine's 1994 and 1996 listing of top 25 programs, the Berger Entrepreneurship Program integrates theory and application. Students in this program focus on analysis, decision making, and business planning.

Baccalaureate Degree
Bachelor of Science in Business Administration (B.S.B.A.)

Graduate Degrees
For contact information about the Master's in Business Administration, see the Karl Eller Graduate School of Management entry in this manual.

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

LANDSCAPE ARCHITECTURE (LAR)

Professor William H. Havens
Landscape Architecture
College of Architecture
The University of Arizona
PO Box 210075
Tucson AZ 85721-0075
Phone: (520) 621-1004
FAX: (520) 621-8700
E-mail: whavens@ag.arizona.edu
URL: http://architecture.arizona.edu/landscape/default.htm

Landscape Architecture is an intercollegiate graduate program administered within the College of Architecture. Students who have an interest in landscape architecture and natural resources disciplines can choose to tailor a graduate program to meet their specific needs.

Baccalaureate Degree
The program offers no baccalaureate degree.

Graduate Degree
Master of Landscape Architecture (M.L.A.)
Major and degree
Landscape architecture (M.L.A.)

Program Requirements
For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Landscape Architecture (LAR)

500. The Profession of Landscape Architecture
(1) I An examination of principles and practices of the profession. Course includes a brief history of the profession as well as famous practitioners and projects.

507. The American Landscape (3) II (Identical with GEOG 507, which is home).

510. Design Studio I (4) I Development of visual and graphic skills; functional, aesthetic, environmental, and socio-cultural design
ordering systems; concept-getting; form generation; and design theory and criticism. Interrelationships among design, site engineering, materials, and construction techniques.


520A. Plant Materials and Design [2] I Native and selected exotic plant materials frequently used in landscape design and revegetation in the Southwest. Influence of site conditions and requirements on selection of plant materials. Theoretical basis for planting design process, functional use of plants in landscapes and design planting plans for various sites.

520B. Plant Materials and Design [2] II Native and selected exotic plant materials frequently used in landscape design and revegetation in the Southwest. Influence of site conditions and requirements on selection of plant materials. Theoretical basis for planting design process, functional use of plants in landscapes and design planting plans for various sites.


542. History and Theory of Landscape Architecture [3] I Cultural, ecological, and aesthetic factors that influence design, planning, and stewardship of landscapes and how those factors and resultant landscapes have varied and evolved over time.

543. Contemporary Landscape Architecture [3] II Examination of landscape architecture in the United States from the mid 20th century, including: romantic and classical design expressions; the role of industrialization and social changes in public design; and the birth of “modernism”; the environmental movement’s affect on natural system approaches to design and planning; and post-modern design experimentation.


551. Site Engineering [3] I Engineering aspects of landscape design and site planning. Development of technical competency in grading, storm water management, earthwork, and road alignment utilizing aesthetics and design principles as well as an understanding of ecological sensitivity. P, LAR 510; Field trips.


574. Field Methods in Environmental Psychology [3] II (Identical with PSYC 574, which is home).

592. Seminar

u. Interdisciplinary Environment-Behavior-Design [3] (Rpt./6 units) II (Identical with PSYC 596U, which is home).

597. Workshop

i. Interdisciplinary Studio for Community Design (3-6) I (Identical with ARCH 597I, which is home). May be convened with LAR 497I.

599. Independent Study [1-5] I

611. Interdisciplinary Studio [4] I Complex landscape design and planning problems within an interdisciplinary area.

620. Interdisciplinary Studio [4] II Complex landscape design and planning problems within an interdisciplinary area.

621. Landscape Planning Studio [4] I, II Theories and models in landscape planning; planning issues and methods; case studies; one major studio planning project.

631. Computer Applications in Planning [3] II Techniques in planning of regional landscape resources; visual simulation, computer map overlay, resource modeling, video applications, application of research into automated decision-support systems. Solving problems through the use of automated spatial modeling and analysis.

660. Professional Practice [2] II The practice of landscape architecture including professionalism, registration, the landscape architect professional, services and fees, construction contract documents, bid documents and procedures, and business organization and operation.

693. Internship [1-8] (Rpt.) I, II

694. Practicum

a. Landscape Architecture Teaching [1-2] (Rpt./1) I, II


695. Colloquium

d. Landscape Architecture Research [2] I, II


696. Seminar

a. Landscape Architecture [1] [Rpt./1] I, II

699. Independent Study [1-5] I, II

900. Research [1-8] (Rpt./)

909. Master’s Report [1-9] (Rpt./) I, II

910. Thesis [1-8] (Rpt./)

920. Dissertation [1-9]

930. Supplementary Registration [1-9] (Rpt./)


LANGUAGE, READING AND CULTURE (LRC)

Education Bldg., Rm. 512A
The University of Arizona
PO Box 210069
Tucson AZ 85721-0069
Voice/TY: (520) 621-1311
FAX: (520) 621-1853
E-mail: lrcinfo@mail.ed.arizona.edu
URL: http://www.ed.arizona.edu/departs/lrc/lrcinfo.htm

Baccalaureate Degree

The program offers no baccalaureate degree.

Graduate Degrees

Master of Arts (M.A.)
Master of Education (M.Ed.)
Educational Specialist (Ed.S.)
Doctor of Education (Ed.D.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees

Bilingual/Bicultural Education (M.Ed.)
Bilingual/Multicultural Education (M.A.)

Language, Reading and Culture (M.A., Ed.S., Ed.D., Ph.D.)

Program Requirements

For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Language, Reading and Culture (LRC)

139. Literacy Tutoring [3] Introduction to literacy and study strategies theory and practice; observation of literacy learning; supervised literacy tutoring.

195. Colloquium

a. Freshman Colloquium [1] I

197. Workshop

a. Investigating Learning Strategies [3]

199. Independent Study [1-6] (Rpt./)

knowledge of cultural diversity and literacy processes with their content and specialization. P. Admission to the College of Education. May be convened with LRC 535.

480. Children's Literature in the Classroom (3) Analysis and discussion of classic and contemporary children's literature of all genres, and its relationship to language, reading and culture. P. Admission to the College of Education. May be convened with LRC 580.

493. Internship (1-6) [Rpt.]

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt. 2]

499. Independent Study (1-3) [Rpt.]

501. Foundations of Reading Instruction in Spanish (3) I II Introduction to the theoretical and practical aspects of the reading process, with attention to essential decoding and comprehension skills; special application for teaching Spanish-speaking children to read. Taught in Spanish. P. Spanish fluency.

504. Language and Culture in Education (3) I II Introduction to aspects of language and culture that affect education, particularly: reading, writing and the language arts; discussion of social and political concerns

507. Teaching of Reading: Decoding and Comprehension (3) I II Linguistic, psychological and cultural bases of decoding and comprehension: theories that influence practice; materials and practices that facilitate learning to read.

510. Foundations of Bilingual Education (3) I II Socio-cultural factors, language practices and education: analysis of theories and practices affecting bilingual learners; historical, social and cultural influences; relationship of theory to the characteristics and needs of the bilingual learner. May be convened with LRC 510.

512. Educating the Culturally Diverse (3) I II Issues faced in education associated with ethnic and linguistic pluralism in the United States: analysis of the interaction of school, community, cultural and family factors in the education of diverse populations. May be convened with LRC 512.

514. Bilingual Reading and Writing (3) I Analysis of reading and writing situations encountered by bilingual students; phonological, semantic, and syntactic aspects of instruction; methods and materials. May be convened with LRC 514.

515. Media and Reading, Language and Arts (3) Procedures for planning, creating and using effective media presentations in reading and language arts instructional settings. May be convened with LRC 515.

518. Methods and Materials in Bilingual Education (3) I II Analysis and evaluation of methods and materials used in bilingual education programs; effective strategies in first and second languages; concurrent and separate language approaches and cooperative models. May be convened with LRC 518.

528. Bilingual Curriculum and Development (3) I II Theory and application of curriculum development to bilingual instructional programs: designs, organizational patterns, materials and media, change strategies, and evaluation. May be convened with LRC 528.

530. Computer Application for Teachers (3) I II For a description of course topics see LRC 430. Graduate-level requirements include an in-depth research paper or other project. May be convened with LRC 430.

532. Pre-Reading and Beginning Reading Development (3) I II An examination of various aspects involved in pre-reading and beginning reading development, including psychological, sociological, physiological, linguistic and educational considerations.

535. Content Area Literacy in a Multicultural School (3) I II For a description of course topics see LRC 435. Graduate-level requirements include an in-depth research paper or other project. May be convened with LRC 435.

537. Classroom Diagnosis and Instruction (3) I II Procedures for diagnosing and developing reading and writing skills for pupils of below-average achievement level. P or CR, LRC 505.

545. Research in Computer Language Arts (3) I II The role of scholarship and research in the rapidly evolving field of computer-mediated language arts teaching and learning. Analysis of research methodologies and evaluation of technology's impact on the classroom learning experience.

551. Reading, Writing and Texts: A Psycho-Sociolinguistic Perspective (3) I II Readers and writers as users of language; reading and writing as language processes; what makes a text a text.

553. Language Acquisition and Development (3) I Study of the development of language in young children; focus on oral language and its relationship to emergent literacy; instructional strategies that build on language development.

554. Applied Linguistics in Education (3) I The application to curriculum, teaching and learning of concepts from linguistics, psycho-linguistics and sociolinguistics. P or CR, LRC 551.

557. Application of Miscue Analysis (3) I II Study of miscue analysis to explore the reading process, reading research, and readability, as well as to evaluate readers; applications to reading strategies and curriculum; focus on comprehension. P or CR, LRC 551.

559. Whole Language: Curriculum and Organization (3) I II Whole language pedagogy: theory, curriculum, organization, and practice. Application will be made to all levels in first and second languages. Field trips.

570. Language Research Methodology (3) I II Investigation of procedures for conducting literacy research; examples of literacy research paradigms; critical analysis of evidence supporting literacy practices. P. LRC 507 or CR, LRC 551.

575. Anthropology and Education (3) I Intended to acquaint students with anthropological theories and methods that can have an impact on educational analysis. (Identical with ANTH 575).
growth in reading comprehension; examination and analysis of instructional materials; research related to comprehension and cognitive development. P, LRC 507.

635. Written and Reading in Content Areas (3) I II Methodology appropriate for reading and writing to learn content; compatible organizational models; program implementation. P or CR, LRC 507, LRC 504, LRC 505 or LRC 551.

638. Reading Diagnostic Laboratory (3-6) [Rpt./ 6 units] I II Supervised practice in reading assessment; identification of factors influencing reading achievement, evaluation, construction, and administration of assessment procedures; development of interview techniques. P, LRC 507, LRC 537.

639. Reading Instructional Laboratory (3-6) [Rpt./ 6 units] I II Supervised practice in teaching reading and writing; preparing, analyzing and critiquing special instructional programs for students. Open to majors only. P, LRC 507. LRC 537.

653. Written Language Development (3) Study of latest research in the writing and reading development of preschool and school-aged children: relationships between reading and writing development explored through student research; applications to instruction. P, LRC 505, LRC 553.

677. History of American Indian Education (3) (Identical with AIS 677, which is home).

678. Contemporary American Indian Education and Research (3) (Identical with AIS 678, which is home).

693. Practicum (1) [Rpt./]

694. Practicum
a. Bilingual Education (3) [Rpt./ 2] I II P, 15 graduate units including LRC 510 and LRC 514.

696. Seminar
a. Language, Reading and Culture (1-3) [Rpt./ 21 units] P, 15 graduate units including LRC 504 and LRC 505.

b. Research in Bilingual Education (1.6) [Rpt./ 9 units] I II

c. Research in Language and Literacy (1-6) [Rpt./ 9 units] I II

699. Independent Study (1-3) [Rpt./]

719. Preceptorship (1-6) [Rpt./]

750. Colloquium
a. Theory and Research in Language, Reading and Culture (1-3) [Rpt./ 15 units] I II

776. Seminar
a. Research and Evaluation in Language, Reading and Culture (1-3) [Rpt./ 15 units] I II

900. Research (1-6) [Rpt./]

910. Thesis (1-6) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

LATIN (LAT)

For information about courses in Latin, see the entry for the department of Classics in this manual.

LATIN AMERICAN STUDIES (LA S)

Douglass Bldg., Rm. 103
The University of Arizona
PO Box 210028
Tucson AZ 85721-0028
Phone: (520) 626-7242
FAX: (520) 626-7248
E-mail: laac@u.arizona.edu
URL: http://w3.arizona.edu/~laac

Baccalaureate Degree

Bachelor of Arts (B.A.)

Graduate Degree

Master of Arts (M.A.)

Major and Degrees

Latin American Studies (B.A., M.A.)

Program Requirements

For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data_files/ lược. Minor requirements are available on line at: http://worldwide.arizona.edu/academic/oncourse/data_files/Minor.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Latin American Studies (LA S)

102. Contemporary Latin America: A Social Science Perspective (3) An interdisciplinary social science introduction to the people, places and cultures of Latin America, and to the political, economic and social institutions in that region. 2R, IL.

237. Survey of Mexican Folk Music (3)

(Identical with MUS 237, which is home).

319. Mexican American Culture (3) I (Identical with ANTH 319, which is home).

322. Introduction to Prehispanic, Hispanic, and Chicano Art (3) II (Identical with ARH 322, which is home).

325. Intermediate Grammar, Conversation and Writing Skills (3) II (Identical with PORT 325, which is home).

330. Intermediate Conversation (3) II

(Identical with SPAN 330, which is home).

331. Anthropology and Development (3) I (Identical with ANTH 331, which is home).

350. Readings in the Literary Genres (3) I II

(Identical with SPAN 350, which is home).

351. Race and Class in Latin America (3) II

(Identical with HIST 351, which is home).

352. Slavery in Latin America (3) I

(Identical with HIST 352, which is home).

361. The U.S.-Mexico Border Region (3) I

(Identical with HIST 361, which is home).
368. Colonial Mexico (3) I (Identical with HIST 368, which is home).
369. Mexico Since Independence (3) II
   (Identical with HIST 369, which is home).
371A. Commercial and Technical Spanish (3) I
   (Identical with SPAN 371A, which is home).
371B. Commercial and Technical Spanish (3) II
   (Identical with SPAN 371B, which is home).
384. Sociology of Latin American Societies (3)
   II (Identical with SOC 384, which is home).
388. Immigration and Refugees Policy (3) I
   (Identical with POL 388, which is home).
399. Independent Study (1-3) [Rpt.]
399I. Honors Independent Study (1-3) [Rpt.] I II
401. Survey of Spanish-American Literature
   (3) I (Identical with SPAN 401, which is home).
402. Survey of Mexican Literature (3) S
   (Identical with SPAN 402, which is home).
403. Mexican and Mexican-American Literature
   (3) II (Identical with SPAN 403, which is home).
404. Archaeology and Planning in Mexico (3) I
   (Identical with ARCH 404, which is home). May be convened with LA S 504.
406. Lusophone Literature since 1900 (3) I
   (Identical with PORT 406, which is home).
409. Economic Anthropology (3) II (Identical
   with ANTH 409, which is home). May be convened with LA S 509.
411. Middle America (3) II (Identical with
   GEOG 411, which is home). May be convened with LA S 511.
412. South America (3) I (Identical with
   GEOG 412, which is home). May be convened with LA S 512.
415. Creative Writing in Spanish (3) II
   (Identical with SPAN 415, which is home).
417. Cultures of Ancient Mexico (3) S
   (Identical with ANTH 417, which is home). May be convened with LA S 517.
422A. Pre-Hispanic Art (3) I (Identical with
   ARH 422A, which is home). May be convened with LA S 522A.
422B. Pre-Hispanic Art (3) II (Identical with
   ARH 422B, which is home). May be convened with LA S 522B.
425. Advanced Grammar and Composition (3)
   I II (Identical with SPAN 425, which is home).
429. The U.S.-Mexican Borderlands in
   Comparative Perspective (3) II (Identical with
   PORT 429, which is home). May be convened with LA S 529.
430. Brazilian Civilization (3) II (Identical with
   PORT 430, which is home).
431. Civilization in the Portuguese-Speaking
   World (3) II (Identical with PORT 431, which is home). May be convened with LA S 531.
433. Mexican and Mexican-American
   Civilization through Literature (3) I (Identical
   with SPAN 433, which is home).
437. Democracies, Emerging and Evolving (3)
   I (Identical with POL 437, which is home). May be convened with LA S 537.
439. Ethics and the News Media (3) I (Identical
   with JOUR 439, which is home). May be convened with LA S 539.
441. Children's Literature in Spanish (3) I
   (Identical with SPAN 441, which is home).
444. Mexican and Mexican-American Prose
   Fiction (3) I II (Identical with SPAN 444, which is home).
445. Novel of the Mexican Revolution (3) I II
   (Identical with SPAN 445, which is home).
446. Mexican and Mexican-American Theater
   (3) I II (Identical with SPAN 446, which is home).
447. Latin-American Political Development (3)
   I II (Identical with POL 447, which is home). May be convened with LA S 547.
448. Government and Politics of Mexico (3) I
   (Identical with POL 448, which is home). May be convened with LA S 548.
449. Brazilian Literature in Film (3) I
   (Identical with PORT 449, which is home).
450. Religion and Politics (3) II (Identical
   with POL 450, which is home).
451. Mesoamerican Media and Cultural
   Analysis (3) II (Identical with M AR 451, which is home).
453A. Mesoamerican Archaeology (3) I
   (Identical with ANTH 453A, which is home). May be convened with LA S 553A.
453B. Mesoamerican Archaeology (3) II
   (Identical with ANTH 453B, which is home). May be convened with LA S 553B.
454. Andean Archaeology (3) II (Identical
   with ANTH 454, which is home). May be convened with LA S 554.
457. Inter-American Politics (3) I (Identical
   with POL 457, which is home). May be convened with LA S 557.
460. Southwest Studies (3) I
   The geographical, historical, political and cultural
   dimensions of the Mexican state of Sonora, with a special
   emphasis on rural Sonora, its geography, people and
   economy, and on the regional relations within the state.
   Field trip. (Identical with GEOG 460). May be convened with LA S 560.
461. Environmental and Resource Geography
   (3) II (Identical with GEOG 461, which is home).
463. Topics in Luso-Brazilian Literature (3) I
   II (Identical with PORT 463, which is home). May be convened with LA S 563.
464. History of Argentina (3) I (Identical with
   HIST 464, which is home). May be convened with LA S 564.
465. Women in International Development (3)
   II (Identical with ANTH 465, which is home). May be convened with LA S 565.
466. History of Brazil (3) II (Identical with
   HIST 466, which is home). May be convened with LA S 566.
467. Contemporary Latin America (3) I
   (Identical with HIST 467, which is home). May be convened with LA S 567.
469. History of Women in Latin America (3) II
   (Identical with HIST 469, which is home). May be convened with LA S 569.
493. Internship (1-6) [Rpt.]
495. Colloquium
   a. Latin American Studies (3) [Rpt.]
   b. Spanish or Portuguese proficiency. Writing-
   Emphasis Course. (Identical with POL 495A). May be convened with LA S 595A.
498. Senior Capstone (1-3) I II
498H. Honors Thesis (3) [Rpt.] I II
499. Independent Study (1-4) [Rpt.]
499H. Honors Independent Study (3) [Rpt.] I II
500. Introduction to Latin American Studies
   (3) Interdisciplinary introduction to graduate
   work and research in Latin American Studies. P.
   graduate students in Latin American Studies -
   M.A. and Ph.D. minor, or consent of instructor.
504. Architecture and Planning in Mexico (3) I
   (Identical with ARCH 504, which is home). May be convened with LA S 404.
508. The Mexican American: Cultural
   Perspective (3) I (Identical with MAS 508, which is home).
509. Economic Anthropology (3) II
   (Identical with ANTH 509, which is home). May be convened with LA S 409.
511. Middle America (3) II (Identical with
   GEOG 511, which is home). May be convened with LA S 411.
512. South America (3) I (Identical with
   GEOG 512, which is home). May be convened with LA S 412.
517. Cultures of Ancient Mexico (3) S
   (Identical with ANTH 517, which is home). May be convened with LA S 417.
522A. Pre-Hispanic Art (3) I (Identical with
   ARH 522A, which is home). May be convened with LA S 422A.
522B. Pre-Hispanic Art (3) II (Identical with
   ARH 522B, which is home). May be convened with LA S 422B.
525. Advanced Grammar and Composition (3)
   I II (Identical with SPAN 525, which is home).
529. The U.S.-Mexican Borderlands in
   Comparative Perspective (3) II (Identical with
   PORT 529, which is home). May be convened with LA S 429.
530. Development of Spanish-American
   Literature from the Pre-Columbian Period to
569. History of Women in Latin America (3) II (Identical with HIST 569, which is home). May be convened with LA S 469.

593. Internship (1-6) [Rpt./]

595. Colloquium
a. Latin American Studies (3) [Rpt./] I II For a description of course topics see LA S 495A. May be convened with LA S 495A.

d. Colloquium (3) [Rpt./] I II

596. Seminar
a. Latin American Studies (3) [Rpt./] I II (Identical with JOUR 596H, which is home).

599. Independent Study (1-4) [Rpt./]

631. Anthropology and Development (3) II (Identical with ANTH 631, which is home).

693. Internship (1-6) [Rpt./]

695. Colloquium
b. Advanced Studies in Latin American History (3) [Rpt./] I II (Identical with HIST 695B, which is home).

696. Seminar
j. Latin America: Modern Period (3) [Rpt./] I II (Identical with HIST 696J, which is home).

600. Contracts (3) I

601A. Introduction to Legal Process and Civil Procedure (3) I

601B. Introduction to Legal Process and Civil Procedure (2) II

602. Criminal Procedure (4) I II

603A. Research and Writing: First-year Legal Research (1) I

603B. Research and Writing: First-year Legal Writing (1) II

604A. Torts (2) I

604B. Torts (3) II

605. Property (5) II

606. Constitutional Law I (3) I

607. Appellate Practice and Moot Court (1) II

608. Evidence (4) I II

609. The Legal Profession (2-3) I II

610. Health Law (3) I II

611. Employment Law (3) I II

612. Family Law (3) II

613. Law and Medicine (3) II

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**College of Law (LAW)**

**College of Law, Room 110B**

The University of Arizona

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The University of Arizona College of Law is a member of the Association of American Law Schools and an approved law school of the American Bar Association. A rigorous course of professional education prepares students for service to the community in the private and public practice of law. To qualify for membership in the legal profession, a student must possess a broad educational experience and significant intellectual capacity. The successful student must negotiate a difficult course of study, during which he or she is expected to master the principles of the law and of the legal system and to acquire professional techniques of lawyers.

**Professional Degree**

Juris Doctor (J.D.)

Graduate Degree

Master of Laws (LL.M)

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**Law (LAW)**

540. Correctional Policy and Theory (3) II (Identical with PA 540, which is home).

562. Mental Health Law and Policy (3) [Rpt./] I II (Identical with PSYC 562, which is home).

584. Development of Federal Indian Policy (3) I II (Identical with POL 584, which is home).

595. Colloquium
a. American Indian Studies (3) [Rpt./] I II (Identical with AIS 595A, which is home).

596. Seminar
g. Philosophy of Law (3) I II (Identical with PHIL 596G, which is home).

b. Law, Psychology, and Policy (3) I II (Identical with PSYC 596H, which is home).

600. Contracts (5) I

601A. Introduction to Legal Process and Civil Procedure (3) I

601B. Introduction to Legal Process and Civil Procedure (2) II

602. Criminal Procedure (4) I II

603A. Research and Writing: First-year Legal Research (1) I

603B. Research and Writing: First-year Legal Writing (1) II

604A. Torts (2) I

604B. Torts (3) II

605. Property (5) II

606. Constitutional Law I (3) I

607. Appellate Practice and Moot Court (1) II

608. Evidence (4) I II

609. The Legal Profession (2-3) I II

610. Health Law (3) I II

611. Employment Law (3) I II

612. Family Law (3) II

613. Law and Medicine (3) II
654. Environmental Legislation (2) I II
655B. Intellectual Property Law: Copyright Law (2) II
655D. Intellectual Property Law: Trademark Law (1) I II
656. Sentencing Law (2) II
657. Partnership Taxation (3) II P, LAW 646.
658. Securities Regulation (3) II
659. International Human Rights (3) I III
660. Land Use Planning (3) II (Identical with PLAN 660, which is home).
661A. Moot Court Board: Moot Court National Team (2) I
661B. Moot Court Board (2) II
662. Bankruptcy and Related Issues (3) I
663. Individual Income Tax (3) I I
664. Law and Social Science (2) II
665A. Interviewing and Negotiating: Interviewing (1) I P, LAW 665A is not prerequisite to LAW 665B.
665B. Interviewing and Negotiating: Negotiating (1) II P, LAW 665A is not prerequisite to LAW 665B.
666. Law and Economics (3) II
668. Pretrial Litigation (3) I II P, LAW 608.
669. Environmental Law (3-4) II
670. Public International Law (3) I II
671. Law and Humanities (2) II
672. Legal Analysis and Legal Reasoning (2)
673. Law of Mass Media (2) I
674. Law of “White Collar Crime” (2-3) I
675. State and Local Government (3) I
676A. Juvenile Law (2-3) I II
676B. Law of Child Abuse and Neglect (2-3) I II
678. Jessup Moot Court (2) II
679. International Civil Litigation (2) I II
680A. Mediation (1) I
680B. Mediation (1) II
681. Law of the United Nations (2) I II P, open to non-law students with consent of instructor.
682. Law of the Elderly (2) II
683. Law of Evidence (3) II
684. Remedies (1) I
685A. Trial Advocacy: Basic Trial Advocacy (2-3) I P, LAW 608, LAW 609.
685B. Trial Advocacy: Advanced Trial Advocacy (2-3) II P, LAW 608, LAW 609, LAW 645A.
686. Federal Income Taxation (3-5) I
687. Corporate Taxation (3) II P, LAW 646.
689. Tort (3) II
690. Criminal Law (3) II
691. Income Taxation of Estates and Trusts (2) II P, LAW 619, LAW 646.
692. Advanced Appellate Practice and Moot Court (2) II
201. Introduction to Linguistics (3) II
204A. Intermediate Navajo (3) II Continuation of vocabulary development, oral skills enhancement and mastery of Navajo verb paradigms. Native speakers undertake original research and writing in Navajo. (Identical with AIS 204A).
204B. Intermediate Navajo (3) II Continuation of vocabulary development, oral skills enhancement and mastery of Navajo verb paradigms. Native speakers undertake original research and writing in Navajo. (Identical with AIS 204B).
210. Native Languages of North America (3) I II Genetic and typological diversity of North American native languages; areal features, i.e., characteristics spread over a geographical region; and the history of the study of these languages, concentrating on individuals and the problems of classification. (Identical with AIS 210).
222. The Structures and Sources of American English Words (3) I S Linguistic principles governing the internal structure of English words and the ways in which new words are created, with a focus on spelling, sounds and morphemes. (Identical with ENGL 222).
260. Speech Science (4) I (Identical with SPH 260, which is home).
285. Introduction to Humanities Computing (3) S I (Identical with GER 285, which is home).
299. Independent Study (1-3) [Rpt.]
299H. Honors Independent Study (1-3) [Rpt.]
303. Gender and Language (3) I (Identical with ANTH 303, which is home).
307A. Elementary O'Odham (3) I Speaking, reading, writing, and oral comprehension in the Tohono O'Odham (Papago) language. (Identical with AIS 307A).
307B. Elementary O'Odham (3) II Speaking, reading, writing, and oral comprehension in the Tohono O'Odham (Papago) language. (Identical with AIS 307B).
310. Morphology and Morpho-syntactic Properties of the World's Languages (3) II Introduces the student to the commonly shared features of word building rules in the world's languages and provides an introduction to the theoretical issues involved in languages for which the word/sentence distinction does not exist. Students will have many problem sets containing data from dozens of languages. P, LING 101 or LING 201.
315. Introduction to Phonology (3) II Considers the sound structure of a wide variety of human languages, with the aim of finding principles that describe in an insightful way the properties of their sounds and sound patterns. In addition, the course will introduce the student to the higher level organizational principles governing the combinations of sounds into morphemes, words, and phrases. P, LING 101 or LING 201.
320. Language and Social Issues (3) I (Identical with PSYC 341, which is home).
341. Language Development (3) I (Identical with PSYC 376, which is home).
376. Introduction to the Philosophy of Language (3) I II (Identical with PHIL 376, which is home).
388. Symbolic Processing (3) I Fundamentals of processing of natural language text, especially parsing and grammar development; includes programming in Prolog or other symbolic programming languages. P, LING 201 or LING 202. Writing-Emphasis Course.
393. Internship e. Congressional Internship (1-3) S (Identical with POL 393E, which is home).
399. Independent Study (1-3) [Rpt.]
399H. Honors Independent Study (1-3) [Rpt.]
402. Gender and Language in Japan (3) I II (Identical with JPN 402, which is home). May be convened with LING 502.
403. Foundations of Syntactic Theory I (3) I Introduction to fundamental issues in the theory of syntax. Familiarizes the student with the essentials of (1) government binding theory and its predecessors, and (2) standard categorial grammar and its relatives. P, LING 300. May be convened with LING 503.
410. Foundations of Phonological Theory I (3) I Investigation of the principles that underlie current phonological theory, concentrating on the representation of sounds and the regular patterns of sound in natural language. Topics include distinctive feature theory, syllable theory, the core skeleton, rule formulation and rule interactions. P, LING 315. May be convened with LING 510.
411. Introduction to Japanese Linguistics (3) I (Identical with JPN 411, which is home). May be convened with LING 511.
412. Advanced Japanese Linguistics (3) II (Identical with JPN 412, which is home). May be convened with LING 512.
415. Phonological Phonetics (3) I Study of the acoustic and articular properties of sounds and patterns of sounds that occur in human language. Focus on the significance of the properties of sounds for phonological theory, in particular, distinctive feature theory. Role of psycho-acoustic studies as a source of evidence for phonological theory. P, LING 315. May be convened with LING 515.

LINGUISTICS (LING)
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Baccalaureate Degree
Bachelor of Arts (B.A.)
Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)
Majors and Degrees
Linguistics (B.A., M.A., Ph.D.)
Anthropology/Linguistics (Ph.D.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs are available online at: http://www.arizona.edu/academic/onecourse/data/interface/.

For graduate program requirements consult the Graduate Catalog and the department office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Linguistics (LING)
102. Linguistics for Native American Communities (3) S Introduction to descriptive linguistics for Native Americans; practical linguistic and social issues in Native American languages; phonetics and phonology; orthography; dialects and language change; classroom applications. (Identical with AIS 102).
104A. Beginning Navajo (3) I Study of the sound system and spelling conventions of Navajo, and acquisition of basic oral and literacy skills. Cultural and grammatical information is conveyed by using situations in Navajo life as topics. (Identical with AIS 104A).
104B. Beginning Navajo (3) I Study of the sound system and spelling conventions of Navajo, and acquisition of basic oral and literacy skills. Cultural and grammatical information is conveyed by using situations in Navajo life as topics. (Identical with AIS 104B).
195. Colloquium
a. Learning Foreign Languages: Windows to the World (1) I II (Identical with GER 195A, which is home).
b. Language In Life (1) I
199. Independent Study (1-3) [Rpt.]
LINGUISTICS  183

419. Linguistic Structure of Modern Chinese (3) I (Identical with CHN 419, which is home). May be convened with LING 519.

420. Linguistic Structure of Modern Chinese (3) II (Identical with CHN 420, which is home). May be convened with LING 520.

425. Language Variation (3) II Study of geographical and social dialects, stylistic differences, and idiolectal variation and the implications of variation for writing grammars and for understanding language change. P, ANTH 256 or one course in linguistics preferably 101 or 201. (Identical with ANTH 425). May be convened with LING 525.

426. Introduction to Arabic Linguistics (3) II (Identical with ARB 426, which is home). May be convened with LING 526.

432. Psychology of Language (3) II Introduction to language processing. The psychological processes involved in the comprehension and production of sounds, words, and sentences. Other topics may include language breakdown and acquisition, brain and language, and bilingual processing. P, LING 101 or PSYC 101. (Identical with PHIL 432, PSYC 432). May be convened with LING 532.

436. Japanese Sociolinguistics (3) II (Identical with JPN 436, which is home). May be convened with LING 536.

438. Computational Linguistics (3) I Fundamentals of formal language theory; syntactic and semantic processing; the place of world knowledge in natural language processing. P, LING 388 or a course in one of the following: formal languages, syntax, data structures, or compilers. (Identical with C SC 438, PSYC 438). May be convened with LING 538.

441. Language Acquisitions (3) II (Identical with SP H 441, which is home). May be convened with LING 541.

443. Advanced Language Development (3) I II (Identical with PSYC 443, which is home). May be convened with LING 543.

445A. Structure of Non-Western Language (3) [Rpt./ 2] I In-depth linguistic analysis of selected phonological, syntactic, and semantic problems in a non-Western language, concentrating on native languages of the Southwest area. P, LING 101 or LING 201. (Identical with AIS 445A).

445B. Structure of Non-Western Language (3) [Rpt./ 2] II In-depth linguistic analysis of selected phonological, syntactic, and semantic problems in a non-Western language, concentrating on native languages of the Southwest area. P, LING 101 or LING 201. (Identical with AIS 445B). May be convened with LING 545B.

452. Introduction to Hispanic Linguistics (3) I II (Identical with SPAN 452, which is home).

489. Theory of Spanish Morphosyntax (3) II (Identical with SPAN 453, which is home).

457. Applied Linguistics (3) I (Identical with SPAN 457, which is home).

462. Linguistics and the Study of Literature (3) II (Identical with ENGL 462, which is home). May be convened with LING 562.

463. Philosophy of Language (3) I II (Identical with PHIL 463, which is home). May be convened with LING 563.

465. Pragmatics (3) II (Identical with PHIL 465, which is home). May be convened with LING 565.

468. Speech Perception (3) II (Identical with SP H 468, which is home). May be convened with LING 568.

476. Language in Culture (3) II (Identical with ANTH 476, which is home). May be convened with LING 576.

477. Discourse and Text (3) II (Identical with ANTH 477, which is home). May be convened with LING 577.

480. Historical Comparative Linguistics (3) I (Identical with ANTH 480, which is home). May be convened with LING 580.

489. Areal Survey of Native North American Languages (3) I II (Identical with ANTH 489, which is home). May be convened with LING 589.

495. Colloquium
a. Linguistics (1) [Rpt./ 3] I II May be convened with LING 595A.

496. Seminar
b. Topics in Japanese Linguistics (3) [Rpt./ 2] II S (Identical with JPN 496C, which is home). May be convened with LING 596C.

f. Cognitive Psychology (3) [Rpt./ I] II (Identical with PSYC 496F, which is home).

498. Senior Capstone (1-3) I II

499H. Honors Thesis (3) [Rpt./ 2] I II

499H. Honors Independent Study (1-6) [Rpt./]

500. Linguistics for Non-majors (3) I II Conceptual foundations, methodology, and current theoretical frameworks. Students will carry out actual linguistic analysis. For students in fields other than linguistics.

501. Formal Foundations of Linguistics (3) I A survey of the aims of linguistic research and introduction to the basic mathematics of formal linguistics: logic, sets, algebra's, graphs, feature structures, formal language theory.

502. Gender and Language in Japan (3) II (Identical with JPN 502, which is home). May be convened with LING 402.

503. Foundations of Syntactic Theory (3) I For a description of course topics see LING 403. Graduate-level requirements include a greater number of problems. May be convened with LING 403.

504. Government Binding Theory (3) II Continuation of 503, focusing on government, control, binding, thematic relations, and the theory of logical form.

505. Extended Categorical Grammar (3) II Continuation of 503, exploring extensions of standard categorial grammar. Function and argument, relationships between syntactic and semantic types, functional composition and type-changing rules, application to natural language structures.

510. Foundations of Phonological Theory I (3) I For a description of course topics see LING 410. Graduate-level requirements include a greater number of problems. May be convened with LING 410.

511. Introduction to Japanese Linguistics (3) I (Identical with JPN 511, which is home). May be convened with LING 411.

512. Advanced Japanese Linguistics (3) II (Identical with JPN 512, which is home). May be convened with LING 412.

514. Foundations of Phonological Theory II (3) II Investigation of the evidence and arguments for non-linear representations (autosegmental and metrical) and of the organization of the phonological component of grammar, including evidence for its interaction with morphological structures and rules.

515. Phonological Phonetics (3) I For a description of course topics see LING 415. Graduate-level requirements include an additional project or research paper. May be convened with LING 415.

519. Linguistic Structure of Modern Chinese (3) I (Identical with CHN 519, which is home). May be convened with LING 419.

520. Linguistic Structure of Modern Chinese (3) II (Identical with CHN 520, which is home). May be convened with LING 420.

522. Linguistic Semantics and Lexicology (3) II Study of word and sentence meaning, relationship between the lexicon and the grammar, idioms, metaphor, etymology, and change of meaning. P, one course in linguistics. (Identical with PHIL 522).

525. Language Variation (3) II For a description of course topics see LING 425. Graduate-level requirements include mastery of the formalism, solving data-set problems, and a higher level of performance. (Identical with ANTH 525). May be convened with LING 425.

526. Introduction to Arabic Linguistics (3) II (Identical with ARB 526, which is home). May be convened with LING 426.

532. Psychology of Language (3) II For a description of course topics see LING 432. Graduate-level requirements include more extensive readings and writing. (Identical with PHIL 532, PSYC 532). May be convened with LING 432.

535. Morphology (3) I Morphology is the internal structure of words and the relationship between words and the syntactic, phonological, and semantic properties of the units that include them. Course work includes the development of morphological theory.

536. Japanese Sociolinguistics (3) I (Identical with JPN 536, which is home). May be convened with LING 436.

537. Psycholinguistics (3) II Introduction to advanced psycholinguistics. The psychological mechanisms underlying the comprehension and production of sounds, words, and sentences.
Other topics may include language breakdown and acquisition, brain and language, discourse processing, and bilingual processing. (Identical with PHIL 537, PSYC 537).

538. Computational Linguistics (3) I For a description of course topics see LING 438. Graduate-level requirements include a greater number of assignments and a higher level of performance. (Identical with C SC 538, PSYC 538). May be convened with LING 438.

541. Language Acquisitions (3) II (Identical with SP H 541, which is home). May be convened with LING 441.

542. Topics in Psycholinguistics (3) [Rpt/ 1] I II (Identical with PSYC 542, which is home).

543. Advanced Language Development (3) I II (Identical with PSYC 543, which is home). May be convened with LING 443.

544. Syntactic Analysis (3) I An examination of the syntactic diversity presented by natural human languages and an exploration of the issues that such diversity presents for syntactic analysis. Topics include AUX, word order, constituency, and subjects.

545A. Structures of Non-Western Languages (3) [Rpt/ 2] I Graduate-level requirements include a higher level of performance. (Identical with AIS 545A).

545B. Structure of Non-Western Language (3) [Rpt/ 2] II For a description of course topics see LING 445B. Graduate-level requirements include a higher level of performance. (Identical with AIS 545B). May be convened with LING 445B.

548. Topics in Language and Cognition (3) [Rpt/ 1] I II (Identical with PSYC 548, which is home).

562. Linguistics and the Study of Literature (3) II (Identical with ENGL 562, which is home). May be convened with LING 462.

563. Philosophy of Language (3) I II (Identical with PHIL 563, which is home). May be convened with LING 463.

564. Formal Semantics (3) I Introduction to model-theoretic investigations of natural language interpretation, including quantification, referential relations, tense, aspect and modality. (Identical with PHIL 564).

565. Pragmatics (3) II (Identical with PHIL 565, which is home). May be convened with LING 465.

566. Speech Perception (3) II (Identical with SP H 568, which is home). May be convened with LING 468.

574. Linguistic Perspectives on Mexican-American Spanish and Bilingualism (3) I II (Identical with SPAN 574, which is home).

576. Language in Culture (3) II (Identical with ANTH 576, which is home). May be convened with LING 476.

577. Discourse and Text (3) II (Identical with ANTH 577, which is home). May be convened with LING 477.

580. Historical Comparative Linguistics (3) II (Identical with ANTH 580, which is home). May be convened with LING 480.

583. Sociolinguistics (3) I (Identical with ANTH 583, which is home).

585. Linguistic and Computer-Assisted Approaches to Literature (3) II (Identical with GER 585, which is home).

589. Areal Survey of Native North American Languages (3) I II (Identical with ANTH 589, which is home). May be convened with LING 489.

595. Colloquium
a. Linguistics (1) [Rpt/ 3] I II For a description of course topics see LING 495A. May be convened with LING 495A.

596. Seminar
a. Syntax and Semantics (3) [Rpt/ 2] I II b. Topics in Phonological Theory (3) [Rpt/ 2] I II c. Current Issues in Syntactic Theory (3) [Rpt/ 2] II d. Linguistic Investigations and Applications (3) [Rpt/ 3] I II Current research in linguistics, with emphasis on relationships among syntax, semantics, and phonology.

699. Independent Study (1-6) [Rpt/]

900. Research (1-4) [Rpt/]

920. Dissertation (1-9) [Rpt/]

930. Supplementary Registration (1-9) [Rpt/]

MANAGEMENT AND POLICY (MAP)
McClelland Hall, Rm. 405
The University of Arizona
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URL: http://www.bpa.arizona.edu/depts/map

Baccalaureate Degree
Bachelor of Science in Business Administration (B.S.B.A.)

Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Business Management (B.S.B.A.)
Management (M.S., Ph.D.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

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Management & Policy (MAP)
299. Independent Study (1-5) [Rpt/]

299H. Honors Independent Study (1-3) [Rpt/]

305. Management and Organizational Behavior (3) I II GRD Integration of classical and organizational behavior approaches to management in private and public organizations in various cultures. Special sections of this course are offered for participants in the University Honors Program. P, ECON 201B, advanced standing as specified in the College of Business and Public Administration.

320. Legal, Social and Political Environment of Business (3) I II Introduction to the social, legal and political environment of business. The relationship between business and government, regulation and interest groups, the legal process. P, advanced standing as specified in the College of Business and Public Administration.

330. Human Resources Management (3) I II GRD Policies and current practices in utilizing human resources effectively at all organizational levels. P, advanced standing as specified in the College of Business and Public Administration.

376. Statistical Inference in Management (3) Further topics in statistical analysis and inference applied to managerial decision making. P, Open to student who have completed /enrolled in AREC/ECON 339. (Identical with ECON 376, MKTG 376).

394. Practicum (3) [Rpt/]

399. Independent Study (1-5) [Rpt/]

399H. Honors Independent Study (1-3) [Rpt/]

420. Advanced Business law (3) I II GRD Negotiable instruments, partnerships, corporations, and property rights. P, advanced standing as specified in the College of Business and Public Administration, admission to BPA graduate programs. P or CR, MAP 320.

426. Wills, Estates and Trusts (3) I Wills, inheritances, estates, and trusts; the administration of estates, including the duties and liabilities of executors and trustees; basic estate and gift tax laws applicable to estate planning. P, advanced standing as specified in the College of Business and Public Administration.

430. Human Resources Policies (3) II An integrative, case-oriented focus on problems and policies in the procurement,
development, compensation, and motivation of personnel. P, MAP 330, 6 units in human resource management.

432. Bargaining and Negotiation in Organizations (3) I II Examination of the state of the art of bargaining and negotiation, and the development of bargaining skills in a wide variety of business and interpersonal settings. P, MAP 305.


444. Group-Process Methods in Management (3) Application of behavioral science knowledge to group functioning in organizations with emphasis on perspectives from organizational behavior, social psychology and sociology. P, MAP 305. (Identical with SOC 444).

450. Training and Development (3) II Examines employee training and development as a systematic planned strategy for continuous expansion of employee competence, broadly defined, in order to meet organizational and individual goals.

455. Preventive Health Care Policy and Administration (3) I Preventive health care activities, analysis of public policies relating to such care, and discussion of general issues in its administration including health promotion, health education, environmental health, and the nature and functions of public health departments and planning agencies. P, advanced standing as specified in the College of Business and Public Administration.

471. Management Policies (3) I II Analysis plus case studies of management in business enterprises. An honors section of this course will be available for entrepreneurship program students. Writing-Emphasis Course. P, MAP 305, FIN 311, MKTG 361, advanced standing as specified in the College of Business & Public Administration. Credit only for one of: ACCT 471, FIN 471, MAP 471, MIS 471, or MKTG 471.

475. Topics in Management (3) [Rpt./ 1] I Critical examination of various research activities taking place in the field of management and organizational behavior. P, MAP 305.

480. Men, Women and Work (3) I II Survey of research on topics that have to do with gender and organizations. Topics include social determinants of career choice, perceptions and performance of men and women as managers, occupational sex segregation, work and family issues, implications of technological change for women's employment, affirmative action and comparable worth. P, MAP 305. (Identical with W S 480).

481. Finance and New Venture Development (4) I (Identical with FIN 481, which is home).

483. Marketing Planning and Operational Decision-Making (4) II New product development; marketing programming and strategy; bargaining technique; individual and group decision-making processes. Open only to entrepreneurship program students. P, ECON 330, FIN 311, MKTG 361, advanced standing as specified in the College of Business and Public Administration, open only to entrepreneurship program students. (Identical with MKTG 483).

484. Development of New Venture Plans (4) II Preparation and presentation of a comprehensive business plan. Integration of financial, operational, and marketing elements. Open only to entrepreneurship program students. P, ECON 330, FIN 311, MKTG 361, advanced standing as specified in the College of Business and Public Administration, open only to entrepreneurship program students. (Identical with FIN 484).

486. Managerial Judgement and Decision (3) I II Development of a working understanding of decision analysis (DA) and its use in decision making. Emphasis on practical applications in professional and personal decisions. P, advanced standing as specified in the College of Business and Public Administration.

487. New Venture Development and Industry Analysis (4) I (Identical with ECON 487, which is home).

491. Preceptorship (1-4) I II

493. Internship (1-6) I II

499. Seminar a. Honors (3) [Rpt./] I II

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./] I II

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (3) [Rpt./] I II

500. Management Case Analysis and Presentation (3) I II Written analysis of cases and other reports; development of skills in analysis, decision making, and written and oral presentation, with emphasis on the total situation of each case considered.

502. Organization Theory and Behavioral Relations (3) I II (Identical with PHL 502).

503. Human Resource Management (3) I Principles, methods, research relevant to management of an organization's human resources, with emphasis on employment psychology, training, development, compensation. P, MAP 305 or MAP 502.

505. Organizational Power (3) I Development of organizational power and influence techniques for individuals and groups. Uses cases and practical experience to build on motivation, negotiation, and group dynamic skills. P, MAP 502.

506. Business Communication in Management (3) I One unit of a three-course module designed to improve the oral and written communication skills of MBA students preparing for business leadership careers. In this module, students learn to prepare and deliver oral presentations and written documents which focus on effective communication in the business discipline of management. P, MBA students only; CR, MAP 502.

532. Conflict and Cooperation in the Dyad (3) I Critical exposition of the essential ideas of two-person game theory and the findings of experimental research on strategic interactions in the dyad.

534. Industry Analysis and New Venture Development (3) (Identical with ECON 534, which is home).

535. Studies in International Management (3) Graduate-level requirements include additional research and writing on more complex issues. (Identical with PA 535).

537. Finance for New Ventures (3) I (Identical with FIN 537, which is home).

538. Marketing, Negotiation and Decision Tactics (3) I Development of bargaining and decision-making skills through simulated negotiations and role playing. Open only to students in the entrepreneurship program. P, ECON 500A, ECON 500B, FIN 511, MKTG 500. (Identical with MKTG 538).

539. Planning of New Ventures (3) I New venture development, financial projections, resource assessment, and long-range planning. Open only to students in the entrepreneurship program. P, ECON 500A, ECON 500B, FIN 511, MKTG 500. (Identical with FIN 539).

543. White Collar and Organizational Crime (3) I (Identical with PA 543, which is home).

545. Interactive Behavior in Small Groups (3) I Critical survey of the essential ideas of n-person game theory (n=2) and the findings of experimental research on social dilemmas, bargaining, and coalition formation.

554. Research Methodology (3) I Behavioral research techniques; bias, validity, reliability, and applicable statistical techniques; critiques of research articles and reports.

556. Gender Issues in Organizational Behavior (3) I II Reviews the research on several topics having to do with gender and organizations, including: social determinants of career choice; occupational sex segregation; perceptions of men and women as managers; gender issues in motivation, leadership, and job satisfaction; work and family issues; implications of technological change for women's employment; organizational change including affirmative action and comparable worth. (Identical with SOC 556).

560. Management of Technology (3) I Issues in formulating and implementing technology strategy as organizations and industries grow, mature and stagnate. Topics include patterns of diffusion, role of licensing and joint ventures, and the divergence between leading edge and profitable science. P, MAP 305 or MAP 502.

568. Environmental Scanning and Business Strategy (3) I II (Identical with MKTG 568, which is home).

571. Business Strategy and Policy Making (3) I II Case method approach to problems and policies facing top management in making and
Management Information Systems (MIS)

McClelland Hall 430
The University of Arizona
PO Box 210108
Tucson AZ 85721-0108
Phone: (520) 621-2748
FAX: (520) 621-2433
URL: http://www.bpa.arizona.edu/bpa_departments/mis/ugrad_program.html

Baccalaureate Degree
Bachelor of Science in Business Administration (B.S.B.A.)

Graduate Degree
Master of Science (M.S.)

Majors and Degrees
Management Information Systems (B.S.B.A., M.S.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available online at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

Management Information Systems (MIS)

111. Introduction to Computing (3) Basic computer hardware and software concepts, computer terminology, problem solving and program development concepts, with emphasis on problem definition and systems development, introduction to a general purpose programming language and hands-on experience using application software systems.

121. Introduction to Business Programming (3) COBOL and PASCAL programming language; file organization maintenance, and structured programming techniques. P, MIS 301.

122. Advanced Programming (3) Application system development techniques, fundamental data structures and algorithms; design and implementation of selected software procedures using Pascal. P, MIS 121, MATH 123, advanced standing as specified in the College of Business and Public Administration.

307. Computer Architecture and Data Communications (3) Computer architecture, operating systems principles, systems software, data communications, networks, protocols and distributed processing. P, MIS 121, advanced standing as specified in the College of Business and Public Administration.

331. Database Management Systems (3) Introduction to database management systems; relational, CODASYL, and hierarchic models; security concurrency, integrity and recovery issues; query interfaces. P, MIS 301, advanced standing as specified in the College of Business and Public Administration.

341. Information Systems Analysis and Design (3) The analysis and logical design of business data processing, management information and management control systems; project management and cost-benefit analysis; techniques for stating and analyzing information systems requirements; use of automated and non-automated techniques for logical system design. P, MIS 21, advanced standing as specified in the College of Business & Public Administration.

342. Data Structures and Algorithms (3) (Identical with C SC 342, which is home.)

372. Comparative Programming Languages (3) [Rpt.] I II (Identical with C SC 372, which is home.)

373. Basic Operations Management (3) Quantitative techniques applied to design, operation, control and improvement of manufacturing systems. Topics include forecasting, facility planning and layout, inventory management, quality control and just-in-time manufacturing. P, MATH 123, advanced standing as specified in the College of Business and Public Administration.

393. Internship (1-3) [Rpt.] I II

396. Proseminar
h. Honors Proseminar (3) P, advanced standing as specified in the College of Business and Public Administration.

399H. Honors Independent Study (1-3) [Rpt.] I II

411. Social Issues of Computing (3) Broad survey of the individual, organizational, cultural, social and ethical issues provoked by current and projected uses of computers. P, advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 511.

421. Advanced Systems Modeling and Simulation (3) I Simulation concepts, simulation software, modeling of systems, model validation, selecting input probability distributions, random variate generation, statistical analysis of output data and SIMAN simulation language. P, advanced standing as specified in the College of Business and Public Administration, fundamental knowledge of probability and statistics. (Identical with C SC 421.)
422. Linear Programming and Applications (3) Recognition, formulation and solution of linear programming models for decision making. Modeling issues illustrated using examples from systems design, manufacturing, logistics, finance, etc. P, MATH 119 and advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 522.

441. Information System Design and Implementation (3) Design of computer-based solutions to individual and organizational problems; involves an analysis of subsystems user interfaces, hardware/software selection and evaluation, and system implementation; explores interface between systems and individuals and organizations. P, MIS 341 and advanced standing as specified in the College of Business and Public Administration.

450. International Dimensions of Information Technologies (3) International and regional information technology development strategies and policies; IT and national sovereignty; development and control of global "information highways," impact of public and business policies on information systems design and use; international institutions and IT: convergence or divergence of information systems across countries, regions and international economic sectors. P, advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 550.

451. Advanced Business Programming (3) I Business systems programming environment; basic and advanced COBOL; file organization and access methods; external sort and multi-key files; 4GLs in data processing. P, MIS 301 and advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 551.

453. Software Systems (3) I II Software development and software engineering; brings together the elements of programming language, operating system, and development techniques; teaches and uses the C programming language and the Unix operating system. P, MIS 301, advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 553.

454. Computer Graphics (3) Interactive computer graphics; user interface design; pictorial data structures and management. P, MIS 301.

461. Accounting Information Systems (3) I II (Identical with ACCT 461, which is home).

471. Policy Formation and Management Information Systems (3) Integration of the MIS activity with the functional operations of the business organization; utilization of case studies and a computer simulation model to enhance executive decision making relative to planning, organizing, controlling, and actuating. P, FIN 311, MAP 305, MKTG 361. senior status, advanced standing as specified in the College of Business and Public Administration. Writing- Emphasis Course. Credit only for one of ACCT 471, FIN 471, MAP 471, MIS 471, or MKTG 471. Open to majors only.

473A. Production and Operations Management (3) II Productive systems, including service type industries; activities entailed in selecting, designing, operating, controlling, and updating systems. Forecasting, aggregate planning, MRP, inventory models under uncertainty, scheduling. P, MIS 373, advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 573A.

473B. Production and Operations Management (3) I Productive systems, including service type industries; activities entailed in selecting, designing, operating, controlling, and updating systems. Topics include project management, quality control, reliability, facility layout and decision theory. Case studies, group projects and industry speakers give students an understanding of human problems and quantitative methods. P, MIS 373, advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 573B.

474. Current Topics in Operations Management (3) II Coverage of new techniques and technologies in operations management. Examples of topics that may be covered are JIT, OPT, robotics. P or CR, MIS 473B, advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 574.

475. Managing for Quality Improvement (3) I Operational aspect of quality improvement. Topics include statistical process control, total quality management. P, MIS 473B, advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 575.

476. Management of Service Operations (3) Explores management issues for services, which dominate our modern economy. Emphasis on design and evaluation of service systems, information system requirements through case analyses, analytical problem solving, and/or term project. P, MIS 373, advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 576.

477. The Supply Chain and Logistics (3) I Dynamics of modern supply chain planning and control; emphasis on information management techniques, as well as strategy, procurement, material management and transportation. Cases, simulation, and analytical problem solving. P, MIS 373 and MIS 473A. May be convened with MIS 577.

478. Project Management (3) I II Projects are the preferred way to get things done today in business. Course focuses on the problems and methods of running projects; special attention to information technology and software projects. Students manage real projects, use scheduling software, study cases and analytical tools. P, MIS 373, advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 578.

479. Computer Models for Operations Management (3) II Use of available software packages to analyze complex operations management problems. P, MIS 373, advanced standing as specified in the College of Business and Public Administration. May be convened with MIS 579.

480. Introduction to Artificial Intelligence (3) I II This course deals with important and practical AI and knowledge based system concepts and techniques for emerging complex information systems, including knowledge representations, problem solving methods, cognitive modeling techniques, natural language processing, machine learning, neural networks, genetic algorithms, intelligent agents, case-based reasoning, and intelligent information analysis and visualization. Hands-on projects involving C, C++, or Java programming are required. May be convened with MIS 580.

481. Internet Business and Technology (3) This course examines the information content, design, implementation, operational, managerial, business and legal issues that are essential to doing business on the Internet. (Identical with JOUR 481). May be convened with MIS 581.


496. Seminar a. Special Topics in Management Information Systems (3) Rpt./2 May be convened with MIS 596A.

497. Workshop a. Collaboration Computing (3) I II May be convened with MIS 597A.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) Rpt./2 I II

499. Independent Study (1-4) Rpt./

499H. Honors Independent Study (3) Rpt./ I II

506. Business Communication in Operations Management (1) I This is one unit of a three-course module designed to improve the oral and written communication skills of MBA students preparing for business leadership careers. In this module, students learn to prepare and deliver oral presentations and written documents which focus on effective communication in the business discipline of operations management. CR, MIS 567 Open to MBA students only.

507A. Information Systems Architecture (3) I Fundamental concepts of software development systems. The principles of operating systems are presented, emphasizing UNIX and DOS/ Windows. The role of programming languages in development environments is explored, and the C and C++ languages are introduced. The nature of the software development cycle is presented with an emphasis on software development environments. P, MIS 531A.

507B. Data Communications (3) II Comprehensive view of data and computer communications. Explores key issues in the field, general categories of principles (including basic concepts and terminology); design approaches and applications in business; standards such as the
511. Social Issues of Computing (3) For a description of course topics see MIS 411. Graduate-level requirements include an additional term paper. May be convened with MIS 411.

521A. Systems Modeling and Simulation (3) I Topics include concepts of simulation, simulation software, model validation, selecting input probability distributions, random variate generation, statistical analysis of output data. SIMAN simulation language is covered. Previous programming experience is helpful, but not required. P, MIS 521A or equivalent. (Identical with C SC 521A).

521B. Systems Modeling and Simulation (3) I Modeling and analyzing complex business systems using advanced simulation and statistical techniques. A semester project is required. P, MIS 521A or equivalent. (Identical with C SC 521B).

522. Linear Programming and Applications (3) I For a description of course topics see MIS 422. Graduate-level requirements include an additional term paper or program. May be convened with MIS 422.

531A. Data Structures and Algorithms (3) I This course covers the design, implementation and analysis of data structures to be examined including stacks, queues, lists, trees, and graphs. The course will cover 40-50 different search and analysis algorithms for important information systems applications, including knowledge discovery, databases, Internet search, and data mining. Hands-on projects involving C, C++ or Java programming are required.

531B. Data Structures and Database Management (3) II Introduction to database processing in comparison with file processing. Review of file organization and relevant data structures. Detailed study of various tools needed for logical and physical design, including data flow diagrams and the entity-relationship model. Examines the Relational and Codasyl database models. Several commercially available database management systems are reviewed. Course covers implementation. Students learn to develop database applications using Sybase or Sun/Unix machines. P, MIS 531A.

535. Data Management: Technology and Applications (3) Introduction to fundamentals of database systems, design techniques and their use in organizations. Course covers relational database technology and focuses on design of database applications. Case studies will be used to illustrate the use of database systems for strategic and operational decision making. Emerging technologies and their applications will be covered. Students will get hands-on experience with state-of-the-art commercial relational and object-oriented database technology and learn to use SOL, basic working knowledge of computers.

541A-541B. Computer-Aided Information Systems Analysis and Design (3-3) I Introduction to the management and techniques associated with software development, both domestically and internationally with focus on the analysis and design stages. Emphasizes international issues. Involves "hands-on" experience with Computer-Aided Software Engineering (CASE) tool. (Identical with C SC 541A and C SC 541B).

546. Algorithms for Graphs and Network (3) I Model formulation and solution of problems on graphs and networks. Topics include heuristics and optimization algorithms for shortest paths, min-cost flow, matching and traveling salesman problems. Credit is allowed for this course or SIE 546. P, MIS 552 or SIE 544 or consent of instructor.

550. International Dimensions of Information Technology (3) I For a description of course topics see MIS 450. Graduate-level requirements include an additional term paper or program and a class presentation. May be convened with MIS 450.

551. Advanced Business Programming (3) I For a description of course topics see MIS 451. Graduate-level requirements include an additional in-depth term paper and 30 percent more reading. May be convened with MIS 451.

553. Software Systems (3) I II For a description of course topics see MIS 453. Graduate-level requirements include the production of several medium-sized programs, with emphasis on the program life-cycle, maintainability, and life-cost. May be convened with MIS 453.

554. Computer Graphics (3) II Interactive computer graphics; user interface design; pictorial data structures and management. P, MIS 531A.

555. Emerging Information Technology and Management (3) Topics will vary depending on student and faculty interest and recent developments in the field.

567. Design and Control of Production Systems (3) I II Introduction to the basic concepts in operations management. Topics covered include project planning, aggregate planning, forecasting, classical inventory models, linear programming and simulation. P, open only to graduate students in BPA.

570. Management and Evaluation of Information Systems (3) I II The methodologies of economics and management information systems are applied to the problem of designing and evaluating information systems for a profit-maximizing firm. An MBA integrative course. P, ECON 500 or consent of instructor.

571. Operations Management (3) I Manufacturing operations from a tactical standpoint. Major topics include materials requirements planning, capability management, scheduling and JIT planning and control. P, ECON 567 or consent of instructor.

573A. Production and Operations Management (3) I II For a description of course topics see MIS 473A. Graduate-level requirements include an additional term paper or program. May be convened with MIS 473A.

573B. Production and Operations Management (3) I For a description of course topics see MIS 473B. Graduate-level requirements include an additional term paper or program. May be convened with MIS 473B.

574. Current Topics in Operations Management (3) I For a description of course topics see MIS 474. Graduate-level requirements include an additional term paper or program. May be convened with MIS 474.

575. Managing for Quality Improvement (3) I For a description of course topics see MIS 475. Graduate-level requirements include an additional term paper or program. May be convened with MIS 475.

576. Management of Service Operations (3) I For a description of course topics see MIS 476. Graduate-level requirements include an additional term paper or program. May be convened with MIS 476.

577. The Supply Chain and Logistics (3) I For a description of course topics see MIS 477. Graduate-level requirements include an additional term paper or program. May be convened with MIS 477.

578. Project Management (3) I For a description of course topics see MIS 478. Graduate-level requirements include an additional term paper or program. May be convened with MIS 478.

579. Computer Models for Operations Management (3) I For a description of course topics see MIS 479. Graduate-level requirements include an additional term paper or program. May be convened with MIS 479.

580. Introduction to Artificial Intelligence (3) I II For a description of course topics see MIS 480. Graduate-level requirements include an additional term paper or program. May be convened with MIS 480.

581. Internet Business and Technology (3) For a description of course topics see MIS 481. Graduate-level requirements include an Internet overview and a case study analysis. (Identical with JOUR 581). May be convened with MIS 481.

583. Stochastic Models in Management Science (3) II Markov chains, models or arrival processes, continuous-time Markov chains, queuing theory, models of computer and manufacturing systems. P, MATH 123.


588. Systems Design for Management (3) I I Focuses on automated tools to support managers in organizations including office automation, decision support systems, GDSS; applications and methodologies for designing, implementing, and evaluating such systems and their organizational impact.

596. Seminar a. Special Topics in Management Information Systems
**Management Information Systems—Marketing**

699. Independent Study (1-6) [Rpt./]

796. Seminar

a. Research Issues (3) [Rpt./] I II Open to majors only.

797. Workshop

a. Research Design (3) [Rpt./] I II P, MIS 796A.

799. Independent Study (1-6) [Rpt./]

900. Research (2-4) [Rpt./]

909. Master's Report (3) [Rpt./]

910. Thesis (6) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

**MARKETING (MKTG)**

McClelland Hall, Rm. 320

The University of Arizona

PO Box 210108

Tucson AZ 85721-0108

Phone: (520) 621-7479

FAX: (520) 621-7483

URL: http://www.bpa.arizona.edu/mkt/index.html

Baccalaureate Degree

Bachelor of Science in Business Administration (B.S.B.A.)

**Major and Degree**

Marketing (B.S.B.A.)

**Program Requirements**

For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

**Marketing (MKTG)**

195. Colloquium

a. Advertising (1) (I)

361. Introduction to Marketing (3) I II Role of marketing in the economy and in business and nonprofit organizations; environmental factors affecting marketing; nature of marketing management decisions. P. ECON 200, advanced standing as specified in the College of Business and Public Administration.

370. Marketing for Nonprofit Organizations (3) I II Application of marketing concepts and tools for public agencies, health services, public transportation, the arts, schools, museums, churches, etc.; role of marketing planning, research, product and service development, pricing, promotion, public relations. P. MKTG 361, advanced standing as specified in the College of Business and Public Administration. Not acceptable for credit toward the marketing major.

376. Statistical Inference in Management (3) (Identical with MAP 376, which is home).

393. Internship (1-3) [Rpt./]

399. Independent Study (2-4) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II

400. Retail Management (3) (Identical with RCS 400, which is home).

424. Services Retailing (3) II (Identical with RCS 424, which is home).

440. Marketing Research (3) I II Concepts and techniques of research for marketing decisions; problem definition, determination of information needs, sources, methods of gathering and analyzing data; presentation of findings for management. P. MKTG 361, MKTG 376, MATH 123, advanced standing as specified in the College of Business and Public Administration, concurrent registration with MKTG 376 may be allowed in exceptional cases, with permission of department.

450. Buyer Behavior (3) I II Customer behavior and the application of concepts and research findings from the behavioral sciences in the solution of marketing problems. P. MKTG 361, MKTG 376, MATH 123, advanced standing as specified in the College of Business & Public Administration.

452. Advertising and Promotional Mangement (3) I II Role of advertising and special promotions in the economy and business and nonprofit organizations, concepts and strategies for programs, budgets, media selection, evaluation of effectiveness. P. MKTG 361, MKTG 376, MATH 123, advanced standing as specified in the College of Business & Public Administration.

454. Management of Sales Operations (3) I II The sales function and its relationship to the total marketing program; sales strategies and objectives; development and administration of sales organizations; control and evaluation of sales operations. P. MKTG 361, MKTG 376, MATH 123, advanced standing as specified in the College of Business & Public Administration. May be convened with MKTG 554.

455. Management of Distribution Systems (3) I Nature and operation of channels in the distribution of goods and services; economic and behavioral problems in wholesaling and retailing; marketing logistics. P. MKTG 361, MKTG 376, MATH 123, advanced standing as specified in the College of Business and Public Administration.

456. International Marketing Management (3) II Marketing operations for foreign environments; cultural, political and economic factors affecting the international marketer. P. MKTG 361, advanced standing as specified in the College of Business & Public Administration.

459. Product Management (3) I II Product (services) strategy for achieving financial
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Prerequisites</th>
<th>Description</th>
<th>Notes</th>
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<tbody>
<tr>
<td>MKTG 500</td>
<td>Marketing Management (3) II Scope, environment and nature of marketing management; customer and market analysis for product, service, price, promotion and distribution decisions.</td>
<td>P, MKTG 361, ECON 330, FIN 311, advanced standing as specified in the College of Business and Public Administration.</td>
<td>An integrative, capstone course focusing on comprehensive marketing problems; development, control, and auditing of marketing organizations and operations. P, MKTG 361, FIN 311, MAP 305, credit only for one of ACCT471, FIN 471, MAP 471, MIS 471, or MKTG 471. Writing-Emphasis Course.</td>
<td>Identical with FIN 480.</td>
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<tr>
<td>MKTG 550</td>
<td>Consumer and Organizational Buyer Behavior (3) I Nature of the purchase decision process for goods and services. Theories, concepts and research methods and findings are examined for use in management and public policy decision making.</td>
<td>P, MKTG 500.</td>
<td>STATISTICAL DECISION MAKING (3) II Probability and statistical analysis; random variables, sampling distributions, hypothesis testing, Bayesian analysis, time series, statistical investigation. Open only to students admitted to a BPA graduate program. P, MIS 400 or MATH 119 and MATH 123.</td>
<td>P, MKTG 500.</td>
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<tr>
<td>MKTG 590</td>
<td>Management of Sales Operations (3) II For a description of course topics see MKTG 454.</td>
<td>Graduate-level requirements include an indepth research paper. May be convened with MKTG 454.</td>
<td>Problems and methods of marketing decision-making in industrial, government and high-tech markets. P, MKTG 500.</td>
<td>P, MKTG 500.</td>
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<tr>
<td>MKTG 559</td>
<td>Product Strategy (3) II Formulating and implementing strategy for growth; analyzing and influencing market structure; developing, pricing, testing new entries; managing the portfolio. P, MKTG 500.</td>
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<td>P, MKTG 500.</td>
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<tr>
<td>MKTG 560</td>
<td>International Marketing (3) II Marketing planning and strategies for foreign environments; cultural, political, economic factors affecting the international marketer, multinational corporation and multinational market groups. P, MKTG 500.</td>
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<td>P, MKTG 500.</td>
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<tr>
<td>MKTG 565</td>
<td>Management for Global Competitive Success (3) II Developing comprehensive strategies and programs for delivering quality goods and services to consumers as a basis for global competitive success. P, MKTG 500 or consult department before enrolling.</td>
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<td>P, MKTG 500.</td>
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<tr>
<td>MKTG 568</td>
<td>Environmental Scanning and Business Strategy (3) II An MBA integrative course.</td>
<td>How information from the economy can be used to develop a firm's competitive strategy. Multidisciplinary, using concepts from economics, marketing and management. Open only to BPA graduate students. Includes case method approach to problems facing top management in making and effecting a strategic plan. P, MKTG 500, ECON 500, FIN 511, open to BPA graduate students only. (Identical with ECON 568, MAP 568).</td>
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<td>P, MKTG 500.</td>
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<tr>
<td>MKTG 572</td>
<td>Marketing Research For Managers (3) I Specification of management information needs, evaluation of research proposals and findings, methods of gathering and analyzing data, administrative aspects of research and decisions. P, MKTG 500.</td>
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<td>P, MKTG 500.</td>
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<tr>
<td>MKTG 582</td>
<td>Multivariate Analysis in Management (3) I Multiple, polynomial, stepwise regression including indicator variables, inference, remedial measures. P, MKTG 552.</td>
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<td>P, MKTG 552.</td>
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<td>MKTG 588</td>
<td>Multivariate Analysis in Management (3) II Analysis of variance and covariance, principal components, discriminant analysis, canonical correlation. P, MKTG 552, MKTG582A is not prerequisite to MKTG582B.</td>
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<td>P, MKTG 552.</td>
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<td>MKTG 599</td>
<td>Independent Study (1-3) [Rpt./]</td>
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<td>P, MKTG 500.</td>
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<tr>
<td>MKTG 697</td>
<td>College or departmental offices. APRRs are also available on line at: <a href="http://www.arizona.edu/academic/oncourse/data/">http://www.arizona.edu/academic/oncourse/data/</a></td>
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<td>MKTG 698</td>
<td>Materials Science &amp; Engineering (MSE)</td>
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<td>MKTG 699</td>
<td>Independent Study (1-3) [Rpt./]</td>
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<td>MKTG 700</td>
<td>Internship (1-6)</td>
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<td>MKTG 701</td>
<td>Research (2-6)</td>
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<td>MKTG 703</td>
<td>Thesis (3-6)</td>
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**MATERIALS SCIENCE & ENGINEERING (MSE)**

- **Bachelor of Science in Materials Science & Engineering (B.S.M.S.E.)**
  - **Graduate Degrees**
    - Master of Science (M.S.)
    - Doctor of Philosophy (Ph.D.)
  - **Major and Degrees**
    - Materials Science and Engineering (B.S.M.S.E., M.S., Ph.D.)

**Program Requirements**

For undergraduate academic program requirements, consult the *On Course* Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: [http://www.arizona.edu/academic/oncourse/data/](http://www.arizona.edu/academic/oncourse/data/). Minor requirements are available online at: [http://www.arizona.edu/academic/oncourse/data/](http://www.arizona.edu/academic/oncourse/data/)
Materials Science and Engineering (MSE)

199. History of Technology and Society (3) I (Identical with ANTH 109).

110. Solid State Chemistry (4) II Fundamental principles of the chemistry of condensed states of matter including metals, polymers, molecular solids and ceramics. 4ES. P, MSE 103A.

195. Colloquium

b. Materials Science and Engineering (1) II (Identical with ENGR 195B).

199. Independent Study (1-3) [Rpt.] I II

207. Material Culture Studies (3) I (Identical with ANTH 207, which is home).

222. Introduction to Materials Science (3) I Introduction to the structure of materials and how structure influences properties. Elementary crystallography, crystal chemistry, and microscopic structure effects are covered. Examples are taken from all classes of materials: metals, semiconductors, ceramics, polymers, glasses, and composites. 3ES. P, MSE 110 or CHEM 103B or MATH 125S; CHEM 103A, consult department before enrolling; Field trips.

224. Materials and Energy Balances in Materials Processing (3) II Analysis of materials processing using material and energy balance computations. Stoichiometry, nonreacting and reacting systems, first law of thermodynamics, degree of freedom analysis. Applications to the processing of conventional and modern new materials. 3ES. P, CHEM 103B or MSE 110; ENGR 102.

240. Thermodynamics (4) I Introduction to the laws of thermodynamics, entropy, free energy, and the concept of equilibrium as applied to materials for conventional and advanced technological applications. 4ES. P, MATH 125B or consult department before enrolling.

249. Technology and The Growth of Civilizations (3) II (Identical with ANTH 249, which is home).

251. Social Constraints on Engineering (3) I Influence of consumers, organizations, state and national governments and international treaties on engineering in the USA, Japan and selected other nations. (Identical with ANTH 251; ENGR 251).

257. Materials Science of Art and Archaeological Objects (3) II The methods, content and practice pertinent to the study of art and archaeology. Materials science provides one of the keys for interpreting objects in their historical and cultural context. 3ES. (Identical with ANTH 257, ENGR 257).

258. Materials Science of Art and Archaeological Objects Laboratory (1) II Laboratory exercises involving the materials science of art and archaeological objects. 1ES. (Identical with ANTH 258, ENGR 258).


293. Internship (1-6)

299I. Independent Study (1-3) [Rpt.] I II

331L. Engineering Materials Laboratory (1) I II Fundamental laboratory techniques for the evaluation of properties and behavior of materials for engineering applications. 1R, 2L, 1ES. P or CR, MSE 331R.

331R. Fundamentals of Materials for Engineers (3) I II Scientific principles which underlie and relate the behavior and properties of materials to their engineering applications. 3ES. P or CR, CHEM 103A; P, PHYS 103.

360L. Materials Laboratory (1) I Laboratory experiments on physical, electrical and optical properties of materials. 1ES. P or CR, MSE 360R.

360R. Structure and Properties of Materials II (3) I Principles of structure and structure-property relationships in materials with emphasis on mechanical properties. 2ES, 1ED. P, MSE 260.


399. Independent Study (1-3) [Rpt.] I II

405. Advanced Extractive Metallurgy (3) II Hydrometallurgy: physical chemistry and kinetics of hydrometallurgical processes including leaching, solvent extraction and metal recovery; flow sheet design and optimization. Pyrometallurgy: analysis, control and optimization of pyrometallurgical processes. 3ED. P, MSE 380; Field trips. May be convened with MSE 505.

409. Transport Phenomena (3) I Principles of momentum, energy and mass transport, as applied to materials processing. 3ES. P, MSE 240, MATH 254. May be convened with MSE 509.

411. Mineral Processing (3) I (Identical with MN E 411, which is home). May be convened with MSE 511.

412. Physical Chemistry of Materials (3) I Physical and chemical topics of interest to material scientists including surface chemistry, electrochemistry and chemical kinetics. 3ES. P, MSE 240. May be convened with MSE 512.

414. Solidification of Castings (3) I II Pass/Fail option. Principles of metal castings while applying fundamentals of transport phenomena and materials science and engineering. Students work in teams on three projects that provide experience in engineering design and hands-on use of the Metal Casting Laboratory. 3ED. P, A ME 432 or CHEE 305 or MSE 331R or MSE 110 or MSE 409; Field trips.

417. Semiconductor Processing (3) I Semiconductor materials, crystal growth, wafering, photolithography, etching, doping, oxidation, metallization, thin film deposition, and device processing. May Materials (3) II Ceramic crystal structures, crystal chemistry, phase equilibria and sintering theory. 3ES. P, MSE 260 or consult department before enrolling. May be convened with MSE 524.


435. Corrosion and Degradation (3) II The science of corrosion and degradation reactions and its application to engineering problems. 2ES. 1ED, P. MSE 331R or MSE 412 or P or CR, CHEM 480B. (Identical with CHEE 435, ENGR 435). May be convened with MSE 535.

440. Thermodynamics of Condensed Phases (3) I Advanced treatment of the principles of thermodynamics with application to electronic and optical materials; emphasis on solutions, defect chemistry and modeling of multicomponent systems. P. MSE 240. May be convened with MSE 540.


442B. Materials Engineering Design (2) I Application of engineering design principles to materials applications and processes: Cost and Economic Analysis. P. MSE 360. Writing-Emphasis Course. May be convened with MSE 542B.

444. Design Competition (3) II Students utilize their undergraduate experience in formulating and developing a materials design project which they present and defend before a review panel. 3ED. P, MSE 442A. May be convened with MSE 544.

452. Nondestructive Evaluation of Materials (3) I Introduction to the nondestructive testing and evaluation of the various classes of engineering materials. Methods considered include leak detection, penetrant, electromagnetic, radiographic, ultrasonic, electrical, electronic, eddy current, acoustic emission, and thermal. 2R, 3L. 2ES, 1ED. P or CR, MSE 331R; MSE 360. May be convened with MSE 552.

455. Physical Metallurgy and Processing of Steel (3) I Equilibrium and nonequilibrium transformations and phases, effects of alloy elements on important transformations in steel, isothermal transformation diagrams and continuous cooling diagrams. Processing aspects include heat treating, heat transfer during cooling and quenching, segregation effects, and surface hardening techniques. 2R. 3L. 2ES, 1ED. P. MSE 331R or MSE 380, and MSE 409 or A ME 442. May be convened with MSE 555.

457. Integrated Circuit Laboratory (3) I II (Identical with ECE 457, which is home). May be convened with MSE 557.
460. Materials Science of Polymers (3) I
Introduction to physical properties of polymers. Microstructure, crystallization, rheology, relaxation and mechanical properties. 1.5ES, 1.5ED. P, MSE 331R or MSE 360R. May be convened with MSE 560.

461. Biological and Synthetic Materials (3) II
Discussion of structure and properties of biological and synthetic materials, such as bone, teeth and elastin. Synthetic materials as substitutes for biological materials, biocompatibility. 1.5ES, 1.5ED. P, CHEM 103A. May be convened with MSE 561.

462. Structure and Properties of Polymers (3) I
Topics of intensive current development in polymer science. P, MATH 125B; knowledge of calculus. May be convened with MSE 578.

463. Science and Society (3) I
The evolution of our technological civilization will be discussed with emphasis on possible future models of technological organizations and on the changing roles of the scientist and engineer. 1ES, 2ED. (Identical with ENGR 486). May be convened with MSE 586.

488. Scanning Electron Microscopy (3) I
Theoretical and practical aspects of electron-beam microanalysis. Lab emphasizes projects and independent research using scanning electron microscopy and energy dispersive X-ray analysis. 2R, 3L. 3ES. P, consult department before enrolling; Field trips. (Identical with ENGR 488).

489. Transmission Electron Microscopy of Materials (3) I
Transmission electron microscopy in materials characterization. Specimen preparation; instrumental techniques; interpretation of micrographs and diffraction patterns, micro- and nano-analysis in transmission electron microscopy. 2R, 3L. 3ES. P, MSE 480 or consult department before enrolling. May be convened with MSE 589.

498. Senior Capstone (1-3) I II
498H. Honors Thesis (3) [Rpt./] I II
499. Independent Study (1-3) [Rpt./]
501. Planning for Discovery (3) [Rpt./] I II
502. Research Proposal Preparation (3) [Rpt./] I
503. Applied Surface Chemistry (3) I
504. Advanced Extractive Metallurgy (3) II
505. Advanced Microstructural Characterization by Transmission Electron Microscopy (3) I
506. Thermodynamics of Condensed Phases (3) I
507. Solid-Fluid Reactions (3) I
509. Transport Phenomena (3) I
511. Mineral Processing (3) I
512. Physical Chemistry of Materials (3) I
513. Imperfections in Solids (3) I
517. Semiconductor Processing (3) I
523. Electrochemistry in Materials Science (3) I
524. Physics and Chemistry of Ceramic Materials (3) II
534. Advanced Topics in Electronic Materials (3) I
536. Advanced Microstructural Characterization by Transmission Electron Microscopy (3) I
540. Thermodynamics of Condensed Phases (3) I
542A. Materials Engineering Design (2) I
542B. Materials Engineering Design (2) I
544. Design Competition (3) II
551. Atomic Computational Techniques in
Materials Science (3) II Monte Carlo and molecular dynamics techniques; classical and quantum dynamical models; application to calculation of materials properties (structural, thermodynamic, transport, electronic properties).

552. Nondestructive Evaluation of Materials (3) II For a description of course topics see MSE 452. Graduate-level requirements include a term paper. May be convened with MSE 452.

554. Electronic Packaging Principles (3) I II (Identical with ECE 554, which is home).

557. Integrated Circuit Laboratory (3) I II (Identical with ECE 557, which is home). May be convened with MSE 457.

560. Materials Science of Polymers (3) II For a description of course topics see MSE 460. Graduate-level requirements include additional computational and written exercises. May be convened with MSE 460.

561. Biological and Synthetic Materials (3) II For a description of course topics see MSE 461. Graduate-level requirements include additional computational and written exercises. May be convened with MSE 461.

562. Structure and Properties of Polymers (3) I For a description of course topics see MSE 462. Graduate-level requirements include additional computational and written exercises. May be convened with MSE 462.

565. Microelectronic Packaging Materials (3) II For a description of course topics see MSE 465. Graduate-level requirements include an additional term paper. (Identical with ECE 465). May be convened with MSE 465.

570. Technology of Polymers and Ceramics (3) I For a description of course topics see MSE 470. Graduate-level requirements include the writing and presentation of an additional term paper. May be convened with MSE 470.

571. The Formation and Structure of Glass (3) I For a description of course topics see MSE 471. Graduate-level requirements include a research paper or project. May be convened with MSE 471.


576. Design, Production and Performance of Ceramics and Metals (3) II For a description of course topics see MSE 476. Graduate-level requirements include a term-long design project and design analysis. (Identical with ANTH 576). May be convened with MSE 476.

579. Culture and Materials Technology (3) I (Identical with ANTH 579, which is home). May be convened with MSE 479.

580. Experimental Methods for Microstructural Analysis (3) II For a description of course topics see MSE 480. Graduate-level requirements include an additional term paper. May be convened with MSE 480.

585. Technological Forecasting (3) I For a description of course topics see MSE 485. Graduate-level requirements include an additional term paper. May be convened with MSE 485.

586. Technology and Society (3) I For a description of course topics see MSE 486. Graduate-level requirements include an additional term paper. May be convened with MSE 486.

588. Scanning Electron Microscopy (3) I Graduate-level requirements include additional lab work.

589. Transmission Electron Microscopy of Materials (3) I For a description of course topics see MSE 489. Graduate-level requirements include an additional term paper and presentation. May be convened with MSE 489.

595. Colloquium
   a. Materials (1) [Rpt./ 5] II
   b. Seminar (1) [Rpt.]
   c. Technology and Social Theory (3) II (Identical with ENGR 596S and SOC 596S).
   d. Independent Study (1-9) [Rpt.]
   e. Thesis (1-8) [Rpt.]
   f. Research (1-9) [Rpt.]
   g. Dissertation (1-9) [Rpt.]

900. Research (1-9) [Rpt.]

920. Dissertation (1-9) [Rpt.]
121. Collegiate Algebra (4) Topics include properties of functions and graphs, polynomial functions, rational functions, exponential and logarithmic functions, sequences and series, and systems of equations. Course includes an integrated review of important concepts in intermediate algebra. Students are expected to have a graphing calculator. MATH 121 may be substituted for MATH 117 in any University requirement or prerequisite. P, acceptable score on math readiness test.

122. Mathematics in Modern Society (3) The course will examine topics such as voting schemes, apportionment problems, network problems, critical paths, Fibonacci numbers, population models, symmetry, fractals, data analysis, probability and statistics. P, acceptable score on math readiness test.

123. Elements of Calculus (3) I II Introductory topics in differential and integral calculus. P, MATH 121 or acceptable score on math readiness test. Credit allowed for only one of the following courses: MATH 123, MATH 124, or MATH 125A.

124. Calculus with Applications (5) Introduction to calculus with an emphasis on understanding and problem solving. Concepts are presented graphically and numerically as well as algebraically. Elementary functions; their properties and uses in modeling; the key concepts of derivative and definite integral; techniques of differentiation, using the derivative to understand the behavior of functions; applications to optimization problems in physics, biology and economics. Graphing calculator will be required for this course. P, MATH 120 or MATH 121 and MATH 118, MATH 117/R/S and MATH 118, or an acceptable score on the math readiness test. Credit allowed for only one of the following courses: MATH 123, MATH 124, or MATH 125A.

125A. Calculus (3) I II An accelerated version of 124. Introduction to calculus with an emphasis on understanding and problem solving. Concepts are presented graphically and numerically as well as algebraically. Elementary functions, their properties and uses in modeling; the key concepts of derivative and definite integral; techniques of differentiation, using the derivative to understand the behavior of functions; applications to optimization problems in physics, biology and economics. Graphing calculator will be required in this course. P, acceptable score on math readiness test. Credit allowed for only one of the following courses: MATH 123, MATH 124, or MATH 125A.

125B. Calculus (3) I II Continuation of 124 or 125A. Techniques of symbolic and numerical integration, applications of the definite integral to geometry, physics, economics, and probability; differential equations from a numerical, graphical, and algebraic point of view; modeling using differential equations, approximations by Taylor series. Graphing calculator will be required in this course. P, MATH 124 or MATH 125A.

160. Introduction to Statistics (3) I II Descriptive statistics. Basic probability concepts and probability distributions, elementary sampling theory and techniques of estimation, hypothesis testing, regression and correlation. Some analysis of variance and nonparametric statistics if time permits. Students will utilize a statistical package for computational purposes. P, MATH 121 or MATH 117/R/S.

199. Independent Study (1-4) 

199H. Honors Independent Study (1-6) 

202. Introduction to Symbolic Logic (3) I II (Identical with PHIL 202, which is home).

215. Introduction to Linear Algebra (3) I II Vector spaces, linear transformations and matrices. There is some emphasis on the writing of proofs. P, MATH 125B.

223. Vector Calculus (4) I II Vectors, differential and integral calculus of several variables. P, MATH 125B.

243. Discrete Mathematics in Computer Science (3) I II Set theory, logic, algebraic structures; induction and recursion; graphs and networks. P, MATH 125B.

254. Introduction to Ordinary Differential Equations (3) I II Solution methods for ordinary differential equations, qualitative techniques; includes matrix methods approach to systems of linear equations and series solutions. P, MATH 223. Credit allowed for one of these courses: MATH 254, MATH 355.

263. Statistical Methods in Biological Sciences (3) I II Organization and summarization of data, concepts of probability, probability distributions of discrete and continuous random variables, point and interval estimation, elements of hypothesis testing, regression and correlation analysis, chi-square distribution and analysis of frequencies, introduction to analysis of variance, with special emphasis on analysis of biological and clinical data. P, MATH 121 or MATH 117/R/S.

322. Mathematical Analysis for Engineers (3) I II. Complex functions and integration, line and surface integrals, Fourier series, partial differential equations. P, MATH 254 or MATH 355. Credit allowed for one of these courses: MATH 322, MATH 422A.

323. Formal Mathematical Reasoning and Writing (3) I II Elementary real analysis as an introduction to abstract mathematics and the use of mathematical language. Elementary logic and quantifiers; manipulations with sets, relations and function, including images and pre-images; properties of the real numbers; supremum and infimum; other topics selected from cardinality, the topology of the real line, sequence and limits of sequences and functions; the emphasis throughout is on proving theorems. Writing-Emphasis Course. P, MATH 215.

330. Topics in Geometry (3) I Topics to be selected from 2- and 3-dimensional combinatorial geometry, postulational Euclidean geometry, Euclidean transformational geometry, symmetry, and 2-dimensional crystallography. P, MATH 215.

344. Foundations of Computing (3) I II (Identical with C SC 344, which is home).

355. Analysis of Ordinary Differential Equations (3) I II Linear and nonlinear equations; basic solution techniques; qualitative and numerical methods; systems of equations; computer studies; applications drawn from physical, biological and social sciences. P, MATH 215. Credit allowed for one of these courses: MATH 355, MATH 254.

362. Introduction to Probability Theory (3) I II Sample spaces, random variables and their properties, with considerable emphasis on applications. P, MATH 123 or MATH 125B.

380. Math Models In Biology (3) I (Identical with ECOL 380, which is home).

397. Workshop

1. Mathematics Education (1) I II P, MATH 315 or MATH 330; open to teaching majors in mathematics only.

399. Independent Study (1-5) 

399H. Honors Independent Study (3) 

402. Mathematical Logic (3) I II Sentential calculus; predicate calculus; consistency, independence, completeness, and the decision problem. Designed to be of interest to majors in mathematics or philosophy. P, MATH 124 or MATH 125B. Credit allowed for one of these courses: MATH 402, MATH 409A. (Identical with C SC 402, PHIL 402).

403. Foundations of Mathematics (3) I II Topics in set theory such as functions, relations, direct products, transfinite induction and recursion, cardinal and ordinal arithmetic; related topics such as axiomatic systems, the development of the real number system, recursive functions. P, MATH 215. (Identical with PHIL 403). May be convened with MATH 503.

404. History of Mathematics (3) I The development of mathematics from ancient times through the 17th century, with emphasis on problem solving. The study of selected topics...
with PHIL 509A-509B, which is home). May be convened with MATH 409A-409B.

510. Algebra for Elementary School (3) I The course aims at strengthening teachers’ understanding of algebra (focusing on a study of patterns and functions) to explore algebra and pre-algebra activities appropriate for K-8 and to discuss research issues related to the learning and teaching of algebra in these grades.

511A-511B. Algebra (3) I Structure of groups, rings, modules, algebras; Galois theory. P, MATH 415A and MATH 415B, or MATH 413 and MATH 415A.

513. Linear Algebra (3) II For a description of course topics see MATH 413. For a description of course topics see 411. Graduate-level requirements include more extensive problem sets or advanced projects. P, MATH 323. May be convened with MATH 413.

514A-514B. Algebraic Number Theory (3) I Dedekind domains, complete fields, class groups and class numbers, Dirichlet unit theorem. P, MATH 511B.

515A-515B. Introduction to Abstract Algebra (3-3) I II For a description of course topics see 415A-415B. Graduate-level requirements include more extensive problem sets or advanced projects. May be convened with MATH 415A-415B.

517A-517B. Group Theory (3-3) I II Selections from such topics as finite groups, abelian groups, characters, and representation theory. P, MATH 511B.

518. Topics in Algebra (3) [Rpt./ 11] I II Advanced topics in groups, rings, fields, algebras; content varies.

519. Topics in Number Theory and Combinatorics (3) [Rpt./ 11] II Advanced topics in algebraic number theory, analytic number theory, class fields, combinatorics; content varies.


520B. Complex Analysis (3) II Rudiments of Riemann surfaces. P, MATH 520A or MATH 582.

522A-522B. Advanced Analysis For Engineers (3-3) I II For a description of course topics see MATH 422A-422B. Graduate-level requirements include more extensive problem sets or advanced projects. May be convened with MATH 422A-422B.

523A-523B. Real Analysis (3-3) I II Lebesque measure and integration, differentiation, Radon-Nikodym theorem, Lp spaces, applications. P, MATH 425A.

524. Elements of Complex Variables (3) I II For a description of course topics see MATH 424. Graduate-level requirements include more extensive problem sets or advanced project. May be convened with MATH 424.

525A. Real Analysis of One Variable (3) I II For a description of course topics see MATH 425A. Graduate-level requirements include more extensive problem sets or advanced projects. May be convened with MATH 425A.

525B. Real Analysis of Several Variables (3) II For a description of course topics see MATH 425B. Graduate-level requirements include more extensive problem sets or advanced projects. May be convened with MATH 425B.

527A-527B. Principles of Analysis (3-3) I II Advanced review of linear algebra and multivariable calculus; survey of real, complex and functional analysis, and differential geometry with emphasis on the needs of applied mathematics. P, MATH 410, MATH 424, differential equation course.

528A-528B. Banach and Hilbert Spaces (3-3) I II Introduction to the theory of normed spaces, Banach spaces and Hilbert spaces, operators on Banach spaces, spectral theory of operators on Hilbert spaces, applications. P, MATH 527B or MATH 583; MATH 523A.

529. Topology in Modern Analysis (3) I II Advanced topics in measure and integration, complex analysis in one and several complex variables, probability, functional analysis, operator theory; content varies.

530. Second Course in Geometry (3) II For a description of course topics see MATH 430. Graduate-level requirements include more extensive problem sets or advanced projects. May be convened with MATH 430.

531. Algebraic Topology (3) I Poincare duality, fixed point theorems, characteristics classes, classification of principal bundles, homology of fiber bundles, higher homotopy groups, low dimensional manifolds. P, MATH 534A, MATH 534B.

534A-534B. Topology-Geometry (3-3) Point set topology, the fundamental group, calculus on manifolds. Homology, de Rham cohomology, other topics. Examples will be emphasized. P, MATH 415A, MATH 425A.


537A-537B. Global Differential Geometry (3-3) I II Surfaces in R3, structure equations, curvature. Gauss-Bonnet theorem, parallel transport, geodesics, calculus of variations, Jacobi fields and conjugate points, topology and curvature; Riemannian geometry, connections, curvature tensor, Riemannian submanifolds and submersions, symmetric spaces, vector bundles. Morse theory, symplectic geometry. P, MATH 534A, MATH 534B.

538. Topology in Geometry and Topology (3) I II Advanced topics in point set and algebraic topology, algebraic geometry, differential geometry; content varies.

539. Algebraic Coding Theory (3) II Construction and properties of error correcting codes; encoding and decoding procedures and information rate for various codes. P, MATH 415A. (Identical with ECE 539).

543. Theory of Graphs and Networks (3) I II For a description of course topics see MATH 443. Graduate-level requirements include more extensive problem sets or advanced projects. (Identical with C SC 543). May be convened with MATH 443.

546. Theory of Numbers (3) I For a description of course topics see MATH 446. Graduate-level requirements include more extensive problem sets or advanced projects. May be convened with MATH 446.

547. Combinatorial Mathematics (3) II For a description of course topics see MATH 447. Graduate-level requirements include more extensive problem sets or advanced projects. May be convened with MATH 447.

550. Mathematical Population Dynamics (4) II (Identical with ECOL 550, which is home).

553A-553B. Partial Differential Equations (3-3) I II Theory and examples of linear equations; characteristics, well-posed problems, regularity, variational properties, asymptotics. Topics in nonlinear equations, such as shock waves, diffusion waves, and estimates in Sobolev spaces. P, MATH 523B or MATH 527B or MATH 583B.


556. Applied Partial Differential Equations (3) II For a description of course topics see MATH 456. Graduate-level requirements include more extensive problem sets or advanced projects. May be convened with 456. May be convened with MATH 456.

557A-557B. Dynamical Systems and Chaos (3-3) I II Qualitative theory of dynamical systems, phase space analysis, bifurcation, period doubling, universal scaling, onset of chaos. Applications drawn from atmospheric physics, biology, ecology, fluid mechanics and optics. P, MATH 422B or MATH 445; MATH 422A.

559A-559B. Lie Groups and Lie Algebras (3-3) I II Correspondence between Lie groups and Lie algebras, structure and representation theory, applications to topology and geometry of homogeneous spaces, applications to harmonic analysis. P, MATH 534B or consent of instructor, MATH 511A, MATH 523A, MATH 534A.

560. Elementary School Probability (1-3) [Rpt./ 3 units] II S Games and other activities that lead naturally to consideration of chance events and data analysis. Activities will relate to numeration and number systems, algebra, geometry and other topics in mathematics to emphasize the integrated nature of mathematics. Students work in groups to create and analyze activities. P, certified elementary teachers with two or more years experience or consent of instructor.

561. Regression and Multivariate Analysis (3) I II Regression analysis including simple linear regression and multiple linear regression. Analysis of variance and covariance. Residuals...
packages for computational purposes. P, MATH 461, MATH 466 or MATH 509.

571. Design of Experiments (3) II Principles of designing experiments. Randomization, blocked designs, factorial experiments, response surface designs, repeated measures, analysis of contrasts, multiple comparisons, analysis of variance and covariance, variance components analysis. P, MATH 223, MATH 461 or MATH 509.

572. Statistical Consulting (3) I Course provides instruction and experience in all aspects of statistical consultation. The class is organized as a small consulting lab with instructor acting as director. Students interact with actual clients from university and local business communities. P, 2 semesters of statistics and consent of instructor.

573. Theory of Computation (3) II (Identical with C SC 573, which is home).

574. Introduction to Geostatistics (3) I Exploratory spatial data analysis, random function models for spatial data, estimation and modeling of variograms and covariances, ordinary and universal kriging estimators and equations, regularization of variograms, estimation of spatial averages, non-linear estimators, includes use of geostatistical software. Application of hydrology, soil science, ecology, geography and related fields. P, linear algebra, basic course in probability and statistics, familiarity with DOS/Windows, UNIX.


576A. Numerical Analysis PDE (3) I Finite difference, finite element and spectral discretization methods; semidiscrete, matrix and Fourier analysis. P, MATH 413, MATH 456, MATH 575B.

576B. Numerical Analysis PDE (3) II Well-posedness, numerical boundary conditions, nonlinear instability, time-split algorithms, special methods for stiff and singular problems. P, MATH 413, MATH 456, MATH 575B.

577. Topics in Applied Mathematics (3) I II [Rpt./36 units] Advanced topics in asymptotics, numerical analysis, approximation theory, mathematical theory of mechanics, dynamical systems, differential equations and inequalities, mathematical theory of statistics; content varies.

578. Computational Methods of Algebra (3) II Applications of computer machine to various aspects of algebra, such as matrix algorithms, character tables and conjugacy classes for finite groups, cost enumeration, integral matrices, crystallographic groups. P, MATH 415A, knowledge of scientific computer programming language. (Identical with C SC 578).

579. Game Theory and Mathematical Programming (3) II For a description of course topics see MATH 479. Graduate-level requirements include more extensive problem sets or advanced projects. P, MATH410 or MATH413 or MATH415A. (Identical with C SC 579). May be convened with MATH 479.


583A-583B. Principles and Methods of Applied Mathematics (3-3) I II Boundary value problems; Green’s functions, distributions, Fourier transforms, the classical partial differential equations (Laplace, heat, wave) of mathematical physics. Linear operators, spectral theory, integral equations, Fredholm theory. P, MATH 422B or MATH 424 or MATH 520A.

585. Mathematical Modeling (3) II For a description of course topics see MATH 485. Graduate-level requirements include more advanced projects. May be convened with MATH 485.

586. Case Studies in Applied Mathematics (1-3) [Rpt./6 units] I II In-depth treatment of several contemporary problems or problem areas from a variety of fields, but all involving mathematical modeling and analysis; content varies.

587. Perturbation Methods in Applied Mathematics (3) I Regular and singular perturbations, boundary layer theory, multiscale and averaging methods for nonlinear waves and oscillators. P, MATH 422B or MATH 454; MATH 422A.

588. Topics is Mathematical Physics (3) [Rpt./11] I II Advanced topics in field theories, mathematical theory of quantum mechanics, mathematical theory of statistical mechanics; content varies.

593. Internship (1-3) [Rpt./] I II

595. Colloquium

a. Math Instruction (1) [Rpt./11] I II
b. Research in Mathematics (1) [Rpt./4] I II
c. Research in Applied Mathematics (1) [Rpt./4] I II

596. Seminar

a. Topics in Mathematics (1-3) [Rpt./12 units] S
b. Mathematical Software (3) [Rpt./1] I For a description of course topics see MATH 496B. May be convened with MATH 496B.
c. Research on Learning (1) [Rpt./3] S P, acceptance into NSF-funded grant program, PRIME.
d. Initiating Reform in the Schools (1) [Rpt./3] S P, acceptance into NSF-funded grant program, PRIME.

597. Workshop

a. Numbers, Algebra and Function (1-2) S P, acceptance into NSF-funded grant program, PRIME.

599. Independent Study (1-6) [Rpt./]

636. Information Theory (3) II (Identical with ECE 636, which is home).

697. Workshop

a. Problems in Computational Science (3)
198  Mathematics—Media Arts

[198] 198

b. Applied Mathematics Laboratory (3) II S P, Applied Math core or equivalent. (Identical with PHYS 697B).

699. Independent Study (1-6) [Rpt./] I II
900. Research (2-8) [Rpt./]
910. Thesis (3-6) [Rpt./]
920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

1 Students without University of Arizona credit in the prerequisites for these courses will be required to have an appropriate score on the math readiness test to be enrolled in these courses.

2 Credit will not be given for this course if the student has credit in a higher level math course; these students will be dropped by the Registrar's Office. Students with unusual circumstances can petition the department for exemption from this rule. This policy does not infringe on the student's rights granted by university policy on repeating a course.

3 Credit will be allowed for only one of MATH 424 or MATH 422B. MATH 422A-B will not be considered a two-semester course at the 400 level in the Master of Arts degree program.

4 Credit will be allowed for only one from each of the following groups: MATH 123, MATH 124 or MATH 125A; MATH 254 or MATH 355; MATH 410 or MATH 413.

MEDIA ARTS (MAR)

Harvill Bldg., Rm. 226
The University of Arizona
PO Box 210076
Tucson AZ 85721-0076
Phone: (520) 621-7352
FAX: (520) 621-9662
URL: http://arts.music.arizona.edu/mediaarts/index.html

Baccalaureate Degrees
Bachelor of Arts (B.A.)
Bachelor of Fine Arts (B.F.A.)

Graduate Degree
Master of Arts (M.A.)

Major and Degrees
Media Arts (B.A., B.F.A., M.A.)

Program Requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRMs). APRMs for all undergraduate majors are available in college or departmental offices. APRMs are also available online at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available online at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Media Arts (MAR)

102. Discovering Media (3) II Survey of the elements which make up video, film, and audio images: light, color, area, depth, movement, and sound in message design and structure. I, II, S.

199. Independent Study (1-3) [Rpt./] I II

200. Fundamentals of Theory and Aesthetics in Media Arts (3) II Survey of the elements which make up video, film, and audio images: light, color, area, depth, movement, and sound in message design and structure. I, II.

201. Survey of Media History (3) I II History of film, television and radio; silent and sound film, radio news and drama, international genres and styles, U.S. television.

203. Concepts in New Media (3) II Introduction to the concepts and processes utilized in new media, with examination of social and historical issues relating to emerging technologies. II, S.

205. Reporting The News (3) I II (Identical with JOUR 205, which is home).

206. Law of the Press (3) I II (Identical with JOUR 206, which is home).

210. Beginning Media Production (3) II Introduction to basic vocabulary of studio television, narrative structure and audio production. Production experience in all three units. P, M AR 200 or M AR 201. Fee.


239. Speaking in the Arts (3) II (Identical with T AR 239, which is home).

241. Beginning Photography (3) [Rpt./] I II 2R. (Identical with ART 241, which is home).

280. Introduction to Electronic Journalism (3) II I Survey of the history, organization, and practice of electronic journalism. 2S.

294. Practicum (1-5) [Rpt./]

297. Workshop

299. Independent Study (1-5) [Rpt./]

299H. Honors Independent Study (1-5) [Rpt./]

302. Recording Studio Production (3) I II (Identical with MUS 302, which is home).

303. Professional Practices (1) Prepares students to meet the professional expectations of media work. Job search strategies (resume writing and interviewing) and professional concepts are studied. P, M AR 101, M AR 200, M AR 304 or M AR 305, and one Writing-Emphasis Course.

304. Beginning Video Production (3) I II Introduction to the technical elements of video production, including equipment, professional practices, and production techniques. Laboratory experience with video equipment and production of technical exercises. I, 2S, 3L. Fee. P, M AR 200 and M AR advanced standing.

305. Introduction to Film Production (3) I II Basic principles of 16mm film production; camera, editing, sound, production techniques and practices; laboratory experience with film production equipment and production of technical short films. 4S, 3L. Fee. P, M AR advanced standing.

306. Digital Animation (3) I Exploration and production of 2-D and 3-D modeling and animation using the computer. Fee. M AR advanced standing.

308. Survey of Media Law and Regulation (3) II Introduction to the legal and regulatory framework of the electronic media and film: licensing, cross-ownership, public interest, self-regulation, consumer influence, and related topics.


311. Lighting for Media Production (2) I Function and qualities of light; typical application in photography, television, motion pictures, architecture, and interior design. P, M AR 200.

312. Video Art in America (3) II Investigation of artist-produced video from the 1960s to the present. Screenings, critical readings and projects. (Identical with ART 312).

314. Intermediate Video Production (3) I II Production of various types of television programs, including techniques and theory of studio and field operations, use of equipment (studio and EFP) and personnel relationships, with emphasis on the role of the television producer. 2R, 3L. Open to majors and minors only. Fee. P, M AR 200, M AR 304 and acceptance of portfolio by Portfolio Committee.

315. Intermediate Film Production (3) I Production of film programs, including techniques and production procedures. Students will produce a short video work. 2R, 3L. Open to B.F.A. media arts majors only. Fee. P, M AR 304, M AR advanced standing.

316. Radio Production (3) I II Analysis and production of selected radio programs with emphasis on complex radio formats and production techniques. 2R, 3L. P, M AR 304 or M AR 305.

318. Personal Diary Film and Video (3) II Exploration of the history of image making in the home and family context and the integration of film and video making into daily life. Students produce short video assignments. Fee.


325. History of German Cinema (3) I (Identical with GER 325, which is home).
333. Roles in Narrative Production (3) II The major roles used in the production of narrative films and videos, including production management and design, camera, sound, editing. P, M AR 304 or M AR 305, and M AR advanced standing.


335. Topics in Media Studies (3) I Examination of specific topic in media studies: film, radio, and/or television. 2R, 2S, P, M AR advanced standing.

336. History of Japanese Film (3) I II Development of Japanese cinema from its origins through its recognition as a major international art film producer during the 1950s and 1960s. Advanced standing waived for this course. See instructor. 2R, 2S. (Identical with JPN 336).

340. Intermediate Artists' Video (3) I (Identical with ART 349, which is home).

341. Professional Media Interviewing (3) I The interview process and specific interview formats, including survey research, journalistic, and panel formats. Interviewer performance is stressed; practice provided.


371. Film/Video Production Financing (3) I II Strategies for production financing for independent film/video projects and ways to position a project in the marketplace. Students will develop a prospectus for their own project. P, M AR 304 or M AR 305.

372. Exhibition Management (3) I II Programming strategies, exhibition techniques, marketing approaches, and management models for film and video series, guest artist presentations, video installations, conferences, and festivals. 2R, 3L.

376. Audience Measurement (3) I Interpretation and utilization of broadcast ratings, surveys, polls and other measures of the attitudes, opinions, and behaviors of media audiences; relationships to social and management concerns.

380. Writing for News and Documentary (3) I Advanced work in the writing of news and public affairs programs for radio, television, and other electronic media with emphasis on news program and documentary formats. Writing-Emphasis Course. P, M AR advanced standing.

391. Preceptorship (1-5) II

393. Internship (1) I II

394. Practicum (1-5)

396. Proseminar

b. Honors Proseminar (3)

397. Workshop


399H. Honors Independent Study (1-3) [Rpt./]

400. Themes in Literature and Film (3) I II [Identical with ENGL 400, which is home].

401. Advanced Pre-Production (3) I II Development of scripts or proposals, completion of pre-production for capstone projects. P, M AR advanced standing.


421. Cultural Theory and Criticism of Media (3) I Critical and cultural theories and their application to media arts, including mass culture, empiricism, technoculture, political economy. P, M AR 200, M AR 320. May be convened with M AR 521.

423. Representation of Gender in the Media (3) I Investigation of gender as a social and cultural construct through the critical analysis of media products including televisions, film, and advertisements. P, M AR 200, M AR 320. (Identical with W S 423). May be convened with M AR 523.

424. Film Theory and Criticism (3) I Advanced studies in current cinematic theory and criticism. Historical examination of major film theories, including formalism, realism, classical Hollywood, structuralism, semiotics, and psychoanalytic theories. May be convened with M AR 524.

426. Sexuality in Media Narratives (3) I Includes psychoanalysis, semiotics, materialism, race, and class analysis, and feminist media production. P, M AR advanced standing. May be convened with M AR 526.

427. Feminist Media Theory (3) II Includes feminist theories in media and the analysis of gender, race, and class in media. P, M AR 200, M AR advanced standing. May be convened with M AR 527.

431. Commercial Intertextuality (3) I Analysis of industrial constraints on the production and circulation of media texts with emphasis on intertextual references. P, M AR advanced standing.

432. Film Theory and Criticism (3) I Advanced production of narrative in popular and underground film, music video and avant-garde video art. May be convened with M AR 526.

433. Editing (3) I II Survey of editing and its role in film, television, and other media. P, M AR advanced standing. May be convened with M AR 534.

437. Ethnographic Film and Video (3) I II Survey of ethnographic film and video from 1895 to present. Examines representative films and tapes in terms of media and anthropological theories. P, for media arts majors, M AR advanced standing. For anthropology majors, junior standing. (Identical with ANTH 437).

449. Advanced Artists' Video (3) I II (Identical with ART 449, which is home).
**College of Medicine (ANES/FCM/MED/MED/NEUR/OB G/OPH/PATH/PEDI/PSY/RONC/RAD/SURG)**

Arizona Health Sciences Center, Rm. 2209
The University of Arizona
PO Box 210201
Tucson AZ 85721-9201
Phone: (520) 626-6214
FAX: (520) 626-4884
URL: [http://www.ahsc.arizona.edu/](http://www.ahsc.arizona.edu/)

The College of Medicine offers a professional program leading to the Doctor of Medicine degree and graduate programs leading to the Doctor of Philosophy degree in certain of the medical sciences. A combined M.D./Ph.D. program in which the two degrees are awarded concurrently is also available. Candidates for the Ph.D. degree are enrolled in the Graduate College of the University. For additional information, request a College of Medicine Catalog from the Admissions Office, College of Medicine, at the address listed above.

**Professional Degree**
- **Doctor of Medicine (M.D.)**

**Graduate Degrees**
- **Master of Public Health (M.P.H.)**
- **Master of Science (M.S.)**
- **Doctor of Philosophy (Ph.D.)**

**Majors and Degrees**
- **Cell Biology and Anatomy (M.S., Ph.D.)**
- **Medicine (M.D.)**
- **Microbiology and Immunology (M.S., Ph.D.)**
- **Nutritional Sciences (Ph.D.)**
- **Pharmacology and Toxicology (Ph.D.)**
- **Physiological Sciences (M.S., Ph.D.)**
- **Public Health (M.P.H.)**

**Program Requirements**
- For undergraduate academic program requirements, consult the [On Course! Academic Program Requirements Reports (APRRs)](http://www.ahsc.arizona.edu/academic/). APRRs are also available online at [http://www.ahsc.arizona.edu/academic/](http://www.ahsc.arizona.edu/academic/). Minor requirements are available online at [http://www.arizona.edu/](http://www.arizona.edu/). For graduate program requirements consult the [Graduate Catalog](http://www.arizona.edu/academic/) and the departmental office listed above. Contact information for the following graduate interdisciplinary programs can be found under the program listing in this manual: Cell Biology and Anatomy, Microbiology and Immunology, Pharmacology and Toxicology, Physiological Sciences, and Public Health.

**To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.**

### Anesthesiology (ANES)

**499. Independent Study (1-3) [Rpt./] I II**

**800. Research (1-6) [Rpt./ 12 units] I II**

**810. Clerkship**
- **a. Anesthesiology (4-6) I II**
- **b. Pain Management (4) [Rpt./] II P, 4th year medical student or consent of instructor.**
- **c. Clerkship in ICU (4) I II Maricopa Medical Center, Phoenix. P, 4th year medical student or consent of instructor.**

**815A. BNI Neuroanesthesiology (4) [Rpt./] I II**

**815B. Obstetrical Anesthesia (4) [Rpt./] II**

**815P. Critical Care Medicine (1-18) [Rpt./] I II (Identical with MEDI 815P).**

**891. Preceptorship**
- **a. Anesthesiology and Subspecialties (1-18) [Rpt./] I II**

**899. Independent Study (1-16) [Rpt./] I II**

### Family & Community Medicine (FCM)

**195. Colloquium**
- **a. Empowerment-Mind-Healing-Health (1-3) I II**

**401. Mind and Behavioral Medicine (2) [Rpt./] I II Critical thinking and working principles in cognitive, mind-body, behavioral aspects of sickness and health; empowerment, stress, coping, conditional/unconditional mind, decision making, addictive-abusive behaviors, communication, and relationships, self awareness, healing and health. P, F CM 195A, upper division or graduate status. May be convened with F CM 501.**

**487. Poverty and Health (3) I II (Identical with NURS 487, which is home). May be convened with F CM 587.**

**500. Research (3-12) [Rpt./ 48 units] I II (Identical with PHL 500).**

**501. Mind and Behavioral Medicine (2) [Rpt./] I II For a description of course topics see F CM 401. Graduate-level requirements include a research project or paper. May be convened with F CM 401.**

**531. Art Therapy Techniques (3) [Rpt./ 2] I II Focuses on art expression as non-verbal communication and as a healing agent for children and persons with disabilities. P, previous course in art and/or special education.**
532. Survey of Art Therapy (3) [Rpt./] I
Surveys the development of art therapy in the United States through examination of the literature, theories, and trends in the field.

539. Art, Symbolism, and Psychopathology (3) [Rpt./] I
Introduction to behavioral and psychological characteristics of various disorders with emphasis on the types of artistic symbolism manifested by each group.

570. Issues and Trends in Public Health (3)
Public health methods, organizations and services such as environmental/occupational health; disease control; health education and promotion; policy and legislation; and medical care. (Identical with PHL 570).

571. International Comparison of Health Care Systems (3)
Comparison of health care systems in developing and industrialized countries in relation to other social systems; public/private component analyses; health care methods and finance. (Identical with PHL 571).

572. Population Dynamics and Family Planning (3)
Social/economic determinants and consequences of population growth; behavioral and health aspects of human reproduction; organization/evaluation of selected family planning programs. (Identical with PHL 572).

573. Health Issues of Women and Children (3)
I Knowledge base, social strategies, health policies and programs relating to health and well-being of women, especially of childbearing years, and children from infancy to adolescence. (Identical with PHL 573).

574. Health Administration and Policy (3)
Management processes/roles of public health professionals; health service organization; policy issues and resource utilization/control; human resources management; public health trends. (Identical with PHL 574).

575. Environmental and Occupational Health (3)
Examination of living/working environments impacting human health; chemical and physical stressors affecting health; techniques for assessing and controlling risks in air, soil and water. (Identical with PHL 575).

576. Biostatistics in Public Health (3)
Analysis and interpretation of measures of wellness and disease association, disease outbreaks, population surveillance, and health promotion program evaluation. (Identical with PHL 576).

577. Social and Behavioral Basis of Public Health (3)
Social learning theory, diffusion of innovations, relationship of cultural values to behavioral change, social marketing, high risk behavior intervention strategies, and communication issues. (Identical with PHL 577).

578. Public Health Nutrition (3) II
Community and individual nutritional assessment; risk profiles; planning, implementing and evaluating programs; national, national and local resources/programs; Healthy People 2000 goals. (Identical with PHL 578).

580. Community Based Research Methodologies (3) II
Research methodologies used in studying community health care issues. Students develop and write a research proposal which will address a community health issue. Student will acquire an understanding of the development of a research project and pilot test data collection instruments and procedures. P, PHL 576, F CM 596A. (Identical with PHL 580).

581. Introduction to Community Health (3) I
The role of the public health professional in enhancing community health and well being. Analysis of current community health issues and methodologies for building community capacity to influence health, access to care, and local, state, and national policy. Community control and input into medical care and health promotion/disease prevention systems analyzed through class assignments. (Identical with PHL 581).

587. Poverty and Health (3) II
(Identical with NURS 587, which is home). May be convened with F CM 487.

588. Healing Systems in the Southwest (3) II
(Identical with NURS 588, which is home).

593. Internship (1-6) [Rpt./]

596. Seminar
a. Public Health (1-12) [Rpt./] I II (Identical with PHL 593A, which is home).

596. Internship
a. Public Health (1-12) [Rpt./] I II (Identical with PHL 593A, which is home).

596. Seminar
a. Public Health (1-12) [Rpt./] I II (Identical with PHL 593A, which is home).

596. Internship
a. Public Health (1-12) [Rpt./] I II (Identical with PHL 593A, which is home).

693. Internship (1-12) [Rpt./]
4) Rpt./[P] I II
b. Medical Subinternship (4) [P, MEDI 803.
811. Subinternship
P, MEDI 803.
c. Clinical Geriatrics (3 -12) [Rpt./ 24 units] I II
b. Ambulatory Diagnostics and Therapy (6)
a. Ambulatory Care (4 -8) [Rpt./ 12 units] P, 
803. Clinical Clerkship (1) [Rpt./]
810. Clerkship
800a. Clinical Research in Minority Health
699. Independent Study (1 -18) [Rpt./]
596. Seminar
555. Cancer Therapeutics (3) II (Identical 
with PHL 896T).
499H. Honors Independent Study (1 -6) 
399H. Independent Study (1 -16) 
299H. Independent Study (1 -16) 
96. Seminar
596. Seminar
599. Independent Study (3-6) [Rpt./] 
699. Independent Study (1-18) [Rpt./]
800a. Clinical Research in Minority Health 
Issues (4-16) I II Open to majors only.
803. Clinical Clerkship (1) [Rpt./] I II
810. Clerkship
a. Ambulatory Care (4-8) [Rpt./ 12 units] P, 
completion of 3rd year medical school.
b. Ambulatory Diagnostics and Therapy (6) 
[Rpt./] I II
c. Clinical Geriatrics (3-12) [Rpt./ 24 units] I II 
P, MEDI 803.
811. Subinternship
a. Internal Medicine (4-12) [Rpt./] I II 
c. Coronary Care Unit - Acting Internship (3- 
4) [Rpt./] I II
d. Intensive Care Medicine (4) [Rpt./] I II P, 
successful completion of 3rd. year of medical school.
f. Honors Course - Internal Medicine (1) I 
g. Primary Care Internal Medicine/Pediatrics 
(4) (Identical with PED 811G).
i. Medical Intensive Care Unit/Coronary Care 
Unit (4-6) [Rpt./] I II
m. General Medicine - Acting Internship (4-8) 
[Rpt./] I II
n. Non-Pharmacological Emergency Care (3-6) [Rpt./]
815. Subspecialty
c. Clinical Cardiology (4-8) [Rpt./] I II 
b. Clinical Dermatology (3-4) [Rpt./]
e. Endocrinology (4-12) [Rpt./] I II 
d. Gastroenterology (3-6) [Rpt./] I II 
e. Hematology-Oncology (3-8) [Rpt./] I II 
f. Geriatrics (4-6) [Rpt./] I II 
g. Infectious Diseases (4-12) [Rpt./] I II 
h. Pulmonary Diseases (1-6) [Rpt./] I II 
i. Evidence Based Medicine (3) P, must be 4th 
year medical student.
j. Pulmonary Laboratory and Consultation 
Service (3-6) [Rpt./] I II
k. Nephrology, Renal Diseases (3-6) [Rpt./] I II 
l. Clinical Allergy (4-6) [Rpt./] I II 
m. Medical Subspecialties (4) [Rpt./] I II P, MEDI 
803.
n. Physical Medicine and Rehabilitation (3-6) 
[Rpt./ 12 units] I II CDT P, 3rd and 4th year 
medical students.
o. Care of HIV-Infected Patients (4) [Rpt./] I 
(Identical with F CM 815o, which is home).
p. Critical Care Medicine (1-18) [Rpt./] I II 
(Identical with ANES 815p, which is home).
q. Cardiology Consultation (4) [Rpt./] I II
r. Clinical Neurology (4-6) [Rpt./] I II
s. Rheumatology (4-6) [Rpt./] I II P, MEDI 803.
t. Hospice Care for the Terminally Ill (3) I II 
(Identical with F CM 815f, which is home).
u. Clinical Endocrinology, Metabolism and 
Hypertension (3-6) [Rpt./] I P, completion of 
required 3rd year internal medicine clerkship.
v. Clinical Evaluation and Treatment of Sleep 
Disorders (3-6) [Rpt./] I P, consultation of 3rd 
medical student.
w. Women's Health (4-6)
x. Pulmonary Function Lab (3) [Rpt./] I II
Y. Pulmonary Function Lab (3) [Rpt./] I II 
Open to majors only.
816a. Outpatient-Geriatric (4-6) I II Outpatient 
aspects of geriatric medicine. Patient care in the 
outpatient setting including home visits, geriatric 
clinic, nursing home, and assisted/supportive 
816b. Native American Medicine and Cardiology 
(4) P, 3rd year internal medicine or 4th year 
medical students only.
816c. Outpatient-Private Practice Primary 
Care (4-6)
816d. Gerontology and Geriatric Care (3-4) P, 
medical students only.
891. Preceptorship
a. General Medicine and/or Subspecialties (3- 
12) [Rpt./ 36 units] I II 
b. Ambulatory Internal Medicine: 
Clinical Problems (4-6) [Rpt./] I II 
P, fourth year medical students.
c. Pulmonary Medicine (3-8) [Rpt./] P, MEDI 
803.
d. Cardioiology (3-8) [Rpt./] I II P, 4th year 
medical students.
e. Hematology/Oncology (3-8) [Rpt./]
f. Medical Toxicology/Clinical Pharmacology 
(4) [Rpt./] I II P, completion of required 
clinical clerkships, 4th year medical students.
g. HIV Service (4) I P, 4th year medical students.
h. Internal Medicine (4-8) I II
896. Seminar
a. Pathophysiology and Immunology of the 
Clinical Manifestations of Coccidioidomycosis 
(2) I II
b. Cardiovascular Pathophysiology (2) . 
(Identical with PSIO 896u and SURG 896u). P, 
3rd and 4th year medical students only.
899. Independent Study (1-16) [Rpt./]

Medicine—Interdepartmental (MED)
487. Public Speaking and Teaching Techniques 
for Health-Care Professionals (2) I (Identical 
with F CM 815f, which is home).
499. Independent Study (1-3) [Rpt./] I II
501. Preparation for Clinical Medicine (1) I II 
P, formal admission to the Ph.D./M.D. program, consent of instructor.
505. Social and Behavioral Science (6) I II P, 
formal admission to the Ph.D./M.D. program, consent of instructor.
596. Seminar
a. Medicine and Literature: The Human 
Perspective (2) II
1. Comprehensive Cancer Care (1) [Rpt./] I II
m. Mind: Body and Behavioral Health (2) 
[Rpt./] I II
n. Research Methods for Clinical and 
Epidemiological Studies (2) II
599. Independent Study (1-18) [Rpt./] I II
625. Human Neuroscience (6) Functional and 
morphological organization of the human 
central nervous system. P, consent of instructor. 
(Identical with CBA 625, NEUR 625, PCOL 
625, PSIO 625).
696. Seminar
a. Introduction to Forensic Pathology (1-3) II 
P, PATH 801; consent of instructor.
801. Preparation for Clinical Medicine (1) 
[Rpt./] I II
805. Social and Behavioral Science (6) [Rpt./] I II
811F. Honors Course-Internal Medicine (1) I
815. Subspecialty
a. Issues in Women’s Health (4) I
b. Neurobiology of Sleep (4) I

825. Human Neuroscience (6) I II Functional and morphological organization of the human central nervous system. (Rpt. /) I II P, consent required to enroll, consent of instructor. (Identical with NEUR 825, PSIO 825.)

830. Supplementary Registration (1-9) [Rpt./] I II

896. Seminar
a. Introduction to Forensic Pathology (1-3) II
b. Physical and Biological Basis of Nuclear Medicine (2) I II

c. Medicine and Literature: The Human Perspective (2) I II

d. Epidemiological Investigations of Infectious Diseases (2) II P, 3rd year medical school.

e. Epidemiological Investigations of Chronic Diseases (2) II P, 3rd year medical school.

f. Gene Therapy for Vascular Disease (2) II P, 3rd and 4th year medical students. (Identical with SURG 896h).

9. Medical Jurisprudence (2) I II


11. Mind: Body and Behavioral Health (2) [Rpt./] I II

12. Space Biology (1-2) II

13. Salt, Water and Kidney Diseases (2) I II

899. Independent Study (2-6) [Rpt./] I II

Neurology (NEUR)

515F. Neuroromuscular Disorders (3) I II P, NEUR 803.

590. Independent Study (1-6) I II

665. Human Neuroscience (6) (Identical with MED 625, which is home).

685. Colloquium
a. Motor Control (2) [Rpt./] I II (Identical with FSI 695A, which is home).

800. Research (1-12) [Rpt./ 36 units] I II

803. Clinical Clerkship (3-6) [Rpt./] I II

810. Clerkship
a. Neurology Consult Service (4) [Rpt./] I II
b. Neurology (3-6) [Rpt./] I II P, NEUR 803.

c. Neurology (3-6) [Rpt./] I II P, NEUR 803.

d. Neurology Consult Service (4) [Rpt./] I II P, NEUR 803.

e. Neurology (3-6) [Rpt./] I II P, NEUR 803.

e. Clinical Practice (3-6) [Rpt./] I II P, NEUR 803.

815. Subspecialty
a. Clinical Involuntary Movement (4-6) [Rpt./] I II P, OB G 803.

816. Behavioral Neurology/Higher Cortical Functions (4) [Rpt./] I II P, NEUR 803.


825. Human Neuroscience (6) I II (Identical with MED 825, which is home).

891. Preceptorship
a. Neurology (1-18) [Rpt./ 54 units] I II
b. Neurology Practice (3) [Rpt./] I II P, NEUR 803.

899. Independent Study (3-6) [Rpt./] I II

Ophthalmology (OPH)

800. Research (6-18) [Rpt./] I II

815. Subspecialty
a. Ophthalmology (3-6) [Rpt./] I II

891. Preceptorship
a. Ophthalmology (1-18) [Rpt./] I II
b. Ophthalmology (3-6) [Rpt./] I II P, admission to the M.D./Ph.D. program and consent of instructor.
g. Pediatric Hematology/Oncology (4-6) [Rpt./I II
h. Pediatric Orthopaedics (3-6) I II P, completion of basic sciences.
i. Developmental and Behavioral Pediatrics (4-6) [Rpt./I II P, pediatric clerkship.
j. Pediatric Pulmonary (4-6) [Rpt./I II P, PED 803.
l. Clinical Allergy (4-6) [Rpt./I II (Identical with MED1 815L, which is home).
m. Pediatric Rotations (4) I II
n. Ambulatory Pediatrics/Newborn Nursery (4-8) [Rpt./I II P, PED 803.
o. Pediatric Gastroenterology (4-8) S P, PED 803 or equivalent.
p. Pediatric Endocrinology (4-6) [Rpt./I II P, PED 803.
q. Pediatric Nephrology (4) I II
s. Clinical Genetics/Dysmorphology (4) [Rpt./I II P, completion of clerkship.
t. Pediatric Rural Ambulatory Elective (4) [Rpt./I II P, PED 803.
u. Pediatric Critical Care (3-6) [Rpt./I II P, 4th year medical student only.
w. Toxicology in Poison Control (4) P, 4th year medical student.
x. Ambulatory Pediatrics/Newborn Nursery (4-6) [Rpt./I II P, pediatric clerkship.
y. Radiology (1 -18) [Rpt./36 units I II P, PED 803.
z. Molecular Cardiovascular Biology (3) [Rpt./I II P, completion of 3rd year psychiatry clerkship.

**Psychiatry (PSYI)**

800. Research (1-12) [Rpt./I II (See College of Medicine Electives Manual).

803. Clinical Clerkship (6-9) [Rpt./12 units I II

810. Clinical Clerkships

a. Clinical and Community Psych (4-6) [Rpt./I II P
b. Child Psychiatry (6) [Rpt./I II
c. Psychiatry (4-6) [Rpt./I II P, PSYI 803; consult department before enrolling.

815. Subspecialty

a. Consultation Psychiatry (4-6) [Rpt./I S P, PSYI 803.
b. Outpatient Psychiatry (4-6) [Rpt./I S P, PSYI 803.
c. Positron Emission Tomography (4-6) S P, completion of 3rd year psychiatry clerkship.

891. Preceptorship

a. Psychiatry (6) [Rpt./2] I II

899. Independent Study (1-18) [Rpt./I II

**Radiation Oncology (RONC)**

515. Subspecialty

i. Cancer Prevention and Control (3-15) II (Identical with EPI 515i, which is home).

551. Molecular Mechanisms of Carcinogenesis (3) I (Identical with CBIO 551, which is home).

555. Cancer Therapeutics (3) II (Identical with CBIO 555, which is home).

596. Seminar

h. Cancer Biology Series (1) [Rpt./2] I II (Identical with CBIO 596h, which is home).

615. Subspecialty

a. Cancer Epidemiology and Prevention (3) I (Identical with EPI 615a, which is home).

b. Cancer Control (3) (Identical with EPI 615b, which is home).

c. Cancer Prevention and Control (3-15) II (Identical with EPI 615b, which is home).

699. Independent Study (1-3) [Rpt./I II

815. Subspecialty

a. Introduction to Radiation Oncology (1-16) [Rpt./I II

b. Cancer Epidemiology and Prevention (3) I (Identical with EPI 615a, which is home).

h. Cancer Prevention and Control (3-15) II (Identical with EPI 615b, which is home).

816. Subspecialty

a. General Surgery (3-8) [Rpt./I II P, 4th year medical student or completion of SURG 803.

811. Subinternship

b. BNI Neurological Surgery (4-6) [Rpt./I II P, 4th year medical students.

815. Subspecialty

a. Urology (4-6) [Rpt./I II P, completion of SURG 803.

819. Subspecialty

a. Plastic Surgery (3-6) [Rpt./I II P, completion of 3rd year clerkship. Credit allowed for only one of these courses: SURG 819, ANES 815P.

820. Research (1-12) [Rpt./I II

810. Clinical Clerkships

a. Clinical and Community Psych (4-6) [Rpt./I II P
b. Child Psychiatry (6) [Rpt./I II
c. Psychiatry (4-6) [Rpt./I II P, PSYI 803; consult department before enrolling.

815. Subspecialty

a. Consultation Psychiatry (4-6) [Rpt./I S P, PSYI 803.
b. Outpatient Psychiatry (4-6) [Rpt./I S P, PSYI 803.
c. Positron Emission Tomography (4-6) S P, completion of 3rd year psychiatry clerkship.

899. Independent Study (1-18) [Rpt./I II

**Surgery (SURG)**

596. Seminar

i. Molecular Cardiovascular Biology (3) [Rpt./2] I (Identical with CBA 596I, CBIO 596I, MCB 596I, PSIO 596I).
undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

**Mechanical Engineering**

For information about mechanical engineering see the entry for the Department of Aerospace and Mechanical Engineering in this manual.

**Mexican American Studies (MAS)**

180. Research Topics in Mexican American Studies (3) II Introduction to Mexican American studies from multidisciplinary perspectives.

199. Independent Study (1-3) [Rpt./]

237. Survey of Mexican Folk Music (3) (Identical with MUS 237, which is home).

280. Social Perspectives (3) I I I II Introduction to Mexican American studies from various perspectives. Research issues and interpretation in the field; public policy and Mexican origin populations; and social sciences and the professions and impact upon the Mexican American community.

293. Internship (1-12) [Rpt./] I II P, MAS 180, consent of instructor.

309. The U.S.-Mexican Borderlands in Comparative Perspective (3) I I (Identical with POL 429, which is home). May be convened with MAS 529.

309H. Honors Proseminar (3) I

403. Mexican and Mexican-American Literature (3) II (Identical with SPAN 403, which is home).

425. Topics in Latino Health (3) [Rpt./] I A public health perspective in examining health and mental health issues affecting Latinos residing in the U.S., with particular emphasis on Mexican-American. (Identical with PHIL 425). May be convened with MAS 525.

429. The U.S.-Mexican Borderlands in Comparative Perspective (3) II (Identical with POL 429, which is home). May be convened with MAS 529.

433. Mexican and Mexican-American Civilization through Literature (3) I (Identical with SPAN 433, which is home).

441. Children’s Literature in Spanish (3) I (Identical with SPAN 441, which is home).

444. Mexican and Mexican-American Prose Fiction (3) I I (Identical with SPAN 444, which is home).

446. Mexican and Mexican-American Theater (3) I I (Identical with SPAN 446, which is home).

447. Contemporary Mexican Literature (3) II S (Identical with SPAN 447, which is home).

452. Introduction to Hispanic Linguistics (3) I I (Identical with SPAN 452, which is home).

453A-453B. Mesoamerican Archaeology (3-3) I (Identical with ANTH 453A-453B, which is home).

467. Race and Ethnic Relations (3) I I (Identical with SOC 467, which is home).

473. Spanish for the Classroom Teacher of Spanish (3) I I (Identical with SPAN 473, which is home).

480. Advanced Research Methods (4) II Designed to provide students with an exposure to qualitative and quantitative decision-making methods, focusing on the Mexican American population. 3R, 3L. P, MAS 180, MAS 280. May be convened with MAS 580.

485. Mexican/Chicana Women's History (3) I CDT Historical survey and sociological analysis of past and present experiences of Mexicanas and Chicanas in the United States. Writing-Emphasis Course. (Identical with W S 485). May be convened with MAS 585.

493. Internship (3-12) [Rpt./]

496. Seminar

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**Completion of required clerkships.**

**Clinics in Medical Ignorance (3-4) [Rpt./] II**

**Pediatric Urology (4) [Rpt./] I II**

**Clinical Toxicology (4-6) [Rpt./] S P, 4th year medical students.**

**Advanced Surgical Study (3-6) [Rpt./] II P, general surgery.**

**Subspeciality**

a. Pediatric Surgery (4) [Rpt./] I II (Identical with PED 816A).

b. Hand Surgery (4) II

c. Rural Pediatric Orthopedics (3-4) (Identical with PED 816C).

d. Neuro-Oncology (4) (Identical with RONC 816B, which is home). P, medical students only.

**Preceptorship**

a. Surgery and Subspecialties (1-18) [Rpt./ 54 units] I II

b. General Surgery “A” (4-12) [Rpt./] I II

c. General Surgery “B” (4-12) [Rpt./] I II

d. General Surgery “C” (4-12) [Rpt./] II

e. Spine and Orthopedic Reconstruction (4-12) I II

f. Vascular Surgery (4-8) [Rpt./] I II P, SURG 803 or 4th year medical students.

**Perfusion Science (1-3) [Rpt./] I II (Identical with PHIL 891L, which is home).**

**Seminar**

a. Medical Ignorance (2) [Rpt./ I II]

b. Gene Therapy for Vascular Disease (2) II (Identical with MED 896H, which is home).

**Independent Study (1-3) [Rpt./] I II**
a. Advanced Topics in Chicano Studies (3) I
P, at least 15 units of core MAS courses. May be convened with MAS 425.

498H. Honors Thesis (3) [Rpt./ 2] I II

499. Independent Study (1-3) [Rpt./]

508. The Mexican American: Cultural Perspective (3) I A critical examination of Mexican American culture as it is portrayed in the social sciences. An assessment of the social, political, and economic factors influencing representations of Mexican Americans. (Identical with ANTH 508, LRC 508 and LAS 508).

525. Topics in Latino Health (3) I For a description of course topics see MAS 425. (Identical with PHL 525). May be convened with MAS 425.

529. The U.S.-Mexican Borderlands in Comparative Perspective (3) II (Identical with POL 529, which is home). May be convened with MAS 429.

550. Development of Mexican and Mexican-American Literature (3) I (Identical with SPAN 550, which is home).

570. Molecular Genetics and Evolution (3) I Molecular genetics and biology of the bacterial genome. P, MIC 205 or equivalent.

571. Immunobiology (3) II Cells and cellular mechanisms involved in host responses to tumors, with emphasis on the delineation of cellular interactions between immune cells and tumors that may result in tumor progression or rejection. (Identical with CBIO 571).

572. Medical Microbiology & Immunology (MBIM)

475. Parasite Immunology (3) II (Identical with V SC 475, which is home). May be convened with MBIM 575.

501A-501B. Medical Microbiology (3-3) I II The biological characteristics of microorganisms of importance in human health and disease; the reaction of the host to infectious agents and the mechanisms of host defense; diagnosis and management of infectious disease. Lectures, discussions, and laboratory experiments. This is a two-semester course with both semesters 501A - 501B required to be taken consecutively in order to receive a final grade. P, BIOC 462A - 462B or equivalent.

503L. Parasite Laboratory (1) I (Identical with V SC 503L, which is home).

503R. Biology of Animal Parasites (3) I (Identical with V SC 503R, which is home).

511. Topics in Molecular Biology (1) II (Identical with MCB 511, which is home).

512. Biological Electron Microscopy (4) I II (Identical with MCB 512, which is home).

517. Microbial Physiology and Gene Cloning (3) II Biochemical and physiological activities of microorganisms.

519. General Immunological Concepts (4) I (Identical with V SC 519, which is home).

520. Pathogenic Bacteriology (3) II (Identical with V SC 520, which is home).

523. Mechanisms of Disease (4) II (Identical with V SC 523, which is home).

525. Environmental Microbiology (3) I (Identical with SWES 525, which is home).

526. Environmental Microbiology Laboratory (2) I General microbiology laboratory, with emphasis on the microfungi. P or CR, MBIM 527R.

527L. General Mycology Lab (2) I General mycology laboratory, with emphasis on the microfungi. P, MIC 205.

528R. General Mycology (3) I General mycology, with emphasis on the microfungi. P, MIC 205.

530. Introduction to Biophysics (2) I (Identical with PHYS 530, which is home).

531. Biophysical Theory (2) II (Identical with PHYS 531, which is home).

532. Pathogenic Virology (3) [Rpt./ 1] I (Identical with V SC 532, which is home).

538. Ecology of Infectious Disease (3) II (Identical with V SC 538, which is home).

540. Biodegradation of Pollutants in Soil and Groundwater (3) II (Identical with SWES 540, which is home).

543. Research Animal Methods (3) I (Identical with V SC 543, which is home).

546. Environmental Biotechnology (2) II (Identical with SWES 546, which is home).

550L. Medical Mycology Laboratory (2) II Laboratory experiments dealing with isolation and identification of fungi of medical importance. 6L. P or CR, MBIM 550R. (Identical with V SC 550L).


551. Molecular Mechanisms of Carcinogenesis (3) I (Identical with CBIO 551, which is home).

552. Molecular Mechanisms of Microbial Pathogenesis (3) I Review of current concepts in specific areas of microbial pathogenesis, including action of exo- and endotoxins, cell surface interactions, phagocytosis and host microbial functions. P, BIOC 460.

554. Host-Microbial Interactions (3) II (Identical with V SC 554, which is home).

555. Cancer Therapeutics (3) II (Identical with CBIO 555, which is home).

560. Development of the Immune System (4) I II Developmental biology of T cells and B cells. Negative selection (tolerance induction) during the differentiation of T cells and B cells as mediated by T cell receptors and immunoglobulin receptors, respectively. Development of major histocompatibility complex antigen restriction (positive selection) during differentiation of T cells in the thymus. Regulation of positive and negative selection in health and disease (autoimmunity).

561. Immunobiology (3) II Cells and cellular events involved in humoral and cell-mediated immune responses: morphologic, physiologic and biochemical characterization of the lymphoreticular system. P, BIOC 462A.

562. Tumor Immunology (3) I The immunological mechanisms involved in host responses to tumors, with emphasis on the delineation of cellular interactions between immune cells and tumor cells that may result in tumor progression or rejection. (Identical with CBIO 562).

570. Molecular Genetics and Evolution (3) I Molecular genetics and biology of the bacterial viruses; molecular mechanisms of gene regulation, DNA replication, DNA repair,


**MILITARY AEROSPACE STUDIES (ML A)**

South Hall, Rm. 104  
The University of Arizona  
PO Box 210032  
Tucson, AZ 85721-0032  
Phone: (520) 621-3521  
FAX: (520) 621-5678

Military aerospace studies (Air Force) are open to male and female students seeking a commission. ROTC courses can be counted as elective credit toward graduation in most academic majors. Lower-division courses carry no service commitment. Veterans may receive credit for the first two years of the four-year ROTC program. Textbooks and uniforms are provided by the departments. Two- to four-year scholarships that pay tuition, books, fees, and a monthly stipend are also available. For further information about the four-year ROTC programs, the special two-year ROTC programs, entry requirements for upper-division courses, and ROTC scholarships, contact the department.

**Baccalaureate Degree**

The department does not offer a baccalaureate degree.

**Graduate Degrees**

The department does not offer a graduate degree. To learn more about departmental programs consult the on-line catalog or contact the department at one of the addresses above.

**Military Science (ML S)**

South Hall, Rm. 101  
The University of Arizona  
PO Box 210032  
Tucson, AZ 85721-0032  
Phone: (520) 621-3521  
FAX: (520) 621-1078  
E-mail: armyrotc@ccit.arizona.edu  
URL: http://www.arizona.edu/rotc

Military science (Army) courses are open to male and female students seeking a commission. ROTC courses can be counted as elective credit toward graduation in most academic majors. Lower-division courses carry no service commitment. Veterans may receive credit for the first two years of the four-year ROTC program. Textbooks and uniforms are provided by the departments. Two- to four-year scholarships that pay tuition, books, fees, and a monthly stipend are also available. For further information about the four-year ROTC programs, the special two-year ROTC programs, entry requirements for upper-division courses, and ROTC scholarships, contact the department.

**Baccalaureate Degree**

The department does not offer a baccalaureate degree.

**Graduate Degrees**

The department does not offer a graduate degree. To learn more about departmental programs consult the on-line catalog or contact the department at one of the addresses above.

**Military Science (ML S)**

105A. Situational Leadership I (1) I Field training exercise at Fort Huachuca, Arizona, with developmental opportunities for leadership and small unit operations. Includes rappelling, grenade assault course, rifle
marksmanship training, and orienteering. P, consent of instructor.

105B. Situational Leadership I (1) I II Field training exercise at Fort Huachuca, Arizona. Provides training opportunities for students in leadership for maintenance of on-site accountability and small unit operations. Activities include rappelling, grenade assault course, rifle marksmanship training and orienteering. P, consent of instructor.

105B. Situational Leadership II (1) I II Field training exercise at Fort Huachuca, Arizona. Provides training opportunities for students in leadership for maintenance of on-site accountability and small unit operations. Activities include rappelling, grenade assault course, rifle marksmanship training and orienteering. P, consent of instructor.

205A. Situational Leadership I (1) I Field training exercise at Fort Huachuca, Arizona. Provides training opportunities for students in leadership for maintenance of on-site accountability and small unit operations. Activities include rappelling, grenade assault course, rifle marksmanship training and orienteering. P, consent of instructor.

205B. Situational Leadership II (1) I II Field training exercise at Fort Huachuca, Arizona. Provides training opportunities for students in leadership for maintenance of on-site accountability and small unit operations. Activities include rappelling, grenade assault course, rifle marksmanship training and orienteering. P, consent of instructor.

210. Tactcs (2) [Rpt./ 4] I II Military tactics applied to patrolling operations; working in groups ranging in size from seven to 50 students in order to learn proper procedures for conducting military operations in a field environment.

211. Ranger Challenge (1) [Rpt./ 4] I II Increase self-confidence, mental discipline and physical fitness through hands-on instruction. The capstone event is a regional competition to be held in the Fall. Field trip.

220. Drill and Color Guard I (1) I Combined Army ROTC color guard and drill team represents The University of Arizona and the ROTC at social functions, parades and ceremonies. Color guard trains and is responsible for the presentation of the national colors, state and Army flags. Participation may include work with multi-service events.

221. Drill and Color Guard II (1) I II Continuation of Army ROTC color guard and drill team activities that represent The University of Arizona and the ROTC at social functions, parades and ceremonies. Color guard trains and is responsible for the presentation of the national colors, state and Army flags. Participation may include work with multi-service events.

230. Rifle Marksmanship I (1) I Army ROTC rifle marksmanship program. Students fire 22 caliber target rifle and develop marksmanship proficiency and firearms safety awareness. Members compete in NRA and NCAA sanctioned matches and work toward Army marksmanship awards. Open to all registered students. P, open to all registered students.

231. Rifle Marksmanship II (1) I II Army ROTC rifle marksmanship program. Students fire 22 caliber target rifle and develop marksmanship proficiency and firearms safety awareness. Members compete in NRA and NCAA sanctioned matches and work toward Army marksmanship awards. Open to all registered students.

297. Workshop a. Army Leadership Dynamics I (2) I P, ML S 197B or consent of department, ML S 197A. b. Army Leadership Dynamics II (2) I P, ML S 197B or consent of department, ML S 197A.

300. Small Unit Leadership I (3) I II Topographical map interpretation; fundamentals of small-unit operations; drill and ceremony, leadership and behavior in the military environment; military planning and execution; practicum. P, consult department before enrolling.

301. Small Unit Leadership II (3) I II Topographical map interpretation; fundamentals of small-unit operations; drill and ceremony, leadership and behavior in the military environment; military planning and execution; practicum. P, consult department before enrolling.

305A. Situational Leadership III (I) I Field training exercise at Fort Huachuca, Arizona. Provides training opportunities for more advanced leadership. Activities include rappelling, grenade assault course, rifle marksmanship training and orienteering. P, consent of instructor.

305B. Situational Leadership III (I) I Field training exercise at Fort Huachuca, Arizona. Provides training opportunities for more advanced leadership. Activities include rappelling, grenade assault course, rifle marksmanship training and orienteering. P, consent of instructor.

310. Army ROTC Advanced Camp (4) I II Six-week summer training camp at Ft. Lewis, Washington, required for commissioning as an officer in U.S. Army. Open only to Advanced Course Army ROTC cadets.

400. Officership I (3) I II Development of skills required to function as a manager; motivation and behavior in a military environment; highlights personal integrity, honor and professional ethics; military legal system; unit management; practicum. P, consult department before enrolling.

401. Officership II (3) I II Development of skills required to function as a manager; motivation and behavior in a military environment; highlights personal integrity, honor and professional ethics; military legal system; unit management; practicum. P, consult department before enrolling.

405A. Situational Leadership IV (1) I Field training exercise at Fort Huachuca, Arizona. Advanced training in conjunction with department cadre to plan and execute all aspects of ML S 105a-b, 205a-b, 305a-b. Includes information briefing and equipment issue as well as night navigation and rifle exercises. P, consent of instructor.

440B. Situational Leadership IV (1) I II Field training exercise at Fort Huachuca, Arizona. Provides training opportunities for students in leadership for maintenance of on-site accountability and small unit operations. Activities include rappelling, grenade assault course, rifle marksmanship training and orienteering. P, consent of instructor.

496. Seminar a. Advanced Officership (3) [Rpt./ 2] I II P, consult department before enrolling.

499. Independent Study (1-3) [Rpt./ I]

MINING AND GEOLOGICAL ENGINEERING (G EN/MN E)

Baccalaureate Degrees
Bachelor of Science in Geologic Engineering (B.S.Ge.E.)
Bachelor of Science in Mining Engineering (B.S.Mn.E.)
Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Geological Engineering (B.S.Ge.E.)
Geological and Geophysical Engineering (M.S., Ph.D.)

Mining Engineering (B.S.Mn.E., M.S., Ph.D.)

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Report (APR). APRs are available online at: http://www.arizona.edu/academic/oncourse/data/essence. Online requirements are available at: http://www.arizona.edu/academic/oncourse/data/oessence/minors/

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Mining Engineering (MN E)

120. Introduction to Earth Engineering (3)

Course provides an overview of studies and careers in mining and geological engineering. The course is an introduction to uses of mineral
and modern methods of extracting and processing minerals. It also focuses on engineering applications in geologic hazard assessment, site investigations and ground water studies. 3R. Field trips. (Identical with G EN 120).

219. Mineralogy and Petrology for Engineers (3) II (Identical with G EN 219, which is home).

220. Mining Methods (3) II Introduction to the techniques, unit operations, and systems involved in underground and surface mining of minerals and coal.

220. Mining Methods (3) II Techniques, unit operations, and systems involved in underground and surface mining of minerals and coal.

229. Independent Study (1-3) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./] I


399. Independent Study (1-5) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II

401. Analysis of Mine Operations (3) I Use of operations research principles and techniques to analyze and optimize various problems in mine operations. May be convened with MN E 501.

402. Probability and Statistical Concepts in Geologic Media (3) I (Identical with G EN 402, which is home). May be convened with MN E 502.


410. Mine Surveying (1) I Mine surveying problems and practices; closed traverse of underground mine; shaft plumbing, stope and raise surveying. P, MN E 120, C E 251.

411. Mineral Processing (3) I Physical and chemical unit operations used to separate and recover the economic minerals and metals from their ores. The modern scientific and engineering background for the operations are presented as well as economic aspects. Includes field trips to major mining operations in Tucson area. Field trips. (Identical with MSE 411). May be convened with MN E 511.


426. Health and Safety in Mining (1) I Fundamental concepts in the recognition, evaluation and control of health and safety hazards encountered in mining operations; includes a review of engineering management responsibilities to control accidents, a review of federal regulations and standards affecting the industrial workplace, and instruction regarding the interaction of industrial hygiene, safety, fire protection and workers' compensation to control losses resulting from industrial accidents. (Identical with G EN 426). May be convened with MN E 526.

427. Geomechanics (3-4) I Mechanical behavior of rock and rock masses; response to load changes: deformations, failure, discontinuity slip; in situ stress state; rock testing; geomechanical classifications; engineering applications: slopes, pillars, tunnels, dam foundations; reinforcement design. P, C E 217, GEOS 301. (Identical with G EN 427). May be convened with MN E 527.

430. Mine Examination and Valuation (3) I Principles and procedures in mineral property valuation, geostatistical ore reserve estimation, engineering, economics, investment analysis; use of a microcomputer. 1ES, 2ED. P, MN E 402, MN E 220. May be convened with MN E 530.

433. Elements of Coal Mining (3) I Coal geology, properties and use. Surface and underground methods and equipment: strip mining; continuous, conventional, longwall mining; ground control; ventilation; haulage; electrical power; drainage. Preparation and reclamation. P, MN E 220, MN E 406, ECE 207. May be convened with MN E 533.


436. Subsurface Environmental Engineering (3) I Analysis of sources of heat, humidity, gases and dust in mines and other subsurface facilities. Design of engineering systems to control these pollutants. P, MN E 406, consult department before enrolling. May be convened with MN E 536.


449. Mineral Exploration (3) I (Identical with G EN 449, which is home). May be convened with MN E 549.


490. Remote Sensing for the Study of Planet Earth (3) II (Identical with REM 490, which is home). May be convened with MN E 590.

494. Practicum (1-6) [Rpt./] I II

494H. Honors Practicum

a. Unit Operations (1-3) P, MN E 220. May be convened with MN E 594A.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./] I II

499. Independent Study (1-3) [Rpt./]

499H. Honors Independent Study (3) [Rpt./] I II

501. Analysis of Mine Operations (3) I For a description of course topics see MN E 401. Graduate-level requirements include a project using MIS software. May be convened with MN E 401.

502. Probability and Statistical Concepts in Geologic Media (3) I (Identical with G EN 502, which is home). May be convened with MN E 402.

503. Analysis of Mining Decisions (3) I Use of geostatistics, system simulation languages and computers to analyze varying mining decisions related to reserve estimation and mine planning. P, MN E 401, MN E 402, MN E 430.

506. Fundamentals of Mine Ventilation (3) II For a description of course topics see MN E 406. Graduate-level requirements include a simulation project on design of an airflow system for an underground mine. May be convened with MN E 406.

511. Mineral Processing (3) I For a description of course topics see MN E 411. Graduate-level requirements include an advanced research project. (Identical with MSE 511). May be convened with MN E 411.

515. Rock Excavation (3) II For a description of course topics see MN E 415. Graduate-level requirements include a research project. Field trips. (Identical with G EN 515). May be convened with MN E 415.

526. Health and Safety in Mining (1) I For a description of course topics see MN E 426. Graduate-level requirements include a term paper. (Identical with G EN 526). May be convened with MN E 426.

527. Geomechanics (3-4) I For a description of course topics see MN E 427. Graduate-level requirements include either a research project or a research paper at the discretion of the instructor. (Identical with G EN 527). May be convened with MN E 427.

529. Rock Slope Analyses and Design (3) I Geologic and engineering considerations in design of optimum rock slope angles; constitutive models for intact rock and joints; theorectical stability analysis, monitoring and control of existing slopes. Field trips. (Identical with G EN 529).
536. Mine Examination and Valuation (3) I For a description of course topics see MN E 430. Graduate-level requirements include either a research project or a research paper at the discretion of the instructor. May be convened with MN E 430.

533. Elements of Coal Mining (3) I For a description of course topics see MN E 433. Graduate-level requirements include a research project. May be convened with MN E 433.

535. Mine Design (3) II For a description of course topics see MN E 435. Graduate-level requirements include either a research project or a research paper at the discretion of the instructor. May be convened with MN E 435.

536. Subsurface Environmental Engineering (3) I For a description of course topics see MN E 436. Graduate-level requirements include a simulation project on the problem of heat and humidity in a subsurface facility. May be convened with MN E 436.

537. Developments in Rock Mechanics (2) I Discussion of new developments in rock mechanics and of areas of interest for future research. P, MN E 427 or MN E 527. Field trips. (Identical with G EN 537).

540. Materials Handling (3) I For a description of course topics see MN E 440. Graduate-level requirements include a research project. May be convened with MN E 440.

545. Fundamentals of Geostatistics (3) II For a description of course topics see MN E 445. Graduate-level requirements include an additional class project. (Identical with G EN 545). May be convened with MN E 445.

547. Undergraduate Construction Geomechanics (2-3) II For a description of course topics see MN E 447. Graduate-level requirements include an independent design/analysis project. May be convened with MN E 447.

549. Mineral Exploration (3) I (Identical with G EN 549, which is home). May be convened with MN E 449.

557. Applied Geomechanics (3) II For a description of course topics see G EN 557. Graduate-level requirements include more in-depth homework problems and completion of a technical project and presentation. (Identical with G EN 557). May be convened with MN E 457.

560. The Mechanics of Fracture in Rock and Other Brittle Materials (3) Fracture mechanics theory applied to the deformation and failure of rock; numerical techniques; micromechanical damage models; flow through fractures; the mechanics of faulting and earthquake rupture. (Identical with G EN 580).

590. Remote Sensing for the Study of Planet Earth (3) II (Identical with REM 590, which is home). May be convened with MN E 490.

594. Practicum

599. Independent Study (1-3) [Rpt./]

696. Seminar

210. Introduction to Earth Engineering (3) I (Identical with MN E 120, which is home).

199. Independent Study (1-6) [Rpt./]

745. Seismic Geotectonics (3) I For a description of course topics see G EN 415. May be convened with REM 415, which is home). May be convened with G EN 515.

416. Field Studies in Geophysics (3) II Seismic, magnetic, electrical, and gravity exploration techniques. Field trips. 3ED. P, G EN 448 or G EN 548. May be convened with G EN 516.


425. Geotechnical Investigations (3) II Senior design course emphasizing the investigation and analysis of geologic factors in the design and construction of engineering projects. 1R, 6L. 3ED. May be convened with G EN 525.

426. Health and Safety in Mining (1) I (Identical with MN E 426, which is home). May be convened with G EN 526.

427. Geomechanics (3-4) I (Identical with MN E 427, which is home). May be convened with G EN 527.

445. Fundamentals of Geostatistics (3) [Rpt./] II (Identical with MN E 445, which is home). May be convened with G EN 545.

448. Geophysical Exploration and Engineering (3) I Principles of gravity, magnetic, seismic and electrical exploration; acquisition and interpretation of data to define geologic structure and evaluate resources. 3R. 2ES, 1ED. P, PHYS 141, PHYS 242, MATH 223. (Identical with GEOS 448). May be convened with G EN 548.


457. Applied Geomechanics (3) II (Identical with MN E 457, which is home).

470. Computer Methods in Geological Engineering (3) I Use of computers to solve problems in geological engineering, including data bases, computer contouring, map filtering and enhancement, and multivariate analysis of geologic data. 3EP, introductory courses in computer programming, math, and earth science. May be convened with G EN 570.

490. Remote Sensing for the Study of Planet Earth (3) I (Identical with REM 490, which is home). May be convened with G EN 590.

498. Senior Capstone (1-3) I I

498H. Honors Thesis (3) [Rpt./]

499. Independent Study (1-4) [Rpt./]

499H. Honors Independent Study (1-3) [Rpt./]


507. Photogeology (3) II Use of aerial photographs in geologic mapping. 1R. 6L. 1.5ES, 1.5ED. P, GEOS 321. (Identical with GEOS 407). May be convened with G EN 507.

515. Rock Excavation (3) II (Identical with MN E 415, which is home). May be convened with G EN 515.


590. Remote Sensing for the Study of Planet Earth (3) I (Identical with REM 590, which is home). May be convened with MN E 490.

594. Practicum

599. Independent Study (1-3) [Rpt./]

699. Independent Study (1-5) [Rpt./]

900. Research (1-4)

909. Master's Report (3) [Rpt./]

910. Thesis (2-6) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]
interpretation and field mapping. (Identical with GEOS 507). May be convened with G EN 407.

515. Rock Excavation (3) II (Identical with MN E 515, which is home). May be convened with G EN 415.

516. Field Studies in Geophysics (3) II For a description of course topics see G EN 416. For a description of course topics see 416. Include additional project work requiring a more in-depth analysis. (Identical with GEOS 516). May be convened with G EN 416.

522. Well Logging Interpretation (3) II Basic well logging theory. Fundamentals of quantitative formation evaluation. Detailed investigation of aspects of well logging applicable to student's research interests. P, consult department before enrolling. (Identical with GEOS 522, HWR 522).

524. Fundamentals of Geotechnics (3) II For a description of course topics see G EN 424. Graduate-level requirements include an in-depth research paper on an assigned topic. May be convened with G EN 424.

525. Geotechnical Investigations (3) II For a description of course topics see G EN 425. Graduate-level requirements include a research project. May be convened with G EN 425.

526. Health and Safety in Mining (1) I (Identical with MN E 526, which is home). May be convened with G EN 426.

527. Geomechanics (3-4) I (Identical with MN E 527, which is home). May be convened with G EN 427.

529. Rock Slope Analyses and Design (3) I (Identical with MN E 529, which is home).

537. Developments in Rock Mechanics (2) I (Identical with MN E 537, which is home).

545. Fundamentals of Geostatistics (3) II (Identical with MN E 545, which is home). May be convened with G EN 445.

548. Geophysical Exploration and Engineering (3) I For a description of course topics see G EN 448. Graduate-level requirements include a special research project collecting and interpreting geophysical field data. (Identical with GEOS 548). May be convened with G EN 448.

549. Mineral Exploration (3) I For a description of course topics see G EN 449. Includes a research report. (Identical with GEOS 549, MN E 549). May be convened with G EN 449.

550. Earthquake Engineering (3) I Applied course in earthquake causes and effects, integrating the fields of seismology, engineering, and seismology. P, MATH 254.

551. Probabilistic Methods in Geotechnical Engineering (3) II (Identical with C E 551, which is home).

557. Applied Geomechanics (3) II (Identical with MN E 557, which is home). May be convened with G EN 457.


570. Computer Methods in Geological Engineering (3) I For a description of course topics see G EN 470. Graduate-level requirements include an additional advanced research project. May be convened with G EN 470.

580. The Mechanics of Fracture in Rock and Other Brittle Materials (3) II (Identical with MN E 580, which is home).

587. Applied Neural Network Computing (3) II Theoretical development and applications of artificial neural networks for classification, parameter estimation, prediction, filtering, and association. Emphasis is placed on applications in science and engineering. P, knowledge of a computer programming language.

696. Seminar
   a. Research (1-3) [Rpt./ 6 units] I II (Identical with MN E 696A).
   b. Independent Study (1-5) [Rpt.]/ [Rpt./]

900. Research (1-4) [Rpt.]

910. Thesis (1-6) [Rpt.]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

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**MOLECULAR AND CELLULAR BIOLOGY (MCB)**

Life Sciences South, Rm. 248
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PO Box 210106
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FAX: (520) 621-3709
E-mail: roxie_cats@tikal.biosci.arizona.edu
URL: http://worm.biosci.arizona.edu/MCB/MCB.html

**Baccalaureate Degree**

Bachelor of Science (B.S.)

**Graduate Degrees**

Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

**Major and Degrees**

Molecular and Cellular Biology (B.S., M.S., Ph.D.)

**Program requirements**

For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/ oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/ academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

**Molecular and Cellular Biology (MCB)**

120. Human Physiology: The Facts of Life (4) I II (Identical with PSIO 120, which is home).

181L. Introductory Biology Laboratory I (1) I Laboratory exercises presenting techniques and fundamental principles of modern biology. Designed to complement the information concurrently presented in 181R. P or CR, MCB 181R. (Identical with BIOI 181L, ECOL 181L, MIC 181L).

181R. Introductory Biology I (3) I S Introduction to the cell and its properties, basic genetics, the immune system, recombinant DNA technology with illustrations from bacteria, plants, animals and humans. Honors section available for 4 units. P, at least MATH 117 (level III) placement on the Math Readiness Test; CR, MCB 181L. (Identical with BIOI 181R, ECOL 181R, MIC 181R).

182. Introductory Biology II (4) II (Identical with ECOL 182, which is home).

195. Colloquium
   a. Great Experiments in Microbiology (1) I II (Identical with MIC 195A, which is home).
   b. Biotechnology (1) I II (Identical with BIOC 195B, which is home).
   c. Society and Science (1) I II (Identical with BIOC 195C, which is home).
   d. Molecular and Cellular Biology of Cancer (1) I

399H. Honors Independent Study (1-3) [Rpt.]

299H. Honors Independent Study (1-4) [Rpt.]

399L. Independent Study (1-3) [Rpt.]

320. Genetics (4) I (Identical with ECOL 320, which is home).

320H. Genetics (5) I (Identical with ECOL 320H, which is home).

321. Genetics Lab (2) I (Identical with ECOL 321, which is home).

360. Principles of Plant Physiology (3) I (Identical with PL S 360, which is home).

361. Principles of Plant Physiology Laboratory (1) I II (Identical with PL S 361, which is home).

399. Independent Study (1-5) [Rpt.]

399H. Honors Independent Study (1-3) [Rpt.]

402. Medical Physics (3) I CDT (Identical with PHYS 402, which is home).

404. Contemporary Biology in Human Affairs (3) I II Advances in biomedical research will be reviewed and their ethical, social and legal implications discussed.

407. Neurobiology (4) I (Identical with NRSC 407, which is home).


411. Molecular Biology (3) II Mechanisms of genome replication, genetic recombination,

414. Science and Theology (3) I Exploration of the interface between science and theology to understand the obstacles to their rational integration. P, MCB 404. Open to science majors, or others with consent.

416. Bioinformatics and Genomic Analysis (3) II Analysis of genome sequences for function using local and internet computer resources. Consult instructor for appropriate prerequisites before enrolling. 1R, 3L. P, consent of instructor for prerequisites before enrolling. (Identical with BIOC 416, ECOL 416, GENE 416). May be convened with MCB 516.

421A-421B. Microbiological Techniques (3) I (Identical with MIC 421A-421B, which is home).

428. Microbial Genetics (3) I II (Identical with PL P 428, which is home).

429. General Virology (3) II (Identical with MIC 429, which is home).

432. Pathogenic Virology (3) [Rpt./ 1] I (Identical with V SC 432, which is home).

437. Vertebrate Physiology (4) I (Identical with ECOL 437, which is home).

439. Plant Cell Biology (3) I (Identical with PL S 439, which is home). May be convened with MCB 539.

455. Developmental Mechanisms (3) I Molecular and cellular mechanisms of development, with emphasis on model systems. P, MCB 181R, MCB 181L, an advanced course in genetics, molecular or cell biology. (Identical with BIOC 455).

456. Developmental Biology (3) I (Identical with AN S 456, which is home).

457. Experiments in Developmental Biology (4) II (Identical with CBA 457, which is home). May be convened with MCB 557.

460. General Protein and General Metabolic (3) I (Identical with BIOC 460, which is home).

462A. Biochemistry (3) I (Identical with BIOC 462A, which is home).

462B. Biochemistry (3) II (Identical with BIOC 462B, which is home).

466. Physiology Laboratory (3) II (Identical with ECOL 466, which is home). May be convened with MCB 566.

467. Endocrine Physiology (3) I (Identical with PSIO 467, which is home).

469. Yeast Genetics and Human Disease (3) II GRD A higher-level genetics course with emphasis on reading and discussing the primary literature. Discussion of studies of the model organism (yeast) and relevance to human biology. P, MCB 320 or PL S 312; MCB 410, MCB 411. (Identical with BIOC 469).

470. The Cell and the Environment (3) II The molecular and cellular responses to the environment. P, MCB 410, and/or biochemistry.

473. Recombinant DNA Methods and Applications (4) II Relevant techniques for the isolation, purification and cloning of genes in E. Coli hosts. Eucaryotic lambda genomic DNA clones will be characterized by restriction mapping, hybridization analysis, and sequence analysis. P, BIOC 462A or MCB 460. CR, MCB 411. (Identical with BIOC 473, GENE 473, MCB 473, PL S 473).

475. Parasite Immunology (3) II (Identical with V SC 475, which is home).

476A-476B. Analysis of Biological Diversification (3) [Rpt./ 1] I II (Identical with GEOS 476A-476B, which is home). May be convened with MCB 576A-576B.

491. Preceptorship (2) [Rpt./ 6 Units]

494. Practicum (3) [Rpt./]

496. Seminar
a. Molecular and Cellular Biology (1) [Rpt./ 6]
   I II P, consult instructor before enrolling.

497. Workshop
a. Special Tutoring Workshop (3-5) I II P, MCB 320 or PL S 312 and MCB 410 or MCB 411; open to MCB and biochemistry majors only, consult department before enrolling. (Identical with BIOC 497A, GENE 497A).

498. Senior Capstone (1-5) [Rpt./ 10 units] I II

498H. Honors Thesis (3) [Rpt./ 2] I II

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (1-3) [Rpt./] I II

502. Medical Physics (3) I (Identical with PHYS 502, which is home).

510. Plant Molecular Biology (3) II (Identical with PL S 510, which is home).

511. Topics in Molecular Biology (1) II Provide experience in critical thinking, in making and testing hypotheses, in evaluating original research papers, and in expressing ideas in discussions. Complements the lecture format of MCB 411. (Identical with BIOC 511, MBIM 511).

512. Biological Electron Microscopy (4) I II Provides theoretical background and practical experience in transmission and scanning electron microscopy that are necessary for the efficient and effective application of ultrastructural and cytochemical techniques as research tools. P, one college level course in each of physics, chemistry, and biology. (Identical with AN S 512, BIOC 512, CBA 512, ENT 512, MCB 512, PATH 512, PL P 512, PSIO 512, V SC 512).

516. Bioinformatics and Genomic Analysis (3) II For a description of course topics see MCB 416. Graduate-level requirement include a research project, written report, and a class presentation. (Identical with BIOC 516, ECOL 516, GENE 516). May be convened with MCB 416.

529. General Virology (3) II (Identical with MBIM 529, which is home).

539. Plant Cell Biology (3) I (Identical with PL S 539, which is home). May be convened with MCB 439.

545. Concepts in Genetic Analysis (3) I Methods of genetic analysis including mutation isolation, genetic and physical mapping, reverse genetics, evolutionary mechanisms, molecular variation and genomic evolution. P, introductory undergraduate genetics course or biology course. (Identical with BIOC 545, ECOL 545, GENE 545, INSC 545).

549. Survival Skills for Students (2) I II (Identical with SP H 549, which is home).

550. Topics in Pigment Cell Biology (2) I (Identical with CBA 550, which is home).


556. Developmental Biology (3) I (Identical with AN S 556, which is home). May be convened with MCB 456.

557. Experiments in Developmental Biology (4) II (Identical with CBA 557, which is home). May be convened with MCB 457.

560. Current Advances in Plant Physiology (3) I (Identical with PL S 560, which is home).

566. Physiology Laboratory (3) II (Identical with ECOL 566, which is home). May be convened with MCB 466.

568. Nucleic Acid (4) I (Identical with BIOC 568, which is home).

569. Topics in Gene Recomfiguration (2) I II (Identical with BIOC 569, which is home).

572. Cell Regulation (3) II Advanced treatment of biological regulation in eukaryotic cells. Topics to be discussed include regulation of cellular metabolism, cytoskeletal dynamics, organelle function, and cell division. P, MCB 462A, MCB 462B, consult department before enrolling. (Identical with BIOC 572).

574. Advances in Mammalian Genetics (2) [Rpt./ 1] I (Identical with BIOC 574, which is home).

575. Special Topics In Biological Imaging (2) I II (Identical with CBA 575, which is home).

576A-576B. Analysis of Biological Diversification (3) [Rpt./ 1] I II (Identical with GEOS 576A-576B, which is home). May be convened with MCB 476A-476B.

577. Principles of Cell Biology (4) II (Identical with CBA 577, which is home).

582. Topics in Neural Development (2) I (Identical with NRSC 582, which is home).

583. Topics in Neural Plasticity (2) II Reading and discussion of primary literature on molecular, cellular, biochemical, physiological, and structural changes that occur on the adult nervous system. P, course in neurobiology, consult department before enrolling. (Identical with CBA 583, NRSC 583).

584. Cellular Neurobiology (2) II (Identical with CBA 584, which is home).

585. Biological Structure I (4) II (Identical with BIOC 585, which is home).

586. Intracellular Messengers (2) I (Identical with BIOC 586, which is home).

587. Biology of Neurological Disease (2) II (Identical with NRSC 587, which is home).
588. Principles of Cellular and Molecular Neurobiology (4) I (Identical with NRSC 588, which is home).

599. Cancer Genetics (3) [Rpt/ 1] I (Identical with CBIO 589, which is home).

595. Colloquium
a. Topics in Molecular Biology (1) [Rpt/ 1] II Open to majors only.
b. Journal Club (1) [Rpt/ 5] I II (Identical with CBIO 595B, which is home).

596. Seminar
a. Seminar (1) [Rpt/ 6] I II
b. Concepts in Cellular Differentiation (2) II (Identical with CBIO 596C, which is home).
c. Molecular Cardiovascular Biology (3) [Rpt/ 2] I (Identical with SURG 596, which is home).

597. Workshop
a. Recombinant DNA Techniques (2) S (Identical with CBIO 597A, which is home).

599. Independent Study (1-5) [Rpt/]
621. Molecular Plant-Microbe Interactions (3) I (Identical with PL P 621, which is home).

623A. Biology Update (2) S (Identical with CBIO 623A, which is home).

623B. Biology Update (2) S (Identical with CBIO 623B, which is home).

695. Colloquium
a. Plant Biology (1) I (Identical with PL P 695A, which is home).

697. Workshop
a. Scientific Infrastructure (2) I Open to majors only.

699. Independent Study (1-5) [Rpt/]

795. Colloquium
a. Introduction to Research (3-5) [Rpt/ 10 units] I II (Identical with BIOC 795A, which is home). Open to CBIO and BIOC majors only.

801. Molecular and Cellular Biology (4) I P, freshman medical students only.

900. Research (1-8) [Rpt/]

910. Thesis (1-8) [Rpt/]

920. Dissertation (1-9) [Rpt/]

980. Supplementary Registration (1-9) [Rpt/]

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THE SCHOOL OF MUSIC AND DANCE (MUS/MUSI)

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FAX: (520) 621-8118
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URL: http://arts.music.arizona.edu/

Baccalaureate Degrees
Bachelor of Arts (B.A.)

Bachelor of Music (B.M.)
Graduate Degrees
Master of Music (M.M.)
Doctor of Musical Arts (D.M.A.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Composition (M.M., D.M.A.)
Conducting (D.M.A.)

Music (B.A.)
Music Education (B.M., M.M., Ph.D.)

Options:
- instrumental
- vocal

Music Theory (M.M., Ph.D.)
Musicology (M.M.)
Performance (B.M., M.M., D.M.A.)

Principals:
- baritone
- bassoon
- cello
- clarinet
- composition
- flute
- french horn
- guitar
- harp
- harpsichord
- jazz studies
- oboe
- organ
- piano
- saxophone
- string bass
- trombone
- trumpet
- tuba
- violin
- voice

Program Requirements
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To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Music (MUS)

100. Basic Musicianship (3) I II CDT Introduction to the rudiments of musical notation, harmony, rhythm, and melody.

101A. Exploring Music through Piano for General Students (3) [Rpt/ 2] I Introduces and develops basic concepts of music as a creative process in studying piano. Includes music fundamentals, beginning improvisation, playing by ear, chording to melodies, music reading, and repertory.

101B. Exploring Music through Piano for General Students (1) I II Studying piano pieces and music basics. P, MUS 101A or by audition/interview.

102A. Class Guitar for General College Students (1) I Introduction to basic guitar playing techniques for the general college student, with emphasis on literature and styles of playing of current interest to students. 102a and 102b are offered both semesters.

102B. Class Guitar for General College Students (1) I II Development of guitar skills including sight reading, accompanying, tone production and other classical techniques. 102a and 102b are offered both semesters.

103. Class Voice for General College Students (2) I II Practical training in singing, with emphasis on basic skills of breathing, tone and diction; repertory to include folk, current, and classic songs in English.

105L. Operatic Stage Training (1) [Rpt/ 2] I An introduction to the fundamentals of movement, acting and stage terminology as related to the performance of opera and operetta. Emphasis on practical experience, including in-class study of selected operatic scenes.

107. Understanding Music through Listening (3) I II Development of listening skills through introductory study of Western art music, world music, and jazz.

108. Survey of Music II (3) I II Continuation of 107, with emphasis on Western art music, particularly that of the Medieval through the Baroque era, and the music of other cultures. P, MUS 107 is not prerequisite to MUS 108.

MUS 109. Rock and American Popular Music (3) I This course surveys the history of rock music in a way that underscores the power of music as a means of communication. In addition to studying the various sound characteristics and styles associated with rock, we will look at the specific ways that the development of rock music illustrates basic operations of music in general: the role music plays in shaping social (including economic) interaction, and the relationship between musical production and worldviews.

110A-110B. Piano Class (1-1) I II Introductory development of basic keyboard musicianship and technique through activities including playing by ear, improvising, harmonizing, transposing. P, CR, MUS 102A-MUS 102B; open to music majors and minors only.

111. Voice Class (1) [Rpt/ 1] I II Beginning instruction; introduction and development of basic skills, breathing, diction, tone, rhythm, sight-singing, repertory songs in English; practical training in singing without specialization. Open to music majors and minors only.

120A-120B. Musical Skills and Structure I (3-3) I II CDT Study of rhythm, melody, harmony.
text, time, and form in music. Students work in analysis, composition, music reading, ear training, conducting and class performance. P. MUS 100.

130A-130B. Introduction to Music Literature (2-2) I II CDT Survey of music literature, with emphasis on structure, period, and style. P or CR, MUS 102A-MUS102B

153. Percussion Instruments Class (1) II Class instruction in all percussion instruments, including materials and procedures for teaching these instruments in the schools. For music education majors only.

199. Independent Study (1-2) [Rpt./]

200. Large Conducted Ensembles (1) [Rpt./] All courses listed below may be repeated during each semester of registration. Prerequisite for entrance to all ensembles is by audition.

b. Marching Band (1) [Rpt./] P, audition required.

c. Campus Band (1) [Rpt./] P, audition required.

d. Wind Symphony (1) [Rpt./] P, audition required.

e. Conducted Instrumental Ensemble (1-2) P, audition required.

f. Symphony Orchestra (1) [Rpt./] P, audition required.

g. Symphonic Choir (1) [Rpt./] P, audition required.

h. University Singers (1) [Rpt./] P, audition required.

i. University-Community Chorus (1) [Rpt./] P, audition required.

j. Chamber Choir (1) [Rpt./] P, audition required.

k. Choraliers (1) [Rpt./] P, audition required.

l. Opera Theatre (1-4) Training in all aspects of operatic production, including major singing roles, minor roles, opera chorus, opera scenes and chamber operas; technical training in set construction, make up, costumes, and lighting.

m. Jazz Ensemble (1) [Rpt./] P, audition required.

n. Honor Choir (1) [Rpt./] P, audition required.

o. Mariachi Arizona (1) [Rpt./] II P, audition required.

201. Coached Ensemble (1-2) [Rpt./]

202. Small Conducted Ensemble (1-2) [Rpt./]

205L. Opera Theatre (1-4) Training in all aspects of operatic production, including major singing roles, minor roles, opera chorus, opera scenes and chamber operas; technical training in set construction, make up, costumes, and lighting.

210A-210B. Piano Class (1) II Continuation of 110b, with additional sight-reading, score-reading, and accompanying. P, MUS 110B. Open to MUS majors and minors only.

211A-211B. Diction for Singers (2) I Training in diction for singers in English, French, German, Italian, Spanish and ecclesiastical Latin.

220A-220B. Musical Skills and Structure I (3) I Continuation of 120a-120b, dealing with music from the late medieval period through early 20th-century art music in chronological order. 2R, 3L, P, MUS 120B.

231. Jazz History (3) I CDT Development of Jazz in the United States.

237. Survey of Mexican Folk Music (3) Examination of the traditional folk music of Mexico. Covers the history and evolution of the mariachi as well as the vast potpourri of Mexican music tradition. A working knowledge of Spanish is helpful but not required. P, working knowledge of Spanish is helpful but not required. (Identical with LA S 237, MAS 237).

240. Introduction to Composition (3) [Rpt./] I II Introduction to the basics of music composition, stressing fundamental forms, techniques and procedures. P, MUS 120B or consent of instructor.

250. Introduction to Music Education (3) I Observation of and practical field experience in public schools; video-taped class presentations. Field trips. Open to majors only.

299. Independent Study (1-2) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./] I II P. MUS 220B, Writing-Emphasis Course.

302. Recording Studio Production (3) I II Recording studio procedures including the recording chain and pre-post and actual recording production techniques. P, consult School of Music and Dance to enroll. (Identical with M AR 302).

310A. Functional Piano for Music Education Majors (1) I Development of functional piano skills needed for public-school music teaching, with emphasis on improvising, harmonizing, transposing, and accompanying. P, MUS 210B.

310B. Functional Piano for Music Education Majors (1) II Continuation of 310a with materials of increasing difficulty; open-score part-reading and rehearsal techniques. P, MUS 210B.

320. Form and Structure in 20th Century Music (3) I Intensive analysis of post tonal music, beginning with serial works of Schenberg through very recent compositions by major composers. P, MUS 220B, open to music majors and minors only.

321A. Jazz Improvisation (2) I Background for the art of improvising jazz. P, MUS 201.

321B. Jazz Improvisation (2) II CDT Continuation and refinement of the techniques studied in 321a. P, MUS 201.

328. American Pop Music: Sinatra Era (3) S American popular music associated with Tin Pan Alley and the American musical theater through the recordings and interpretations of Frank Sinatra.

330A-330B. History of Western Music (3) I Detailed study of the history of music in Western civilization from its origins to modern times; its relationship to general cultural development. P, MUS 220B, Writing-Emphasis Course.

334. Music in World Cultures (3) I CDT Overview of nonwestern music in selected world cultures.

338M. Music (3) II (Identical with TTE 338M, which is home).  

340. Composition (3) [Rpt./] I II Pursuit of the more sophisticated aspects of music composition in regard to form; handling of original ideas and searching for a broader and more practical view of music composition as a profession. P, 6 unit of MUS 240 or consent of instructor.

344. Arab and Asian Music (3) II Exploration of the structure and utility of music in Indian, Arab; Chinese, Japanese, and Indonesian cultures.

350A-351B. Winwood Techniques and Materials (1-1) I II Class instruction of flute, clarinet, oboe, saxophone, and bassoon, including materials and procedures for teaching these instruments in the public schools. Open to majors only.

351A-351B. Brass Techniques and Materials (1-1) I II Class instruction on trumpet, trombone, horn and other low brass, including materials and procedures for teaching these instruments in the public schools. Open to majors only.

352. String Instrument Techniques and Materials (1-3) I II Conducting techniques for teaching these instruments in the public schools. Open to majors only.

360. Music Fundamentals through Experience (3) CDT Music skills, concepts and information learned through playing, singing and focused listening. Emphasis on beginning experiences with autoharp, guitar, recorder and voice. No prior musical training is assumed.

361. Music Learning and Perception in the Preadolescent Child (3) I II A study of processes by which children achieve musical growth. Examination of means, settings and materials through which children acquire musical understanding and competence. P. MUS 360.

370. Introduction to Conducting (2) I Conducting choral as well as instrumental ensembles; includes basic beat patterns, transpositions and clefs, and introduction to score study. P or CR, MUS 220A.

371. Intermediate Instrumental and Choral Conducting (2) I Conducting techniques for instrumental ensembles of varying sizes; instrumental rehearsal techniques, score reading, and score study. P, MUS 370.

393. Internship  
e. Congressional Internship (1-3) S (Identical with POL 393E, which is home).

396H. Honors Proseminar (3) I II

399. Independent Study (1-2) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II P. MUS 220B, Writing-Emphasis Course.

400. Large Conducted Ensembles (1) [Rpt./] All courses listed below may be repeated during each semester of registration. Prerequisite for entrance to all ensembles is by audition.

b. Marching Band (1) [Rpt./] P, audition required. May be convened with MUS 500B.

c. Campus Band (1) [Rpt./] P, audition required. May be convened with MUS 500C.

d. Wind Symphony (1) P, audition required. May be convened with MUS 500D.

e. Conducted Instrumental Ensemble (1-2). May be convened with MUS 500D.

h. Summer Chorus (1) [Rpt./] P, audition required. May be convened with MUS 500H.

i. Symphonic Choir (1) [Rpt./] P, audition required. May be convened with MUS 500I.
Lighting. P, 2 units of MUS 205.

405L. Opera Theatre (1-4) Training in all May be convened with MUS 502.

401. Coached Ensemble (1-2) [Rpt.] May be convened with MUS 500R.

500. Large Conducted Ensembles (1) and performance practices. Mid-Romantic through the Contemporary periods. MUSI 426A is not prerequisite to MUSI 426B. May be convened with MUS 526B.


440. Compositional Techniques (3) [Rpt./4] I II Creative techniques in the fields of modern harmony, counterpoint, orchestration, electronic music or specific projects in commercial-type composition and arranging. P, 6 units of MUS 340 or consent of the School of Music.


442. Electro-Acoustic Studio Resources (3) II Advanced techniques: synthesis, processing, synthesizer programming, sampling, MIDI, computer-assisted techniques, sequencing and notation. P, consent of instructor. May be convened with MUS 542.

450. Teaching Music in the Elementary School (3) I CDT Role of the music specialist in the elementary school; materials, activities, and observation of demonstration teaching as they relate to a comprehensive music curriculum and qualitative musical experiences for children in grades K-6. Teaching experience in addition to lecture.

451. Methods and Techniques for Secondary Vocal Music Education (3) I Objectives, techniques and materials for teaching the adolescent as a singer/performer/musician in choirs, ensembles and other staged singing groups in the secondary schools. Laboratory experience in addition to lecture.

452. Band Techniques (3) I Objectives, techniques and materials for teaching the adolescent as an instrumentalist/performer in concert bands, marching bands and other wind ensembles in the secondary schools. Laboratory experience in addition to lecture.

455. Music and German Literature (3) I (Identical with GER 455, which is home). May be convened with MUS 555.

493. Internship (1-6) [Rpt.] May be convened with MUS 555.

494. Practicum (1-6) [Rpt.]

496. Seminar e. Seminar in Music and Dance Collaborations (2) I [Rpt.] (Identical with DCC 596e, which is home) May be convened with MUS 596e.

497. Workshop o. Level I Orff Schulwerk (2) May be convened with MUS 5970.

498. Senior Capstone (1-12) I II

498H. Honors Thesis (3) [Rpt./2]

499. Independent Study (1-4) [Rpt.]

499H. Honors Independent Study (1-3) [Rpt.] I II

500. Large Conducted Ensembles (1)

b. Marching Band (1) For a description of course topics see MUS 400B. May be convened with MUS 400B.

c. Campus Band (1) For a description of course topics see MUS 400C. May be convened with MUS 400C.

d. Wind Symphony (1) For a description of course topics see MUS 400D. May be convened with MUS 400D.

e. Conducted Instrumental Ensemble (1-2)

h. Summer Chorus (1) For a description of course topics see MUS 400H. May be convened with MUS 400H.

i. Symphonic Choir (1) For a description of course topics see MUS 400I. May be convened with MUS 400I.

j. University Singers (1) For a description of course topics see MUS 400J. May be convened with MUS 400J.

k. University-Community Chorus (1) For a description of course topics see MUS 400K. May be convened with MUS 400K.

l. Chamber Choir (1) [Rpt.] P, audition required. May be convened with MUS 500L.

m. Chorale (1) [Rpt.] P, audition required. May be convened with MUS 500M.

a. Symphony Orchestra (1) [Rpt.] P, audition required. May be convened with MUS 500Q.

q. Collegium Musicum (1) [Rpt.] P, audition required. May be convened with MUS 500Q.

r. Jazz Ensemble (1) [Rpt.] P, audition required. May be convened with MUS 500R.

s. Honor Choir (1) [Rpt.] P, audition required. May be convened with MUS 500R.

t. Mariachi Arizona (1) [Rpt.] I II P, audition required. May be convened with MUS 500R.

u. Wind Symphony (1) For a description of course topics see MUS 400M. May be convened with MUS 400M.

v. Symphony Orchestra (1) For a description of course topics see MUS 400N. May be convened with MUS 400N.

w. College Music (1) For a description of course topics see MUS 400O. May be convened with MUS 400O.

x. Jazz Ensemble (1) For a description of course topics see MUS 400Q. May be convened with MUS 400Q.

y. University-Community Chorus (1) For a description of course topics see MUS 400R. May be convened with MUS 400R.

z. Chamber Choir (1) For a description of course topics see MUS 400S. May be convened with MUS 400S.

AA. Coached Ensemble (1-2) [Rpt.] P, audition required. May be convened with MUS 500T.

BB. Summer Chorus (1) For a description of course topics see MUS 400T. May be convened with MUS 400T.

CC. Wind Symphony (1) For a description of course topics see MUS 400U. May be convened with MUS 400U.

DD. Symphony Orchestra (1) For a description of course topics see MUS 400V. May be convened with MUS 400V.

EE. Jazz Ensemble (1) For a description of course topics see MUS 400W. May be convened with MUS 400W.

FF. University-Community Chorus (1) For a description of course topics see MUS 400X. May be convened with MUS 400X.

GG. Chamber Choir (1) [Rpt.] P, audition required. May be convened with MUS 500Y.

HH. Wind Symphony (1) For a description of course topics see MUS 400Z. May be convened with MUS 400Z.

II. Symphony Orchestra (1) For a description of course topics see MUS 400A. May be convened with MUS 400A.

JJ. University Singers (1) For a description of course topics see MUS 400B. May be convened with MUS 400B.

KK. University-Community Chorus (1) For a description of course topics see MUS 400C. May be convened with MUS 400C.

LL. Wind Symphony (1) For a description of course topics see MUS 400D. May be convened with MUS 400D.

MM. Conducted Instrumental Ensemble (1-2)

NN. Summer Chorus (1) For a description of course topics see MUS 400H. May be convened with MUS 400H.

OO. Symphonic Choir (1) For a description of course topics see MUS 400I. May be convened with MUS 400I.

PP. University Singers (1) For a description of course topics see MUS 400J. May be convened with MUS 400J.

QQ. University-Community Chorus (1) For a description of course topics see MUS 400K. May be convened with MUS 400K.

RR. Chamber Choir (1) For a description of course topics see MUS 400L. May be convened with MUS 400L.

SS. Chorale (1) [Rpt.] P, audition required. May be convened with MUS 500M.

TT. Symphony Orchestra (1) [Rpt.] P, audition required. May be convened with MUS 500Q.

UU. Jazz Ensemble (1) [Rpt.] P, audition required. May be convened with MUS 500R.

VV. Honor Choir (1) [Rpt.] P, audition required. May be convened with MUS 500R.

WW. Mariachi Arizona (1) [Rpt.] I II P, audition required. May be convened with MUS 500R.

XX. Wind Symphony (1) For a description of course topics see MUS 400M. May be convened with MUS 400M.

YY. Symphony Orchestra (1) For a description of course topics see MUS 400N. May be convened with MUS 400N.

ZZ. College Music (1) For a description of course topics see MUS 400O. May be convened with MUS 400O.
Graduate-level requirements include a major. For a description of course topics see MUS 442. 

542. Electro-Acoustic Studio Resources (3) II 
For a description of course topics see MUS 442. Gradient-level requirements include a major research paper and special class presentation. P, consent of instructor. May be convened with MUS 442.

550. Advanced Studies in Music Teaching (3) II 
S Contemporary practices in planning, organizing and evaluating learning experiences in music for K-12 students.

551. Behavioral Research in the Arts (3) I S 
Research methodologies as they apply to artistic behavior; emphasis on applying the results of existing studies to practice and on conducting original research.

555. Music and German Literature (3) I 
(Identical with GER 555, which is home). May be convened with MUS 455.

560. Aesthetics of Music (3) I Exploration of the problems of musical meanings, including a panoramic examination of what philosophers, philosophers, musicians and artists, and others of critical intelligence have contributed to comprehensive theory.

570. Advanced Conducting (3) I Rpt./] II Styles of choral, band, and orchestral literature, as they pertain to the problems of the conductor; references to the styles of all periods, with emphasis on the contemporary and modern.

596. Seminar e. Seminar in Music and Dance Collaborations (2) I I Rpt./ I (Identical with DNC 596, which is home). May be convened with MUS 496e.

597. Workshop o. Level I Orff Schulwerk (2) S For a description of course topics see MUS 4970. May be convened with MUS 4970.

599. Independent Study (1-3) I Rpt./

600. Introduction to Graduate Study in Music (3) I Bibliographical materials; research resources, techniques, and problems directed toward graduate study in music. Required of all doctoral candidates in music. P, required of all doctoral candidates in music. (Identical with LI S 600).

605L. Opera Theatre (1-4) I Rpt./] I II A research-oriented study of major operas from the Renaissance to the present, together with appropriate conducting techniques. 2R, 3L. Open to majors only. P, graduate standing in choral conducting or coral music education. No more than 18 units of this course may be applied to a graduate degree program.

640. Advanced Composition (2-6) I Rpt./] 12 units I II Individual projects in composition. P, open to theory and composition majors only.

650. Foundations and Principles of Music Education (3) I S History and philosophy of music education in the public schools, with emphasis on the basic concepts needed for effective teaching in the field of music, curriculum development and evaluation of the music program.

651. Curriculum Development in Music (3) I II Principles and techniques of curriculum construction applied to the field of music.

652. Management Techniques in Music (3) I II The management of music at all levels of education, industry, and performance.

654. Psychology of Music (3) II S Music perception, physiological and psychological responses to music, basic acoustics, music pedagogy, and evaluation/measurement of music behaviors.

672. Teaching Music in Higher Education (3) I II Contemporary practices in planning, organizing, and evaluating learning experiences in music for college and university students. Open to music majors only.

693. Internship (1-6) I Rpt./

694. Practicum (1-6) I Rpt./


6. Keyboard Studies (2) I Rpt./] II e. Ethnomusicology (3) I P, graduate status or consent of instructor.

699. Independent Study (1-5) I Rpt./

900. Research (2-4) I Rpt./

909. Master's Report (1-6) I Rpt./

910. Thesis (2-4) I Rpt./

915. Master's Recitals (1-2) I Rpt./

920. Dissertation (1-9) I Rpt./

925. Doctoral Recitals (1-9) I Rpt./

930. Supplementary Registration (1-9) I Rpt./
Music Individual Studies (MUSI)

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Music Individual Studies (MUSI) 217
Music—Naval Science

NAVAL SCIENCE (N S )
South Hall, Rm. 109
The University of Arizona
PO Box 210032
Tucson AZ 85721-0032
Phone: (520) 621-1281
FAX: (520) 798-1673
URL: http://w3.arizona.edu/~nrotc/

Naval science courses (Navy) are open to male and female students seeking a commission.

ROTC courses can be counted as elective credit toward graduation in most academic majors.

Lower-division courses carry no service commitment. Veterans may receive credit for the first two years of the four-year ROTC program.

Textbooks and uniforms are provided by the department. Two- to four-year scholarships that pay tuition, books, fees, and a monthly stipend are also available. For further information about the four-year ROTC programs, the special two-year ROTC programs, entry requirements for upper-division courses, and ROTC scholarships, contact the department.

Baccalaureate Degree
The department does not offer a baccalaureate degree.

Graduate Degrees
The department does not offer a graduate degree.

To learn more about departmental programs consult the on-line catalog or contact the department at one of the addresses above.

Naval Science (N S )

100. Naval Laboratory (1) [Rpt./9] I Various topics such as drill and ceremonies, physical fitness, cruise preparation, sail training, safety awareness, personal finances, and applied exercises in naval ship systems, navigation, naval operations, naval administration, and military justice.

101. Introduction to Naval Science (3) I Introduction to the naval profession and to concepts of seapower, with emphasis on mission, organization, and warfare components of the Navy and Marine Corps; naval courtesy and customs, military justice, shipboard damage control and safety.

NATURAL SCIENCES (NATS )
For more information about Tier 1 and Tier 2 Natural Sciences courses, see the entry for General Education Courses in this manual.

M 580A. Organ (1-2) [Rpt./]
M 580B. Horn (1-2) [Rpt./]
M 580C. Clarinet (1-2) [Rpt./]
M 580D. Euphonium (1-2) [Rpt./]
M 580E. Flute (1-2) [Rpt./]
M 580F. Piano (1-2) [Rpt./]
M 580G. String Bass (1-2) [Rpt./]
M 580H. Harp (1-2) [Rpt./]
M 580I. Harpsichord (1-2) [Rpt./]
M 580J. Violin (1-2) [Rpt./]
M 580K. Viola (1-2) [Rpt./]
M 580L. Cello (1-2) [Rpt./]
M 580M. Organ (1-2) [Rpt./]

EDUCATION DEGREES

Graduate Degrees

The department does not offer a graduate degree.

To learn more about departmental programs consult the on-line catalog or contact the department at one of the addresses above.

Naval Science (N S )

100. Naval Laboratory (1) [Rpt./9] I Various topics such as drill and ceremonies, physical fitness, cruise preparation, sail training, safety awareness, personal finances, and applied exercises in naval ship systems, navigation, naval operations, naval administration, and military justice.

101. Introduction to Naval Science (3) I Introduction to the naval profession and to concepts of seapower, with emphasis on mission, organization, and warfare components of the Navy and Marine Corps; naval courtesy and customs, military justice, shipboard damage control and safety.
102. Naval Ship Systems I: Engineering (3) II Ship characteristics and types including ship design, hydrodynamic forces, stability, compartmentation, propulsion, electrical, and auxiliary systems, interior communications, ship control, and damage control; basic concepts of the theory and design of steam, gas turbine, and nuclear propulsion.

103. Naval Laboratory (2) [Rpt./9] I I Various topics such as drill and ceremonies, physical conditioning, cruise preparation, safety awareness, naval warfare doctrine and operations, administration and military justice. USMC history, traditions, missions, land navigation, troop leading skills and small unit tactics.

105. Marine Lab for Platoon Leaders (1) [Rpt./9] I I USMC history, traditions, missions, land navigation, troop leading skills and small unit tactics.


202. Seapower and Maritime Affairs (3) II U.S. Naval history from the American Revolution to the present. Discussion of the theories of Mahan, political issues of merchant marine commerce, and a comparison of U.S. and Soviet naval strategies.

301. Navigation and Naval Operations I (3) I Theory, principles, and procedures of navigation. Students learn piloting navigation including the use of charts, visual and electronic aids, the theory and operation of magnetic and gyro compasses, and celestial navigation.


310. Evolution of Warfare (3) I The development of warfare to present, focusing on theorists, strategists, tacticians, and technological developments. Student acquires sense of strategy and impact of precedent on military actions.

400. Advanced Naval Laboratory (1) [Rpt./5] I II Command and leadership training associated with the student battalion. Includes settings which manifest conditions of stress, time management, personal accountability, decision making, and command leadership. P, open to NROTC students only.

410. Amphibious Warfare (3) I Historical survey of the development of amphibious doctrine and amphibious operations, with emphasis on the evolution of amphibious warfare in the 20th century; present day potential and limitations on amphibious operations, including the rapid deployment force concept.

NEAR EASTERN STUDIES (NES / ARB / PRS)
Franklin Bldg., Rm. 403
The University of Arizona
PO Box 210080
Tucson AZ 85721-0080
Phone: (520) 621-8013
FAX: (520) 621-2333
E-mail: neareast@csit.arizona.edu
URL: http://www.u.arizona.edu/~barbara/homep.html

Baccalaureate Degree
Bachelor of Arts (B.A.)
Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)
Major and Degrees
Near Eastern Studies (B.A., M.A., Ph.D.)

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Arabic (ARB)

101. Elementary Arabic I (5) I II CDT Conversation and readings in modern standard Arabic.


348. Arabic Literature in English (3) I II Historical survey of Arabic literature of the Middle East and Mediterranean world, with readings in English translations.


403. Advanced Arabic I (3) I II Continuation of 402 with emphasis on oral and written comprehension and expression. P, ARB 402. May be convened with ARB 503.

404. Advanced Arabic II (3) I II Continuation of 403 with emphasis on oral and written comprehension and expression. P, ARB 403. May be convened with ARB 504.

424A-424B. Conversational Levantine Arabic (3) I Extensive oral drill with emphasis on the acquisition of facility in normal conversation and comprehension. P, ARB 101. May be convened with ARB 524A-524B.

425A-425B. Conversational Gulf Arabic (3) I Extensive oral drill with emphasis on the acquisition of facility in normal conversation and comprehension. P, ARB 101. May be convened with ARB 525A-525B.


439A-439B. Egyptian Arabic (3) I Introduction to the Cairene dialect. Phonology, common greetings, basic vocabulary and grammar. P, 1 year of standard Arabic. May be convened with ARB 539A-539B.

495. Colloquium
a. Readings in Modern Arabic Prose (3) [Rpt./1] I II P, 2 years of Arabic. May be convened with ARB 595A.

b. Readings in Classic Arabic Prose (3) [Rpt./1] I II P, 2 years of Arabic. May be convened with ARB 595B.

c. Readings in Classical Arabic Prose (3) [Rpt./1] I II P, 3-years of Arabic for non-native speakers of Arabic. May be convened with ARB 595C.

498. Senior Capstone (1-3) I II

499. Independent Study (1-6) [Rpt./1] I II

503. Advanced Arabic I (3) I II For a description of course topics see ARB 403. Graduate-level requirements include more assignments in Vol. III of the text and additional outside readings. May be convened with ARB 403.

504. Advanced Arabic II (3) I II For a description of course topics see ARB 404. Graduate-level requirements include more assignments in Vol. III of the text and additional outside readings. May be convened with ARB 404.

524A. Conversational Levantine Arabic (3) I II For a description of course topics see ARB 424A. Graduate-level requirements include the ability to speak with sufficient structural vocabulary to participate in most formal and informal conversations, requiring a mastery of at least 120 additional vocabulary items. May be convened with ARB 424A.

524B. Conversational Levantine Arabic (3) I II
For a description of course topics see ARB 424B. Graduate-level requirements include the ability to speak with sufficient structural vocabulary to participate in most formal and informal conversations, requiring a mastery of at least 120 additional vocabulary items. May be convened with ARB 424B.

525A. Conversational Gulf Arabic (3) I II For a description of course topics see ARB 425A. Graduate-level requirements include the ability to speak with sufficient structural vocabulary to participate in most formal and informal conversations, requiring a mastery of at least 120 additional vocabulary items. May be convened with ARB 425A.

525B. Conversational Gulf Arabic (3) I II For a description of course topics see ARB 425B. Graduate-level requirements include the ability to speak with sufficient structural vocabulary to participate in most formal and informal conversations, requiring a mastery of at least 120 additional vocabulary items. May be convened with ARB 425B.

526. Introduction to Arabic Linguistics (3) II For a description of course topics see ARB 426. Graduate-level requirements include a research paper on any phonological, morphological, or syntactic structure of any variety of Arabic. (Identical with LING 526). May be convened with ARB 426.

539A. Egyptian Arabic (3) I II For a description of course topics see ARB 439A. Graduate-level requirements include a picture description, summary of taped dialogues, and short reports on Egyptian movies. May be convened with ARB 439A.

539B. Egyptian Arabic (3) I II For a description of course topics see ARB 439B. Graduate-level requirements include a picture description, summary of taped dialogues, and short reports on Egyptian movies. May be convened with ARB 439B.

595. Colloquium

a. Readings in Modern Arabic Prose (3) [Rpt./1] I II For a description of course topics see ARB 495A. May be convened with ARB 495A.

b. Readings in Classic Arabic Prose (3) [Rpt./1] I II For a description of course topics see ARB 495B. May be convened with ARB 495B.

c. Readings in Classical Arabic Poetry (3) [Rpt./1] I II For a description of course topics see ARB 495C. May be convened with ARB 495C.

599. Independent Study (1-3)

Near Eastern Studies (NES)

101. Beginning Turkish I (5) CRT This course is designed to introduce the Turkish language to beginning students, to develop oral and written skills for both comprehension and expression. Language skills to be emphasized include: understanding, reading, writing, translation, and speaking.

102. Beginning Turkish II (5) CDT This course is a continuation of 101. It is designed to improve different aspects of language and writing skills for the second semester students.

Objectives are: to improve different aspects of language and writing skills; to provide a variety of readings for written comprehension; to develop a good grammar background; to improve listening skills; to introduce students to some examples of Turkish culture.

103A-103B. Elementary Modern Hebrew (5-5) I CDT (Identical with JUS 103A-JUS 103B, which is home)

170. Indian Civilizations (3) I II Survey of traditional and contemporary social, political, and thought patterns of India. (Identical with HIST 170).

171. Ancient Civilizations of the Near East (3) I Survey of pre-Islamic cultures of Persia, Mesopotamia, Syria-Palestine, Anatolia and Egypt, with emphasis on unifying themes and institutions. (Identical with ANTH 171, HIST 171).

172. Islamic Civilization: Traditional and Modern Middle East (3) II Survey of the traditional and contemporary social, political, and economic institutions of Islamic civilizations in the Middle East. (Identical with ANTH 172, HIST 172).

194. Practicum (1-3) [Rpt.]

199. Independent Study (1-3) [Rpt.]

201. Intermediate Turkish I (5) I CDT This course begins the second year of Turkish. It is an intermediate course designed to improve various aspects of the language; reading, comprehension, vocabulary, translation, composition, and grammar. P, NES 101 and NES 102 or equivalent.

202. Intermediate Turkish II (5) II CDT This is a continuation of NES 201. Emphasis will be placed on grammar knowledge, conversational skills, vocabulary, reading, and writing. P, 201.

203A-203B. Intermediate Modern Hebrew (5-5) I CDT (Identical with JUS 203A-JUS 203B, which is home)

277A. History of the Middle East (3) I Middle East history from the rise of Islam to the Turkish conquest of Constantinople, 600-1453. (Identical with HIST 277A). Writing-Emphasis Course for Middle East specializations.

277B. History of the Middle East (3) I Modern Middle East: the Ottoman Empire, Iran, and the Arab lands, 1453-present. S07a is not prerequisite to 277B. (Identical with HIST 277B). Writing-Emphasis Course for Middle East specializations.

293. Religion and State in Islam (3) I (Identical with JUS 293, which is home).

369. Geography of the Middle East (3) I (Identical with GEOG 369, which is home).

372A. History and Religion of Israel in Ancient Times: Biblical Period through the Babylonian Exile; Introduction to Hebrew Bible (3) I (Identical with JUS 372A, which is home).

372B. History and Religion of Israel in Ancient Times: Ezra-Nehemiah to the Roman Empire; with emphasis on formation of rabbinic Judaism (3) II (Identical with JUS 372B, which is home).

375. Ethnography of the Middle East (3) II (Identical with ANTH 375, which is home).

377. Modern Israel (3) I (Identical with JUS 377, which is home).

379. The Ottoman Turkish Empire, 1300-1924 (3) I A survey of Ottoman history noting its expansion into Europe and the Middle East and its political and social institutions. (Identical with HIST 379).

381A-381B History of Muslim Societies (3) I II (Identical with HIST 381A-HIST 381B, which is home).

382. Archaeology and the Bible (3) II (Identical with JUS 382, which is home).

383. Religion and State in Islam (3) I (Identical with HIST 383, which is home).

396H. Honors Proseminar (3) I II

399H. Honors Independent Study (1-3) [Rpt./]

401. Ancient Mesopotamia (3) I II Sumerian, Babylonian, and Assyrian civilization from the first cuneiform documents to the fall of the Neo-Babylonian empire, with special attention to political and social organization. P, NES 171, ANTH 101, NES 110 or consult department before enrolling. (Identical with HIST 401). May be convened with NES 501.

402. Economic History of the Islamic World (3) I An introduction to the economic history of the Islamic world from the seventh century to the present. May be convened with NES 502.

409A. Biblical Hebrew: Prose Texts (3) I II Study of Biblical Hebrew grammar and literature: Prose texts. (Identical with JUS 409A). May be convened with NES 509A)

409B. Biblical Hebrew: Poetry (3) I II Study of Biblical Hebrew grammar and literature: Poetry. (Identical with JUS 409B). May be convened with NES 509B.

435. Jewish Mysticism (3) II (Identical with JUS 435, which is home). May be convened with NES 535.

438. The Book of Psalms (3) I (Identical with JUS 438, which is home). May be convened with NES 538.

439. History of North Africa from the Islamic Conquest (3) II History of the peoples, cultures, and societies of North Africa (Present-day Morocco, Algeria, Tunisia and Libya from the Islamic conquests to the post-colonial era. Includes Islamic Spain and the Ottoman Period, but focuses on the modern era and themes of imperialism, nationalism, and Islamic reform. P, NES, 277A, NES 277B, or consent of instructor.
materials in historical reconstruction. May be convened with NES 581A-NES 581B.

484. History of the Arab-Israeli Conflict, 1800 to Present (3) II Origins of Zionism, and Palestinian and other Arab nationalisms from the nineteenth century and the post-1948 Arab-Israel state conflict in the Cold War era. (Identical with HIST 484). May be convened with NES 584.

485A. Social, Cultural and Political History of Iranian Plateau from the 7th Century to (3) I 600-1500. From Islamic invasions to the aftermath of the Mongol invasions. P, NES 277a, NES 277b or consent of instructor. (Identical with HIST 485A). May be convened with NES 585A.

485B. Social, Cultural and Political History of Iranian Plateau from the 7th Century to (3) II The Iranian plateau in the modern era of western imperialism and nationalistic Islamic responses. P, NES 277a, NES 277b or consent of instructor. (Identical with HIST 485B). May be convened with NES 585B.

487. Islamic Mysticism (3) II (Identical with HIST 487, which is home). May be convened with NES 587.

490. Women in Middle Eastern Society (3) I (Identical with ANTH 490, which is home). May be convened with NES 590.

494. Practicum (1-3) [Rpt./] I II

495. Colloquium e. Struggle and Survival in the Modern Middle East and North Africa, c. 1850-Present (3) I For a description of course topics see NES 495E. May be convened with NES 595E.

496. Seminar b. Special Topics in Near Eastern Studies (3) [Rpt./] I II May be convened with NES 596B.

c. Women and the Literature of Identity in Modern Middle East and North Africa (3) II (Identical with HIST 496C, which is home). May be convened with NES 596C.

d. Mediterranean Cities in the 15th-16th Centuries: Cairo, Istanbul, Florence and (3) II (Identical with ARCH 496D, ARH 496D). May be convened with NES 596D.

g. Islamic Law and Society (3) II May be convened with NES 596G.

498. Senior Capstone (1-3) I II

499. Honors Thesis (3) [Rpt./] I II

499H. Independent Study (1-5) [Rpt./]

501. Ancient Mesopotamia (3) II For a description of course topics see NES 401. Graduate-level requirements include additional readings and a research paper. (Identical with HIST 501). May be convened with NES 401.

502. Economic History of the Islamic World. (3) I For a description of course topics see NES 402. Graduate-level requirements include submission of an expanded research paper. (Identical with ARL 402, POL 402, POL 407). May be convened with NES 402.

509A. Biblical Hebrew: Prose Texts (3-4) I CDT For a description of course topics see NES 409A. Graduate-level requirements include extra extensive readings. (Identical with JUS 509A). May be convened with NES 409A.

509B. Biblical Hebrew: Poetry (3-4) II CDT For a description of course topics see NES 409B. Graduate-level requirements include extensive readings. (Identical with JUS 509B). May be convened with NES 409B.

535. Jewish Mysticism (3) II (Identical with HIST 535, which is home). May be convened with NES 435.

539. History of North Africa from the Islamic Conquest (3) II (Identical with HIST 539). May be convened with NES 439.

542. Transformation of Agrarian Societies in the Middle East (3) II For a description of course topics see NES 442. Graduate-level requirements include extensive research paper and readings. (Identical with HIST 542). May be convened with NES 442.

545. Women in Islamic History (3) I (Identical with HIST 545, which is home). May be convened with NES 445.

553. Advanced Hebrew (3) [Rpt./] I II (Identical with HIST 553, which is home).

557. Prehistoric Mesopotamia (3) I (Identical with ANTH 557, which is home). May be convened with NES 457.

566. The Middle Eastern City and Islamic Urbanism (3) I For a description of course topics see NES 466. Graduate-level requirements include additional readings and completion of an original research paper on an approved topic. (Identical with GEOG 566). May be convened with NES 466.

567. Population and Development in the Middle East (3) I For a description of course topics see NES 467. Graduate-level requirements include submission of an expanded research paper. (Identical with ARL 467, POL 467, POL 467). May be convened with NES 467.

568A-568B. Asia and the West (3-3) I II For a description of course topics see NES 468A-NES 468B. Graduate-level requirements include extensive readings. (Identical with JUS 509B). May be convened with NES 468B.

570. Religious History of India (3) I (Identical with HIST 570, which is home). May be convened with NES 470.

572. History of Medieval India (3) I (Identical with HIST 572, which is home). May be convened with NES 472.
with HIST 572, which is home). May be convened with NES 472.

573. History of Modern India and Pakistan: 1750-1947 (3) II (Identical with HIST 573, which is home). May be convened with NES 473.

574. Archaeometry: Scientific Methods in Art and Archaeology (3) (Identical with ANTH 574, which is home). May be convened with NES 474.

579. The Ottoman Empire to 1800 (3) II (Identical with HIST 579, which is home). May be convened with NES 479.

580. The Middle East in the Twentieth Century (3) I For a description of course topics see NES 480. Graduate-level requirements include additional readings on selected topics and an extensive research paper. (Identical with HIST 580). May be convened with NES 480.

581A-581B. Archeology of the Old Testament World (3-3) I For a description of course topics see NES 481A-481B. Graduate-level requirements include a full-length research paper. May be convened with NES 481A-481B.

582. History of the Arab-Israeli Conflict, 1800 to Present (3) II For a description of course topics see NES 482. Graduate-level requirements include additional readings and an extensive research paper. (Identical with HIST 582). May be convened with NES 482.

585A-585B. Social, Cultural and Political History of Iran (3-3) I For a description of course topics see NES 485A-485B. Graduate-level requirements include additional readings and an extensive research paper. (Identical with HIST 585A-585B). May be convened with NES 485A-485B.

587. Islamic Mysticism (3) II (Identical with HIST 587, which is home). May be convened with NES 487.

590. Women in Middle Eastern Society (3) I (Identical with ANTH 590, which is home). May be convened with NES 490.

593. Internship (1-3) [Rpt./]

594. Practicum (1-3) [Rpt./]

595. Colloquium

596. Seminar

b. Special Topics in Near Eastern Studies (3) [Rpt./ 4] I II For a description of course topics see NES 495B. May be convened with NES 495B.

c. Women and the Literature of Identity in Modern Middle East and North Africa (3) II For a description of course topics see NES 496C. P, NES 439 or consent of instructor, NES 480.

(d) Arabic Literature and Society (3) II May be convened with NES 496D.

g. Islamic Law and Society (3) II May be convened with NES 496D.

595A-595B. History and Historiography of Colonial North Africa (3) I (Identical with HIST 595A, which is home). May be convened with NES 495A-595B.

597. Mediterranean Cities in 15th-16th Centuries: Cairo, Istanbul, Florence & Venice (3) II (Identical with ARCH 597D). May be convened with NES 497D.

599. Independent Study (1-5) [Rpt./]

656. Seminar

b. Cultural Anthropology (1-3) II (Identical with ANTH 596B). May be convened with NES 496B.

c. Feminist Approaches in the Bible (3) II (Identical with JUS 596W). May be convened with NES 496W.

699. Independent Study (1-5) [Rpt./]

700. Research (2-4) [Rpt./]

799. Independent Study (1-3) [Rpt./]

900. Research (2-4) [Rpt./]

908. Case Studies (3) [Rpt./]

909. Master's Report (1-6)

910. Thesis (1-6) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

**Persian (PRS)**


103. Advanced Persian I (3) [Rpt./] I II CDT Readings in Persian, with the objective of preparing the student for independent research.

304. Advanced Persian II (3) [Rpt./] I II CDT Readings in Persian, with the objective of preparing the student for independent research.

404. Advanced Persian II (3) [Rpt./] I II CDT Readings in Persian, with the objective of preparing the student for independent research.

405. Advanced Persian III (3) [Rpt./] I II CDT Readings in Persian, with the objective of preparing the student for independent research.

503. Advanced Persian I (3) [Rpt./] I II CDT Readings in Persian, with the objective of preparing the student for independent research. Graduate-level requirements include additional readings and translations. May be convened with PRS 403.

504. Advanced Persian II (3) [Rpt./] I II CDT Readings in Persian, with the objective of preparing the student for independent research. Graduate-level requirements include additional readings and translations. May be convened with PRS 404.

599. Independent Study (1-6) [Rpt./] I II

**NEUROLOGY (NEUR)**

For information about neurology courses, see the entry for the College of Medicine in this manual.

**NEUROSCIENCE (NRSC)**

Gould-Simpson Bldg., Rm. 611
The University of Arizona
PO Box 210077
Tucson AZ 85721-0077
Phone: (520) 621-8380
FAX: (520) 621-8282
E-mail: neurosci@neurobio.arizona.edu
URL: http://arl.arizona.edu/cn/
Neuroscience (NRSC)

195H. Honors Colloquium (1) II Introduction to the multidisciplinary field of neuroscience and to scientific ways of knowing and the methods and standards for discovering new knowledge. P, limited to honors freshman.

282. Biology of Sensation (3) I Touch, hearing, vision, olfaction and taste are examined to illustrate scientific methods in biology, development of science in a social context and sensory phenomena in health and disease. 2R, 1D. (Identical with SP H 282).

399. Independent Study (1-3) [Rpt./]

403A-403B. Principles of Mammalian Systems Neurophysiology (3-3) I (Identical with PSYC 403A-PSY 403B, which is home). May be convened with NRSC 503A-NRSC 503B.


494. Practicum (1-6) [Rpt./] I II

495. Colloquium
  b. Developmental Neurobiology (1) [Rpt./6] May be convened with NRSC 595B.
  d. Brain, Behavior and Computation (1) [Rpt./6] II May be convened with NRSC 595D.

498. Senior Capstone (1-3) I II

499. Independent Study (1-3) [Rpt./]

499H. Honors Independent Study (1-3)

503A-503B. Principles of Mammalian Systems Neurophysiology (3-3) I (Identical with PSYC 503A-PSY 503B, which is home). May be convened with NRSC 403A-NRSC 403B.

506. Neural Encoding: Memory and Comprehension of Mammals (3) I (Identical with PSY 506, which is home).

524. Gerontology: A Multidisciplinary Perspective (3) I II (Identical with PSYC 524, which is home).

530. Neural Basis of Language (3) I (Identical with PSYC 530, which is home).

582. Topics in Neural Development (2) I An in-depth analysis of the cellular and molecular basis of neural development. Students will read and discuss journal articles dealing with the development of neurons and their synaptic connections. P, consult program office before enrolling. (Identical with CBA 582, MCB 582, PSIO 582).

583. Topics in Neural Plasticity (2) II (Identical with MCB 583, which is home).

584. Cellular Neurobiology (2) II (Identical with CBA 584, which is home).

585. Neural Mechanisms of Behavior (2) II Discussion of the neural mechanisms of behavior; the control of movement; and integrative mechanisms and plasticity. Examples from vertebrates and invertebrates. (Identical with PSIO 585).

586. Intracellular Messengers (2) I Intracellular messenger systems in the nervous system, description of salient features of each mechanism, and discussion of a particular system which uses that messenger. P, NRSC 588 or consent of instructor. (Identical with BIOC 586, MCB 586).

587. Biology of Neurological Disease (2) II Emphasis on reading, discussing and presenting the primary literature pertaining to scientific investigation of neurological diseases, e.g., multiple sclerosis, stroke, epilepsy. P, graduate or medical students only, consult program office before enrolling. (Identical with MCB 587).


594. Practicum (1-6) [Rpt./] I II

595. Colloquium
  b. Developmental Neurobiology (1) [Rpt./6] For a description of course topics see NRSC 495B.
  d. Brain, Behavior and Computation (1) [Rpt./6] II For a description of course topics see NRSC 495D.

599. Independent Study (1-6) [Rpt./]

695. Colloquium
  a. Motor Control (2) [Rpt./3] II (Identical with PSIO 695A, which is home).
  e. Colloquium (1) II (Identical with MCB 695E, which is home).

699. Independent Study (1-6) [Rpt./]

700. Methods in Neuroscience (2-4) Research rotations in the laboratories of faculty members within the neuroscience program. P, consult neuroscience program office before enrolling.

701. Communication in Neuroscience (2) [Rpt./] II Preparation of an essay, and instruction in scientific writing. P, consult neuroscience program office before enrolling. Open to majors only.

900. Research (1-8) [Rpt./]

910. Thesis (1-8) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

NUCLEAR AND ENERGY ENGINEERING (NEE)

For information about nuclear and energy engineering courses see the entry for the Department of Aerospace and Mechanical Engineering in this manual.
To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Nursing (NURS)

255. Professional Nursing Role I (2) I II Orientation to professional nursing, nursing processes within the context of health care delivery and societal health needs. P, consult department before enrolling, open to majors only.

263. Nursing Processes I (5) I II Application of nursing knowledge to address basic human health patterns; use nursing process to promote health and provide continuing care. 2R, 9L. P, NURS 255. Open to majors only. Fee.

281. Nursing Issues and Research (2) S Overview of nursing as a profession within the health care delivery system. Introduction to research process, role of nurse as consumer and user of research. P, open to accelerated-pathway nursing majors only. Fee.

299. Independent Study (1-6) [Rpt./] I II

299H. Honors Independent Study (1-3) [Rpt./] I II

300. Pathophysiology (3) [Rpt./] I II Provides a conceptual integrative approach to selected pathophysiological phenomena and human responses to illness. P, CHEM 101A, CHEM 101B, non-majors who wish to enroll should consult the instructor and complete all prerequisites.

350. Professional Nursing Role II (2) I II [Rpt./] I II Examination of professional nursing issues, including nursing jurisprudence and ethics, as related to nursing processes, practice roles, and the health care delivery system. P, NURS 255, open to majors only.

364. Nursing Processes II (4) [Rpt./] I II Study and use of nursing processes, including interpersonal processes and psychomotor skills, in the nursing practice role of care provider with persons and their families during a variety of health experiences. 1R, 2L. P, NURS 250, NURS 255, NURS 263.

370. Complementary Healing Practices (3) [Rpt./] I II This course provides information about complementary healing methods and prepares the student to make knowledgeable decisions about their effectiveness. Students are encouraged to use this decision making in their own healthcare and in their role as a care provider and/or as a friend.

374. Care Provider Across the Life span: Families (6) [Rpt./] I II Application of nursing processes to providing care in the family context with a focus on health experiences related to the transitions, including childbearing, parenting, health and changes in aging. 3R, 3L. P, NURS 250, NURS 255, NURS 263.


378. Nursing Care in Death and Dying (3) I Designed to provide students the opportunity to explore feelings regarding death, to consider needs and perceptions of the patient and the patient's family, and to improve ability to provide nursing care. Writing-Emphasis Course. P, consult college before enrolling, open to majors only.

379. Nursing Research (2) II Development of knowledge and skills related to the research process and use of research findings. Writing-Emphasis Course. P, NURS 255, open to majors only.


393. Internship (2-4) [Rpt./]

393H. Honors Internship (3-6) [Rpt./]

394. Practicum (1-6) [Rpt./]

396. Proseminar
a. Health and Family Assessment (2) II P, open to registered nurse students only, admission to College of Nursing.
b. Profession Nursing Role (1) I II P, open to registered nurse students only, admission to College of Nursing.

396H. Honors Proseminar (3) I

399. Independent Study (1-5) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II


420. Health Assessment of the School Age Child (3) S Health maintenance, health promotion, physical and developmental assessment, screening, management and referral of the school age child. P, NURS 481 or consult college before enrolling. Open to majors only.

421. Nursing Care of the Child with a Handicap or Chronic Illness (3) S Overview of congenital and acquired handicaps or chronic conditions in school age children. Assessment, management and in the school setting of these children and their families. P, NURS 481 or consult college before enrolling; open to majors only. May be convened with NURS 521.

422. School Nursing Practice (3) I Analysis and application of nursing in school systems. Program development and evaluation, health curriculum development, and principles of epidemiology for identification of high risk groups. P, NURS 481 or consult college before enrolling; open to majors only. May be convened with NURS 522.

431. Professional Nursing Issues (2) [Rpt./ 1] I II Exploration of nursing issues and processes as applied to professional leadership and influencing change in health care and health care delivery systems. P, NURS 355, NURS 382, NURS 384, open to majors only.


473. Family Health and Deafness (3) II [Rpt./] I II An ecological framework organizes the study of family response to deafness/hearing impairment of a family member. Students consider family members who become deaf/hearing impaired at varying points in their life, from infants to seniors, their relationships with family, and strategies for influencing individual and family health across the life span. The ecological framework includes concepts of environment, soma, psyche, family, culture, society, and health. P, one lower division course in Social Science (e.g. Psychology). May be convened with NURS 574.

475. Care Provider in Complex Health Experiences (5) I II Nursing care of individuals and families across their life span who are experiencing complex health experiences; emphasis is in tertiary and community settings. Change course title, description and prerequisites to: Care Provider in Complex Health Experiences (5) Nursing care of individuals and families across their life span who are experiencing complex health experiences; emphasis is in tertiary and community settings. Open to majors only. 2R, 9L. P, NURS 382, NURS 384. Open to majors only. Fee.

482. Advanced Physiology (4) S Selected physiologic functions and adaptive changes which occur in health and illness. Cellular
physiology, the immune system, neurophysiology, cardiovascular, pulmonary, renal, and endocrine physiology. P, undergraduate physiology. May be convened with NURS 580.

481. Health Experiences of Human Systems: Communities (5) I II Use of nursing sciences and public health science in promoting and preserving health of populations. Addresses the nursing roles of provider and coordinator of care in population-focused practice in diverse community settings. Change course title, description, and prerequisites to: Health Experiences of Human Systems: Communities use of nursing sciences and public health science in promoting and preserving health of populations. Addresses the nursing roles of provider and community settings. Open to majors only. 2R, 9L. P, NURS 475, NURS 483 Open to majors only. Fee.

482. Nurse as Care Provider Across the Lifespan: Mental Health Experiences (5) I II Concepts, principles, and techniques of nurse-client relationships with individuals, families and groups in a variety of mental-health settings. P, NURS 382 and NURS 384.

485. Nurse in Clinical Selective (2) Directed nursing practice in an area of clinical interest. Open to majors only. 6L. P, NURS 472, NURS 475; CR, NURS 481, NURS 483, NURS 488.

486. Coordinator of Care in Diverse Settings (6) I II Use of nursing processes and theories, management theory, in nursing practice and leadership roles in a variety of health care settings. Opportunities to practice in a specialty of choice are also provided. Change course title, units, description and prerequisites to: Coordinator of Care in Diverse Settings (6) Use of nursing processes and theories, management theory, in nursing practice and leadership roles in a variety of health care settings. Opportunities to practice in a specialty of choice are also provided. 2R, 9L. P, NURS 475, NURS 483. Open to majors only. Fee.

487. Poverty and Health (3) I II Study of the relationship between poverty and health. Concepts and theories from anthropology, psychology and sociology will be used to analyze problems associated with poverty. Advanced degree credit available for non-Ph.D. majors only. Writing-Emphasis Course. P, 6 units of social science. (Identical with CM 487). May be convened with NURS 587.

488. Senior Capstone (1-3) I II

489. Honors Thesis (3) I II

499. Independent Study (1-5) I II

502. Professionalizing Presentation Skills (1) I II (Identical with BIOC 502, which is home).

504. Conceptual Models (3) I S Theory and research surrounding conceptual models with emphasis on description of conceptual models.

506. Ethics and Ethical Decision Making for Health Care (3) I A critical examination of the epistemology of moral reasoning, models of ethical reasoning, and the application of decision making models throughout a variety of health care contexts. Specific moral dilemmas and issues related to scientific advances are examined such as genetic manipulation, euthanasia, research with human subjects, and organ transplantation. Relational ethics in the day-to-day provision of health care at the individual and societal levels is also emphasized.

517. Information Technology (3) I For a description of course topics see NURS 417. Graduate-level students must make two presentations and create a professional web page. May be convened with NURS 417.

521. Nursing Care of the Child with a Handicap or Chronic Illness (3) I S For a description of course topics see NURS 421. Graduate-level requirements include a paper and/or a presentation. May be convened with NURS 421.

522. School Nursing Practice (3) I For a description of course topics see NURS 422. Graduate-level requirements include identifying a select population; conducting a needs assessment; planning, implementing, and evaluating a specific health program. May be convened with NURS 422.

530. Methods in Nursing Research (3) I Critical examination of selected problems and methods in the nursing research process. Consideration is given to both qualitative and quantitative methods. (Identical with PHL 530).

572. Adult Pharmacotherapeutics (3) I Clinical pharmacology course that provides the student with knowledge about common medications used to treat adults. Primary focus is drug management of chronic and self-limiting acute diseases. Covers representative drugs of a pharmacologic group, indications for use, drug selection, titration of dosage, key adverse effects, monitoring of therapy, alternate drugs, and special concerns in prescribing to the older adult. P, NURS 580.

574. Family Health and Deafness (3) I II [Rpt./I] For a description of course topics see NURS 474. For a description of course topics see NURS 474. Graduate-level requirements include conducting a project. May be convened with NURS 474.

576. Pain Management: An Interdisciplinary Team Approach (3) I II For a description of course topics see NURS 476. Graduate-level requirements include a scholarly paper regarding a pain theory or management topic. May be convened with NURS 476.

579. Issues in Rural Health (3) II Topics include: community assessment, planning and evaluation; interdisciplinary practice; health care issues for southwestern ethnic minority populations. (Identical with MAP 579, PHL 579, PHPR 579, PSYC 579).

580. Advanced Physiology (4) S For a description of course topics see NURS 480. Graduate-level requirements include a comprehensive paper. May be convened with NURS 480.

584. Statistical Packages in Research (3) I Analysis of data for research projects, theses and dissertations using SPSS and SAS. Organization of data for statistical analysis, entering data and creating command files using the editor, writing and debugging programs. Techniques for producing graphical output using SAS/GRAPH.

587. Poverty and Health (3) I II For a description of course topics see NURS 487. Graduate-level requirements include an in-depth research paper on an aspect of poverty. (Identical with CM 587, PHL 587). May be convened with NURS 487.

588. Healing Systems in the Southwest (3) I II Application of principles from anthropological theory to the actual practice of patient care, with emphasis on culture content of groups living in the greater Southwest. P, 9 units of behavioral science. (Identical with ANTH 588, CM 588).

589. Health of the Older Adult (3) I Current research of the aging process including physical and mental alterations; emphasis on physiological changes. P, consult college before enrolling. (Identical with GERO 589).

599. Independent Study (1-4) [Rpt./] 600A. Nursing Theory and Practice: Child, Maternal-Newborn (3) I Maintenance, therapeutic and preventive nursing care of persons in various settings: child, maternal-newborn.


600C. Nursing Theory and Practice: Community Health (3) I II Maintenance, therapeutic and preventive nursing care of persons in various settings: one area of nursing: community health.

600D. Nursing Theory and Practice: Gerontology (3) II Maintenance, therapeutic and preventive nursing care of persons in various settings: gerontology.

600E. Nursing Theory and Practice: Adult Health (3) I II Maintenance, therapeutic and preventive nursing care of persons in various settings: adult health.

601. Pathophysiological Alterations (3) I Examination of selected alterations in physiologic mechanisms including alterations in immunologic function, gas exchange and transport, fluid transport and balance and pertinent cellular mechanisms. Process of application to clinical care of individuals will be incorporated. P, NURS 580 or 3 hours of graduate level physiology.

603. Public Health Science (3) I Health promotion and disease prevention in communities and populations, epidemiology and legal/political issues in advanced public health nursing. Nursing and public health theories synthesized. Open to majors only. (Identical with PHL 603).

604. Developmental Concepts in Nursing (3) II Examination of the principles and philosophy of the life span developmental framework and other models of development, particularly as related to understanding a variety of nursing phenomena in practice and research.

605. Issues in Family Relations (3) II Examination of issues in providing care to families using
theory and research from nursing and related fields. Concepts included will apply to the young, developing, and mature family. Open to majors only.

**606. Social, Psychological Problems in Nursing** (3) II Focus on concepts of stress and training with emphasis on health-related outcomes. Nursing research on addictions, depression, abuse, and violence will be explored. Open to majors only.

**607. Cross-Cultural Nursing** (3) S Focus on a synthesis of theories from nursing and related fields to explore cultural variations in response to actual or potential problems of health or illness. The methods for caring and treating culturally influenced responses will be examined. Open to majors only. (Identical with PHL 607).

**608. Cognitive Alterations** (3) S Client problems related to the processing of sensory information including etiological factors. Research-based nursing interventions for clients with cognitive alterations are examined. Open to majors only.

**609. Health Assessment** (3-4) I Advanced health assessment and health promotion for adult and geriatric age groups. Students will learn advanced techniques in interviewing, history taking, physical examination, risk appraisal, and data base compilation. Open to master’s students in the NP options or consent of instructor.

**610. Care of Childbearing Families** (4) I To cover conception, OB, the neonatal period and early childhood to age five. Course will address family dynamics related to pregnancy and the incorporation of a new member as well as the clinical experience of providing prenatal care, well-child care, early childhood acute illnesses and identifying chronic illnesses. P, NURS 580; CR, NURS 609, NURS 694; admission to MS level, FNP option.

**611. FNP: Primary Care I** (3) I First of three primary care courses preparing FNPs. Beginning skills in health promotion, disease prevention, assessment/management of common health conditions in individuals and families. P, NURS 580; CR, NURS 609, NURS 694; admission to MS level in nursing and FNP option.

**612. Nurse Educator Role** (3) II Theoretical and practical application of teaching-learning process in classroom and clinical settings. Principles of teaching, learning, instructional design, testing. Micro-teaching included. 2R, 3L. Open to majors only.


**614. Administrative Process** (3) I Theoretical background for nursing administration in care settings. Emphasizes on accountability, budgeting, management skills, constraints and influences as related to nursing administration. Open to majors only. (Identical with PHL 624).

**615. Advanced Role Development** (3) I Exploration of models of advanced practice during (APN) roles in the health care system. Emphasizes factors that influence process of defining and implementing advanced practice nursing roles. P, NURS 580. Open to majors only.

**616. Primary Care of Adults** (4-5) II Basic concepts and knowledge needed to assess and manage therapeutically common acute and chronic health problems prevalent in adults. Emphasis will be placed on pathophysiology, abnormal aging, principles of pharmacology and medication use as therapeutic adjuncts, and the use of diagnostic procedures as aids to clinical decision making. P, NURS 609. Open to majors only.

**617. Advanced Psychiatric Mental Health Nursing II** (4) I Focus on concepts of personality development using psychodynamic and cognitive/behavioral theories oriented to the practice of mental health nursing: employing individual, family and group nursing therapeutic techniques for the amelioration of problem. P, NURS 600A, graduate standing in nursing.

**618. Primary Care: Adults** (4) I II Second of three primary care courses preparing NPs. Focuses on assessment and management of selected acute and chronic health conditions in adults and their families across the age continuum. P, NURS 609, NURS 617, admission to MS program and FNP option; CR, NURS 517, NURS 694B.

**619. FNP: Primary Care III** (4) S Third of three primary care courses preparing family nurse practitioners (FNPs). Focus is on assessment, diagnosis, and management of selected complex and/or urgent/emergent acute and chronic health conditions in primary care practice in individuals and families across the age continuum. P, NURS 617, NURS 618, admission to MS program and FNP option.

**620. Educational Process** (3) I Theoretical and practical application of teaching-learning process in classroom and clinical settings. Principles of teaching, learning, instructional design, testing. Micro-teaching included. 2R, 3L. Open to majors only.

**621. Nurse Educator Role** (3) II Theoretical and practical application of curriculum development and process. Use of teaching-learning process. Preparation for nurse educator role. Directed practice teaching included. 1R, 6L. P, NURS 621. Open to majors only. (Identical with PHL 622).


**623. Clinical Agency Administration** (3) II Practical application of administrative processes in a nursing care delivery setting. Focuses on the use of selected skills essential to effective administration. P, NURS 624. Open to majors only.

**624. Administrative Process** (3) I Theoretical background for nursing administration in care settings. Emphasizes on accountability, budgeting, management skills, constraints and influences as related to nursing administration. Open to majors only. (Identical with PHL 624).

**625. Advanced Role Development** (3) I Exploration of models of advanced practice during (APN) roles in the health care system. Emphasizes factors that influence process of defining and implementing advanced practice nursing roles. P, NURS 580. Open to majors only.

**626. Primary Care of Adults** (4-5) II Basic concepts and knowledge needed to assess and manage therapeutically common acute and chronic health problems prevalent in adults. Emphasis will be placed on pathophysiology, abnormal aging, principles of pharmacology and medication use as therapeutic adjuncts, and the use of diagnostic procedures as aids to clinical decision making. P, NURS 609. Open to majors only.

**627. Advanced Psychiatric Mental Health Nursing II** (4) I Focus on concepts of personality development using psychodynamic and cognitive/behavioral theories oriented to the practice of mental health nursing: employing individual, family and group nursing therapeutic techniques for the amelioration of problem. P, NURS 600A, graduate standing in nursing.

**628. Primary Care: Adults** (4) I II Second of three primary care courses preparing NPs. Focuses on assessment and management of selected acute and chronic health conditions in adults and their families across the age continuum. P, NURS 609, NURS 617, admission to MS program and FNP option; CR, NURS 517, NURS 694B.

**629. FNP: Primary Care III** (4) S Third of three primary care courses preparing family nurse practitioners (FNPs). Focus is on assessment, diagnosis, and management of selected complex and/or urgent/emergent acute and chronic health conditions in primary care practice in individuals and families across the age continuum. P, NURS 617, NURS 618, admission to MS program and FNP option.

**630. Statistics for the Health Sciences** (3) [Rpt./1] I Techniques that describe, compare and relate variables in the health sciences. Techniques include exploratory, descriptive, comparative, correlational and inferential statistics. Parametric and non-parametric techniques are presented.

**631. Advanced Statistics for the Health Sciences** (3) [Rpt./1] I Advanced statistical techniques including multivariate analysis of variance, multiple regression, structural equations modeling, log-linear modeling, factor analysis and discriminant analysis. Students will analyze large data sets using PC and mainframe statistical software to learn techniques. P, NURS 630 or graduate level statistics course. P, NURS 630 or equivalent, NURS 530. (Identical with PHL 634).

**632. Data Management in Health Care Systems** (3) II Acquisition and utilization of large data bases, how data bases are structured, computer applications for large data sets. Emphasis on use of data bases and their contents for evaluation of health care systems. P, NURS 530, NURS 630. (Identical with PHL 634).

**633. Evaluation Research** (3) I Development and use of models and tools for assessing nursing processes, programs and performances.

**634. Data Management in Health Care Systems** (3) II Acquisition and utilization of large data bases, how data bases are structured, computer applications for large data sets. Emphasis on use of data bases and their contents for evaluation of health care systems. P, NURS 530, NURS 630. (Identical with PHL 634).

**635. Nursing Care Management I** (4) II Introduction to models of nursing care management, the case management process, and advanced nursing practice; applicable to clients in a variety of clinical settings. P, graduate standing.

**636. Nursing Care Management II** (3) II Health care financing, delivery of nursing care management and health services in a managed-care environment and related professional issues. P, NURS 640, graduate standing.

**637. Health Care Systems Measurement and Analysis** (3) S Strategies for measurement of structure, process, and outcomes indicators within a health care system. Methods for evaluating instruments and/or global measures. P, NURS 630 or equivalent, NURS 530.


**639. Theory of Systems Management** (3) I Theories of systems management and system analysis; project management; critical decision making and problem solving; cost-benefit analysis and resource allocation. Content is presented with application to health care settings.

**640. Systems Management Application** (3) S Focus is on the role of the systems manager and provides an opportunity for immersion into the role and for application of content from previous systems management courses. Two of the three hours of credit will be devoted to a clinical practicum and preceptorship in a nursing system’s environment and one hour will be a seminar to discuss clinical experiences in the role. P, NURS 650, NURS 645, NURS 633, NURS 603.

**641. Health Care Informatics Application** (3) S Focuses on the role of the informatics specialist and provides an opportunity for immersion into the role and for application of content from previous informatics and system management courses. R2, L3. P, NURS 646 and NURS 650.

**642. Health of Rural and Underserved Populations** (3) II Concepts and theories from nursing, sociology, anthropology, psychology, and health policy are used to analyze health problems encountered by rural, ethnic and underserved populations.

639. Internship (2-4) [Rpt./]

694. Practicum (1-6) [Rpt./]
396. Seminar
a. Nursing Theory (1-3) I II
b. Predictive Modeling (3) II P, NURS 730 or consent of instructor.
c. Advanced Predictive Modeling (3)
d. Qualitative Data Collection Management and Analysis (1-3) [Rpt./4 units] P, consent of instructor.

499. Independent Study (1-4) [Rpt.]

705. Nursing Metatheory (3) I Examination of philosophical and historical foundations of knowledge, and metatheoretical structures and processes of theory development. In-depth analysis of extant and emerging philosophical bases of nursing for scientific inquiry. P, NURS 504 or equivalent, open to majors and minors in nursing.

706. Middle Range Theory (3) II Introduction to ways of knowing, focus on middle range theories in nursing and related sciences. Emphasis on critique, elaboration and theory testing strategies. P, NURS 705 Open to majors only.

725. Contemporary Issues (3) S In-depth examination of contemporary issues related to nursing and the health care system. P, admission to the Ph.D. program, open to majors only.

380. Quantitative Methods in Clinical Nursing Research (3) I Investigation of selected quantitative strategies appropriate to researching problems in clinical nursing. P, NURS 530, NURS 633, admission to Ph.D. program.

381. Qualitative Methods in Clinical Nursing Research (3) I Application of selected qualitative research methods from the social sciences to clinical nursing. P, NURS 530, admission to Ph.D. program.

781A. Instrument Construction (3) S Deductive and inductive processes for constructing/testing instruments to measure nursing care interventions/patient outcomes: Instrumentation for behavior and objective phenomena. 2R, 3L. P, NURS 705, NURS 730, NURS 735, NURS 730, graduate-level statistics. Open to majors and minors in nursing. NURS781A is not prerequisite to NURS781B.

781B. Instrument Construction (3) S Deductive and inductive processes for constructing/testing instruments to measure nursing care interventions/patient outcomes: Instrumentation for subjective phenomena. Includes instrument development/implementation strategies; experience developing a pilot measure. 2R, 3L. P, NURS 705, NURS 730, NURS 705, NURS 730, graduate-level statistics. Open to majors and minors in nursing. NURS781A is not prerequisite to NURS781B.

701. Preceptorship (1-3)

703. Internship (2-4) [Rpt.]

794. Practicum (1-6) [Rpt.]

795. Colloquium

b. Professional Role Development (1) I II

796. Seminar

a. Community-Based Interventions (1-3) [Rpt./3] P, NURS 705 and NURS 706.

799. Independent Study (1-4) [Rpt./]

900. Research (1-4) [Rpt./]

910. Thesis (1-3) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

NUTRITIONAL SCIENCES (N SC)

Shantz Bldg., Rm. 309
The University of Arizona
PO Box 100038
Tucson AZ 85721-0038
Phone: (520) 621-3096
Fax: (520) 621-9446
E-mail: bquin@ag.arizona.edu
URL: http://ag.arizona.edu/NSC/nshome.html

Baccalaureate Degree

Bachelor of Science in Agriculture (B.S.A.)
Graduate Degree
Master of Science (M.S.)
Major and Degrees
Nutritional Sciences (B.S.A., M.S.)
B.S.A. Options:
dietetics
nutrition

Program requirements

For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/ oncource/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

to learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Nutritional Sciences (N SC)

101. Nutrition, Food and You (3) I II Current concepts and controversies in nutrition and food safety; practical applications. Designed for non-majors and majors who desire additional education in nutrition. P, consent of instructor.

102H. Nutrition, Food and You (1) I Current concepts and controversies in nutrition and food safety. Interpretation and critical analysis of hypotheses, experimentation and risk/benefit in nutrition and food science. This honors course is taken concurrently with the honors section of 101. Students earn one credit for additional, seminar time and projects done with faculty outside of class.

120. Microcomputing Applications (3) I II 6L. (Identical with ABE 120, which is home).

197. Workshop
a. Fitness, Nutrition and Food Technology: Issues and Answers (1) S P, Offered only through Horizons Unlimited Summer Program.

Field trip.

208. Nutrition and Metabolism (3) I Introduction to nutritional sciences and the integration of the effects of nutrients and nutritional status of metabolic and physiological functions at the cellular, tissue, organ and system level in humans as related to health and disease. Designed for nutritional sciences majors and those with a background in biological and chemical sciences. P, PSIO 201 or MCB 181; P or CR, CHEM 241A.


251L. Food Studies Laboratory (1) I II An Introduction to the food study laboratory with emphasis on development of skills and observation of phenomena during food preparation. Heavy emphasis will be placed on sanitation and cleanliness. Available to dietetics majors only. Experiments designed to complement corresponding lecture class. P or CR, N SC 251R.

280. Meat and Poultry Product Safety (3) I II (Identical with AN S 280, which is home).

299. Independent Study (1-3) [Rpt./]

299H. Honors Independent Study (1-6) [Rpt./]


340. Introduction to Diet Therapy (3) I II Food composition, principles of interviewing and counseling, cultural aspects of diets, energy requirements, major diseases requiring diet therapy. P, N SC 208, N SC 301, CHEM 103b, CHEM 104b.

358. Institution Food Management (3) I II Quantity food preparation and service, factors affecting food purchasing, storage and inventory; menu planning for institutions, management of time and labor and use of institution equipment, equipment selection and maintenance. 2R, 3L. P, N SC 101, N SC 251.

393. Internship (1-6) [Rpt./] I II

396H. Honors Proseminar (3) I

399H. Independent Study (1-3) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II


411. Consumer Issues on Nutrition (3) S Effects of misinformation and fraud on nutritional
status, general health and family economic means. P, N SC 101 or N SC 301, ECON 201a or 201b. (Identical with FS 411).

440. Nutritional Assessment and Management (4) I Methods and procedures in nutritional care applied in the clinical setting. Biochemical, clinical and dietary data collecting and analysis. Development of nutritional care plans to include formulations and planning for parenteral and enteral support. 2R, 3L, P, N SC 340; CR, N SC 408.

441. Therapeutic Nutrition (4) II Therapeutic principles of nutrition acquisition and utilization, including modification of the diet, for selected disease and/or deficiency states; factors of importance in client/patient care, rehabilitation and education. P, N SC 408. May be combined with N SC 541.

442. Community Nutrition (2) II Nutritional status assessment in the community setting; review of ongoing community programs in government and private agencies; analysis of requirements and role of community nutritionist; nutrition projects and grant writing. Field trips.

447. Perspectives in Geriatrics Laboratory (1) II (Identical with PHPR 447, which is home).

448. Perspectives in Geriatrics (2) II (Identical with PHPR 448, which is home).

458. Food Service Organization and Management (3) I Organization and management of food service systems; responsibilities of management for leadership, sanitation, maintenance, and care of food service plant and its equipment. P, N SC 358.

460. General Protein and General Metabolic (3) I (Identical with BIOC 460, which is home).

461. General Nucleic Acid Biology (2) I (Identical with BIOC 461, which is home).

463. Food Analysis (3) II Laboratory procedures for chemical and physicochemical analysis of food products. 1R, 6L.

468. Food Processing (3) I II Refrigeration, freezing, dehydration, heating, fermentation and pickling, irradiation and addition of chemicals, as they apply to food preservation and processing, retention of nutritive value, flavor, appearance and safety. P, CHEM 241B, MIC 205.

470. Food Microbiology and Sanitation (3) II Microbiology in processing and handling of foods; relation of microorganisms, insects, and rodents to design and function of processing and handling equipment. P, MIC 317. (Identical with MIC 470).

471. Food Microbiology and Sanitation Laboratory (2) II Laboratory procedures for assessment of sanitary quality of foods. P or CR, N SC 470. (Identical with MIC 471).

493. Internship (1-6) [Rpt./] I II

494. Practicum

498. Senior Capstone (1-3) I II

499. Honors Thesis (3) [Rpt./] I II

499H. Honors Independent Study (3) [Rpt./] I II

508. Human Nutrition (3) I For a description of course topics see N SC 408. Graduate-level requirements include an in-depth research paper on a current topic. P, BIOC 460, PSIO 480, PSIO 481. May be combined with N SC 408.

520. Advanced Nutritional Science (3) I Advanced physiology and biochemistry of nutrients with emphasis on present knowledge and current research topics in nutritional sciences. P, BIOC 460 or BIOC 462a.

540. Advanced Dietsetics (3) I Nutrition and metabolism in patient care as applied by the advanced-level practitioner. Open to majors in nutritional sciences only.

541. Therapeutic Nutrition (4) II For a description of course topics see N SC 441. Graduate-level requirements include an in-depth research paper on a current topic. P, N SC 408. May be combined with N SC 441.

547. Perspectives in Geriatrics Laboratory (1) II (Identical with PHSC 547, which is home).

593. Internship (1-6) [Rpt./] I II

595. Colloquium

596. Seminar

a. International Nutrition (2-3) I II (Identical with F CM 596N, which is home).

599. Independent Study (1-5) [Rpt./]


602. Metabolic Integration (3) II Analysis of current knowledge regarding the interactions between the intake, absorption, transport, processing, storage, catabolism and excretion of nutrients and the regulation of metabolic homeostasis in the intact organism. Emphasis areas include interrelationships between protein, carbohydrate and fat metabolism and their regulation by dietary, hormonal and genetic factors in humans. P, BIOC 460 or BIOC 462A-BIOC462B.

609. Nutritional Biochemistry Techniques (3) II Biochemical methods for evaluating metabolic functions of nutrients. 1R, 6L, P, CHEM 324 or CHEM 325 or CHEM 323 or CHEM 326; N SC 408. (Identical with AN S 609).

615. Chemistry and Metabolism of Lipids (3) II Chemistry and structure of lipids and their digestion, adsorption, transport and utilization; current research in lipid metabolism and the role of lipids in certain disease states. (Identical with AN S 615).


628. Steroid and Lipoprotein Chemistry and Metabolism (2) II Biochemistry and metabolism of sterols and lipoproteins in mammalian systems; regulation of biosynthesis and catabolism of sterols and lipoproteins in health and abnormalities related to disease; and dietary regualors of sterol and lipoprotein metabolism as related to cardiovascular disease risk and prevention. P, BIOC 460 or BIOC 462A-BIOC462B, N SC 602.

540. Field Methods in Human Nutrition (3) II Case-oriented approach to nutritional assessment, diagnosis, prescription, plan and prognosis; application of dietary, clinical and biochemical methods. P, open to majors in nutritional and other health sciences areas only.

663. Chemistry of Food Carbohydrates (2) II Chemical and physical properties of carbohydrates important to their presence in food. P, BIOC 460, BIOC 462A.

665. Analysis and Purification of Proteins (3) II (Identical with AN S 665, which is home).

693. Internship (1-6) [Rpt./]

693. Internship

a. Dietetic Internship, ADA Accredited (1-6) [Rpt./] I II Begins Mid-August and continues for 46 weeks. P, consult department before enrolling, course work equivalent to American Dietetic Association DDP. Open to majors only.

696. Seminar

b. Nutrition (1) [Rpt./ 5] I II (Identical with NUSC 696B).

699. Independent Study (1-5) [Rpt./] I II

700. Research (1-4) [Rpt./]

709. Master's Report (1-8) [Rpt./] I II

710. Thesis (1-6) [Rpt./]

920. Dissertation (1-9) [Rpt./] I II

930. Supplementary Registration (1-9) [Rpt./]

NUTRITIONAL SCIENCES (NUSC)
Shantz Bldg., Rm. 308
The University of Arizona
PO Box 210038
Tucson AZ 85721-0038
Phone: (520) 621-5630
Fax: (520) 621-9446
E-mail: nusc@ag.arizona.edu
URL: http://ag.arizona.edu/NSC/NUSC/
Baccalaureate Degree
The program does not offer a baccalaureate degree.

Graduate Degree
Doctor of Philosophy (Ph.D.)

Major and Degrees
Nutritional Science (Ph.D.)

Options:
Nutritional Biochemistry
Human Nutrition (Dietetics)

Program Requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are
Nutritional Sciences (NUSC)

596. Seminar
v. Alcohol, Drugs: Biology to Treatment (3) II (Identical with CHEM 356V, which is home).
599. Independent Study (1-5) [Rpt.] II
605. Methods in Nutritional Research (3) II Survey of experimental approaches to nutrition research in the areas of food safety, animal nutrition, nutritional biochemistry and human nutrition.
696. Seminar
b. Nutrition (1) [Rpt.] I II (Identical with N SC 696B, which is home).
699. Independent Study (1-5) [Rpt.] II
900. Research (1-6) [Rpt.]
910. Thesis (1-6) [Rpt.]
920. Dissertation (1-9) [Rpt.]
930. Supplementary Registration (1-9) [Rpt.]

OBSTETRICS & GYNECOLOGY (OB G)
For information about obstetrics and gynecology courses, see the entry for the College of Medicine in this manual.

OCcupational Safety & health (OSH)
For information about occupational safety and health courses, see the entry for the School of Health Professions in this manual.

OPHTALMOLOGY (OPH)
For information about ophthalmology courses, see the entry for the College of Medicine in this manual.

OPTICAL SCIENCES (OPTI)
Optical Sciences Center, Rm. 401
The University of Arizona
PQ Box 210094
Tucson AZ 85721-0094
Phone: (520) 621-4111
FAX: (520) 621-8778
E-mail: didi.lawson@opt-sci.arizona.edu
URL: http://www.opt-sci.arizona.edu

Baccalaureate Degree
Bachelor of Science in Optical Engineering (B.S.Op.E.)*

Graduate Degrees
Master of Science (M.S.)

Doctor of Philosophy (Ph.D.)

Majors and Degrees
Optical Engineering (B.S.O.P.E.)*
Optical Sciences (M.S., Ph.D.)
* Jointly administered with the College of Engineering and Mines.

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs are available on line at: http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Optical Sciences (OPTI)
210. Geometrical Optics (3) I Basic principles of light, refraction, reflection, properties of optical glass, prisms, paraxial optics, pupils and stops, visual and other basic instruments, aberrations, measurement and testing. P, MATH 125A. (Identical with ECE 210).
210L. Geometrical Optics Laboratory (1) I Cleaning optics, measuring refractive indices, dispersing and deviating prisms, thin lenses, thick lenses, aberration evaluation, Keplerian and Galileo telescopes and compound microscopes. P or CR OPTI 210. (Identical with ECE 210L).
299. Independent Study (1-4) [Rpt.] I II
299H. Honors Independent Study (1-3) [Rpt.] I II
342. Optical Systems Analysis (3) II Mathematical background, special functions, systems and operators, convolution, Fourier series, the Fourier transform, linear filtering, sampling, two-dimensional operations, applications in diffraction and image formation. P, PHYS 142 or PHYS 241; MATH 223.
399. Independent Study (1-6) [Rpt.]
399H. Honors Independent Study (1-3) [Rpt.]
434. Electrical and Optical Properties of Materials (3) I (Identical with MSE 434, which is home).
470A. Optics Laboratory (3) II Beam alignment, data acquisition and signal processing, spectrometers, incoherent sources, thermal and quantum detectors, array detectors and video, image acquisition and processing, optical properties of materials, polarization, scanners and modulators. P, ECE 351A; CR, OPTI 412. (Identical with ECE 470A).
470B. Optics Laboratory (3) II Coherent sources and Gaussian beams, spatial filters, laser cavities and diode lasers, fiber optics, Fourier optics, holography, image quality and MTF, geometrical and interferometric optical testing. P, OPTI 470A; CR, OPTI 416. (Identical with ECE 470B).
473. Atomic and Molecular Spectroscopy for Experimentalists I (3) I (Identical with PHYS 473, which is home). May be convened with OPTI 573.
474. Atomic and Molecular Spectroscopy for Experimentalists II (3) II (Identical with PHYS 474, which is home). May be convened with OPTI 574.
487. Fiber Optics Laboratory (3) II Fiber characteristics; fiber preparation; single and multimode fibers; sources; coupling; communication systems; multiplexing techniques; fiber-optic sensors. P, ECE 456. (Identical with ECE 487). May be convened with OPTI 587.
490. Rêmote Sensing for the Study of Planet Earth (3) II (Identical with REM 490, which is home). May be convened with OPTI 590.
498. Senior Capstone (1-3) I II
499H. Honors Thesis (3) [Rpt.] I II
499. Independent Study (1-6) [Rpt.] I II
499H. Honors Independent Study (3) [Rpt.]
501. Electromagnetic Waves (3) I Maxwell’s equations, boundary conditions, wave equation, vector and scalar potentials and gauges, Green’s
function, reflection, refraction, polarized light, 

502. Introduction to Optical Design (3) I Rays and wave fronts, Snell’s Law, mirror and prism systems, Gaussian imagery and cardinal points, paraxial ray tracing, stops and dispersion, systems of thin prisms, system analysis using ray trace code, chromatic aberrations and achromatization, monochromatic aberrations, ray fans, spot diagrams, balancing of aberrations, aspheric systems. P, PHYS 424 or OPTI 424.


504. Mathematical Methods for Optics (3) I Complex variables, Fourier theory and applications to imaging, coherent and incoherent imaging, other integral transforms, special functions and orthogonal polynomials, linear algebra, integral equations, green’s functions. P, PHYS 412 or OPTI 241; MATH 223.


505L. Fundamentals of Physical Optics Laboratory (1) I Laboratory in support of 501 and 505. P, OPTI 501 or OPTI 505.

506. Radiometry and Detectors (3) I Generation and propagation of black body and other radiation, projected areas, solid angle, inverse square and other laws, isotropic and other surfaces, absorption, reflection, transmission, scattering, imaging and non-imaging detectors, figures of merit, noise, vision, color, film, calibration and measurement, spectrometers and radiometers. P, OPTI 502.

507. Solid-State Optics (3) II Basic concepts in crystals and in optical response, optical properties of phonons and semiconductors, quantum wells, electro-optical properties of bulk semiconductors, optical nonlinearities, solid state devices and laser diodes. P, OPTI 511 or PHYS 371; OPTI 503.

508. Probability and Statistics in Optics (3) II Probability theory, stochastic processes, optical applications, hypothesis testing and estimation. P, OPTI 504 or OPTI 512.

510L. Fundamentals of Applied Optics Laboratory (1) I Optical systems; (2A) Gaussian optics, aberrations, radiometry, sources, detectors, optical engineering. P, OPTI 506.


511L. Lasers and Solid-State Devices Laboratory (1) I Gas and semiconductor lasers, modes and beats, mode locking, spectrum analysis, exotons and quantum wells, noise, modulators and detectors, second-harmonic generation. P, OPTI 503 or OPTI 511; CR, OPTI 507.

512. Introduction to Fourier Optics (3) I Mathematical background, convolution, the Fourier transform, linear filtering, two-dimensional operations, diffraction, image formation. P, PHYS 241 or OPTI 142; MATH 223.

512L. Mathematical Optics Laboratory (1) I Laboratory in support of 504, 508 and 512. P, OPTI 504 or OPTI 512 and C SC 227 or SIE 270.

513. Optical Testing (3) I Fringe analysis, wave front aberrations and analysis, measurement of optical components, surface figure, surface finish, length, refractive index and transfer functions. P, OPTI 505; OPTI 506.

513L. Optical Testing Laboratory (1) I Laboratory in support of 513. P or CR, OPTI 513.

514. Aberration Theory (3) I Aberration theory; geometrical image formation; diffraction; pupil, spread, and transfer functions; random wave front perturbations; system effects; image evaluation; image processing. P, OPTI 506.


527. Holography (3) I Historical background; the Gabor hologram; the hologram as a zone plate; Fresnel, image, Fourier transform, and reflection holograms; practical holography; limitations. P, OPTI 505. (Identical with ECE 527).


531. Image Processing Laboratory for Remote Sensing (3) I (Identical with ECE 531, which is home).

532. Computer Vision (3) I (Identical with ECE 532, which is home).

533. Digital Image Processing (3) I (Identical with ECE 533, which is home).

534. Advanced Topics in Electronic Materials (3) I Rpt. ECE 532 I (Identical with MEE 534, which is home).

538. Medical Optics (3) I Imaging methods in radiology, ultrasound, NMR, thermography, planar x-rays, classical tomography, computed tomography, gamma ray emission methods, positron imaging, digital radiography, xerographic methods. P, OPTI 512.


550. Fundamentals of Remote Sensing (3) I Historical development of remote sensing, the sun and the electromagnetic spectrum; radiometry; radiometry of optical systems; spectroradiometric instruments; reflectance, definitions and measurement; atmospheric properties, measurements and effects; satellite optical sensors; radiometric calibration of sensors; atmospheric correction.

558. Radiometry (3) I Units and nomenclature; Planck’s law; black bodies; gray bodies; spectral emitters; Kirchoff’s law; flux concepts; axial and off-axis irradiance; radiative transfer; normalization; coherent illumination; radiometric instruments. P, OPTI 501.

559. Imaging and Infrared Techniques (3) I Radiometry review; the radiant environment; black body and other radiation; properties of materials; detectors; optical systems; scanners; system design techniques and examples.

561. Physics of Semiconductors (3) I (Identical with PHYS 561, which is home).

563. Photoelectronic Imaging Devices (3) I Intensifiers; camera tubes; storage tubes; specifications; evaluation; applications, electronic optics, human visual process, photon detection. P, PHYS 132.

566. Optical Detectors (3) I Photodetectors, thermal and photoemitters: detectors, signal and noise mechanisms; figures of merit; limitations on the sensitivity of detectors; Infrared Detectors; BLIP; ionizing radiation detection. P, OPTI 502, OPTI 506. OPTI 507.

568. Solid-State Imaging Devices (3) I Charge transfer devices, monolithic and hybrid focal plane arrays, photoconductive, photovoltaic, and pyroelectric detectors, figures of merit, time-delay integration (TDI), fat zero, transfer efficiency, MTF, double-correlated sampling, input techniques, output techniques, buried channel vs. surface channel devices. Composite video characteristics. P, OPTI 507.

573. Atomic and Molecular Spectroscopy for Experimentalists I (3) I (Identical with PHYS 573, which is home). May be convened with OPTI 473.
574. Atomic and Molecular Spectroscopy for Experimentalists II (3) II (Identical with PHYS 574, which is home). May be convened with OPTI 474.


577. Optics of Thin Films (2) I Dielectric interference films; semiconductor and metallic films; planar wave guide films; design methods for multilayer interference filter coatings; thin film components for integrated optical circuits. P, OPTI 505.

578. Fiber Optics Laboratory (3) II For a description of course topics see OPTI 487. Graduate-level requirements include performance of a more advanced set of experiments and demonstration of a deeper knowledge of the subject. (Identical with ECE 587). May be convened with OPTI 487.

579. Remote Sensing for the Study of Planet Earth (3) II (Identical with REM 590, which is home). May be convened with OPTI 490.

580. Colloquium a. Current Subjects in Optical Sciences (1) [Rpt./ 2] I II

586. Seminar

59. Independent Study (1-5) [Rpt./ ]


625. Optical Zingers (2) II GRD A collection of simple-minded explanations or “The fine art of handwriting.”

626. Diode Lasers and Optoelectronics (3) I This course gives an understanding of the physics and technology of diode lasers, wave guides and photogenic components. The main focus is on the operation and design concept of semiconductor lasers, various diode lasers and their performance. Recent developments in laser diodes and active photogenic components are covered. Included are the state-of-the-art technology for monolithic integration of diode lasers with other optoelectronic components and their application for optical communication. P, OPTI 501.

637. Principles of Image Science (3) II Mathematical description of imaging systems and noise; introduction to inverse problems; introduction to statistical decision theory; prior information; image reconstruction and radon transform; image quality; applications in medical imaging; other imaging systems. P, OPTI 504 or OPTI 512; OPTI 508.

680. Microcomputer Interfacing in the Optics Laboratory (3) II Design, construction and use of microcomputer interfaces and assembly language software drivers. Laboratory exercises include interfaces with switches, relays, motors, terminals, A-to-D converters and D-to-A converters. P, C SC 115 or equivalent.

690. Introduction to Opto-Mechanical Design (2) II GRD Optomechanics is emerging as an indispensable field to those involved in optical engineering. Every optical component in a system must be mounted and integrated into a structure in such a way that optical characteristics and physical integrity are preserved in the presence of a variety of physical influences. In this course the principles of opto-mechanical design are reviewed and illustrated in several case studies. P, OPTI 502, PHYS 141.

696. Seminar

699. Independent Study (1-5) [Rpt./ ]

799. Honors Independent Study (1-3) [Rpt./ ]

302. Introduction to Environmental Toxicology (3) II Basic concepts in chemical exposure, metabolism, target organ toxicity, human risk, carcinogenicity, mutagenicity, and teratogenicity. Description of health effects for selected chemicals. P, two semesters of biology and chemistry.

399. Independent Study (1-5) [Rpt./ ]

401. Human Gross Anatomy (3) II (Identical with CBA 401, which is home).

408. Insect Toxicology (3) II (Identical with ENTO 408, which is home). May be convened with PCOL 508.
410. Physical Exposures (3) II 2R, 3L. (Identical with OSH 410, which is home). May be convened with PCOL 510.

420. Case Studies in Biochemical Pharmacology (1) I Contemporary issues is biochemistry will be discussed in a case study format. The course will relate alterations in cellular biochemistry with disease states and drug therapy. Open to majors only.

421. Case Studies in Pharmacology (1) II Contemporary issues in pharmacology and the related disciplines of toxicology, physiology, and immunology will be discussed in a case study format. Relates concepts and mechanisms with disease states and drug therapy. CR, PCOL 436. Open to majors only.

423. Mechanisms of Disease (4) II (Identical with V SC 423, which is home). May be convened with PCOL 523.

435. Introduction to Immunology and Hematology (2) I Molecular, cellular, and organisinal aspects of immune systems protection and destruction; new strategies for pharmacologic interventions; effects of current medical treatments. Open to majors only.

436. Medicinal Chemistry and Pharmacology I (4) II General principles of medicinal chemistry and pharmacology, and comprehensive survey of anti-infective and anti-neoplastic drugs. P, PSIO 480; PCOL 307, BIOC 460, CHEM 241B, CHEM 243B or PSIO 480. (Identical with PHSC 436). May be convened with 536.

437A. Medicinal Chemistry II (3) I Continuation of the comprehensive survey of the medicinal chemistry of drugs, including agents acting on the autonomic, cardiovascular, hematopoietic, inflammatory, and gastrointestinal systems, vitamins and radiopharmaceuticals. P, PCOL 436. May be convened with PHSC 537A.

437B. Medicinal Chemistry III (2) II Continuation of the comprehensive survey of the medicinal chemistry of drugs, including agents acting on the endocrine and central nervous systems. P, PCOL 436, PCOL 437A. May be convened with PCOL 437B.

438. Pharmaceutical Analysis (3) I II Modern methods, test kits, and instrumentation used for qualitative and quantitative analysis of drug metabolites and biochemicals in biological samples.

445. Drugs of Abuse (3) II Pharmacology and toxicology of abused drugs with emphasis on mechanisms of drug action, theories of addiction, involvement of AIDS and the immune system and treatment approaches. May be convened with PCOL 545.

462A. Biochemistry (3) I (Identical with BIOC 462A, which is home).

462B. Biochemistry (3) II (Identical with BIOC 462B, which is home).

466. Physiology Laboratory (3) II (Identical with ECOL 466, which is home). May be convened with PCOL 566.

470. Phytomedicine (2) II Introduction to chemistry, pharmacology, botanical sources, safety and efficacy issues of commonly used herbal drugs with emphasis on pharmaceutical applications. P, PCOL 437A, PCOL 437B.

471A. Pharmacology II (4) I Continuation of the comprehensive survey of the pharmacology of drugs, including agents acting on the autonomic, cardiovascular, hematopoietic, and inflammatory systems. P, PCOL 436. May be convened with PCOL 571A.

471B. Pharmacology III (2) II Continuation of the comprehensive survey of the pharmacology of drugs, including agents acting on the endocrine and central nervous system. P, PCOL 471A.

472. Nursing Pharmacology (3) I II Pharmacodynamics, pharmacology, and adverse effects of commonly used drugs, with emphasis on clinical applications. Not available for elective credit in the College of Pharmacy or graduate credit in pharmacology-toxicology graduate programs. P, open only to nursing majors or with consent of course coordinator. May be convened with PCOL 572.

474. Clinical Toxicology (2) I II Prevention, characteristics, diagnosis and rational management of diseases caused by drug overdose, toxic household products, poisonous plants, venemous animals, environmental and industrial toxicants. P, PCOL 472; PCOL 471B.

480. Human Physiology (5) I II (Identical with PSIO 480, which is home).

484. Fundamentals of Industrial and Environmental Health (3) I (Identical with OSH 484, which is home). May be convened with PCOL 584.

485. Industrial Ventilation (3) II (Identical with OSH 485, which is home). May be convened with PCOL 585.

487. Advanced Industrial and Environmental Health (3) II (Identical with OSH 487, which is home). May be convened with PCOL 587.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./] I II

499. Independent Study (1-6)

499H. Honors Independent Study (3) [Rpt./] I II

501. The Pharmacological Basis of Therapeutics (6) I II Action of chemical agents upon living material at all levels of organization with emphasis on mechanisms of action of prototype drugs. Foundation for a rational approach to human therapeutics and toxicology. P, PSIO 580 or PSIO 601; course equivalent to BIOC462a. Available as both PCOL501 and PHCL 801.

502. Environmental Monitoring and Analysis (2-4) I I (Identical with OSH 502, which is home).

508. Insect Toxicology (3) II (Identical with ENTO 508, which is home). May be convened with PCOL 408.

509. Statistics for Research (4) I II (Identical with MATH 509, which is home).

510. Physical Exposures (3) II (Identical with OSH 510, which is home). May be convened with PCOL 410.

515. Basic Human Pathology (4) II (Identical with PATH 515, which is home).

520. Clinical Pharmacology (2) II Effects of drugs on natural history of disease; drug interactions; drug testing designs; drug abuse literature evaluation; aspects of clinical toxicology. P, PCOL 501.

523. Mechanisms of Disease (4) II (Identical with V SC 523, which is home). May be convened with PCOL 423.

536. Medicinal Chemistry and Pharmacology I (4) II For a description of course topics see PCOL 436. Graduate-level requirements include extensive use of the current literature and emphasis on drug design principles. (Identical with PHSC 537A). May be convened with PCOL 437A.

537A. Medicinal Chemistry II (3) I For a description of course topics see PCOL 437A. Graduate level requirements include extensive use of the current literature and emphasis on drug design principles. (Identical with PHSC 537B). May be convened with PCOL 437B.

545. Drugs of Abuse (3) I For a description of course topics see PCOL 445. Graduate-level requirements include a term paper on some aspect of drug abuse. May be convened with PCOL 445.


551. Molecular Biology of Pharmacological Agents (3) I Molecular mechanism of drugs and toxins at the cellular and subcellular levels, including effects on control mechanisms, cell-cell interactions, organelles, and nucleic acid and protein synthesis. P, BIOC 462A, BIOC 465B or BIOC 411; BIOC 511.

553. Toxicology and Chemical Exposure (2-4) I (Identical with OSH 553, which is home).


566. Physiology Laboratory (3) II (Identical with ECOL 566, which is home). May be convened with PCOL 466.

571A. Pharmacology II (4) I For a description of course topics see PCOL 471A. Graduate-level requirements include an in-depth research paper on a current topic. May be convened with PCOL 471A.

571B. Pharmacology III (2) II Graduate-level requirements include an in-depth research paper on a current topic.

572. Nursing Pharmacology (3) I For a description of course topics see PCOL 472. Graduate-level requirements include a term paper on nursing pharmacology. Not available for elective credit in the College of Pharmacy or graduate credit in pharmacology-toxicology.
graduate programs. May be convened with PCOL 472.

574. Clinical Toxicology (2) II Graduate students will complete sixteen hours experience in the Poison Information Center.

576. Environmental Toxicology (3) II Toxicity of agricultural and industrial chemicals, with emphasis on agriculture and water pollutants; decision-making in environmental issues and risk assessment. P, PCOL 602A, 6 units of biology and organic chemistry. (Identical with ENTO 576).

580. Systems Physiology (5) II (Identical with PSIO 580, which is home).

582. Immunotoxicology (3) I Broad overview of the immune system, with emphasis on how chemicals affect the immune system (immune modulation) and the role of the immune system in chemical-induced tissue injury/allergic responses. P, MIC 419 or equivalent, PCOL 602A, PCOL 602B. (Identical with MBIM 582, MBIM 582).

584. Fundamentals of Industrial and Environmental Health (3) I (Identical with OSH 584, which is home). May be convened with PCOL 484.

585. Industrial Ventilation (3) II (Identical with OSH 585, which is home). May be convened with PCOL 485.

586. Introduction to Pharmacology and Toxicology Research (1) I Introduction to basic research techniques in pharmacology and toxicology through supervised laboratory rotations; student-initiated and faculty-structured lab. Exercises in modern pharmacological and toxicological techniques.

586B. Introduction to Pharmacology and Toxicology Research (1) II Introduction to basic research techniques in pharmacology and toxicology through supervised laboratory rotations; student-initiated and faculty-structured lab. Exercises in modern pharmacological and toxicological techniques.

587. Advanced Industrial and Environmental Health (3) II (Identical with OSH 587, which is home). May be convened with PCOL 487.

593. Internship (1-3) I II

596. Seminar
   a. Advanced Graduate Research (1-3) [Rpt./ 9 units] I
   b. Current Concepts in Industrial Hygiene (1) [Rpt./ 3] II
   c. Advanced Toxicology (1-2) [Rpt./ 8 units] II

597. Workshop
   a. Computer-Assisted Instruction (1) I II
   b. Independent Study (2-4) [Rpt./] I

601. Analytical Instrumentation and Techniques (2-4) I Lecture and laboratory in the qualitative and quantitative determination of toxic substances in the environment and body fluids. Modern instrumental techniques will be employed whenever appropriate. Lecture may be taken separately by non-majors. Toxicology majors take lecture/labatory (4 units). Elective for pharmacology majors and others should take lecture only (2 units). P, CHEM 325, CHEM 326.


602B. Biotechnology Laboratory (1) I Laboratory. Proper use of animals in toxicology and pharmacology research; focuses on organ specific toxicities. (Identical with CBIO 602B, CBIO 602B, PHL 602B, PHL 602B).

610. Topics in Advanced Toxicology (1-3) I II Current developments in toxicology including: chemical carcinogenesis, mutations and teratogenesis; behavioral toxicology; inhalation toxicology; toxicokinetics; metabolism and environmental toxicology or other selected topics. P, PCOL 482.

620. Principles of Pharmacology (3) I Basic principles of the actions of drugs and of intercellular communication; drug-receptor theory; principles of laboratory investigation in pharmacology and toxicology; historical and philosophical foundations of pharmacology and toxicology.

625. Human Neuroscience (6) I II (Identical with MED 625, which is home).

653. Neuropharmacology (3) II Role of various neurochemicals in the peripheral and central nervous systems and the effects of drugs on the nervous system, including their actions at receptors and their influence on synthesis, storage, and release of neurotransmitters.

670. Principles of Perfusion Techniques I (3) I An introduction to basic extracorporeal techniques through discussion of blood propelling devices, heat transfer, gas transfer, bio-materials, and perfusion pharmacology. Open to majors only. P, PCOL 671 or PCOL 671. (Identical with SURG 670).

671. Perfusion Technology Laboratory (1) I An introduction to basic extracorporeal systems. Open to majors only. (Identical with SURG 671).

672. Principles of Perfusion Techniques II (2) I Introduction to basic extracorporeal techniques through discussion of blood propelling devices, heat transfer, gas transfer, bio-materials and perfusion pharmacology. Open to majors only. (Identical with SURG 672).

691. Preceptorship
   I. Perfusion Science (1-3) [Rpt./ 25 units] Students register for 3 units for Fall and Spring semesters and 1 unit for Summer Session I and II. P, admission into circulatory sciences option in within pharmacology.

695. Colloquium
   a. Research Conference (1-3) [Rpt./10] I II
   b. Cellular/Molecular Pharmacology (1-3) [Rpt./ 4 units] II P, BIOL 551; BIOL 424A, BIOL 424B.

696. Seminar
   a. Student Research (1) [Rpt./ 9] I II
   b. Independent Study (1-5) [Rpt./] I II
   c. Research (5) [Rpt./ 1] (Identical with PHPH 815L, which is home).

900. Research (1-5) [Rpt./]

910. Thesis (1-8) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

**COLLEGE OF PHARMACY**

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The University of Arizona
PO Box 210207
Tucson AZ 85721-0207
Phone: (520) 626-1427
FAX: (520) 626-4063
E-mail: AdmissionsInfo@Pharmacy.Arizona.EDU
URL: http://www.pharmacy.arizona.edu

The College of Pharmacy prepares pharmacists to provide pharmaceutical and related health care services. These services are mainly concerned with optimizing the therapeutic effects and minimizing the adverse effects of drugs. The professional program in the College of Pharmacy is fully accredited by the American Council on Pharmaceutical Education.

**Professional Degree**

Doctor of Pharmacy (Pharm.D.)

**Graduate Degrees**

Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

**Majors and Degrees**

Pharmacy (Pharm.D.)
Pharmaceutical Sciences (M.S., Ph.D.)
Pharmacology and Toxicology (M.S., Ph.D.)

**Professional Degree Program**

The professional degree offered by the College of Pharmacy is the Doctor of Pharmacy (Pharm.D.). The program for this degree is based upon six years of college work (two years of pre-pharmacy and four years in the College of Pharmacy).

**Graduate Degree Programs**

The college also offers graduate studies leading to the Master of Science degree in pharmaceutical sciences, pharmacology and toxicology, and pharmacy, and the Doctor of Philosophy degree in pharmaceutical sciences and pharmacology and toxicology. For information on specific graduate programs in the departments of Pharmaceutical Sciences, Pharmacology and Toxicology, and Pharmacy Practice, consult the Graduate Catalog.

**Program Requirements**

For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRs). APRRs are available on line at: http://www.arizona.edu/academic/ oncoursedata/data-interface/. Minor requirements are available on line at http://www.arizona.edu/ academic/oncoursetdata/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.
537B. Medicinal Chemistry III (2) II (Identical with PCOL 537b.). For a description of course topics see PCOL 437a. Graduate-level requirements include extensive use of current literature and emphasis on drug design principles. P, PCOL 536. May be convened with PCOL 437b.

542. Professional Management Practice (3) I For a description of course topics see PHPR 442. Graduate students will write either an additional paper or proposal. May be convened with PHPR 445.

545. Medical Use and US Health Care Systems (3) I For a description of course topics see PHPR 445. Graduate students will write either an additional paper or proposal. May be convened with PHPR 445.

547. Perspectives in Geriatrics Lab (1) II P or CR, PHSC 448. (Identical with GERO 547, N SC 547). May be convened with PHPR 447.

548. Perspectives in Geriatrics (2) II For a description of course topics see PHPR 448. Graduate-level requirements include one in-depth research paper on a single topic relevant to geriatric care. (Identical with GERO 548, PHL 548). May be convened with PHPR 448.

561. Pharmaceutical Research and Drug Literature Evaluation (3) II For a description of course topics see PHPR 461. Graduate students will write either an additional paper or proposal. May be convened with PHPR 461.

583. Perspectives on Cancer Care for Health Professionals (3) S (Identical with NURS 583, which is home) May be convened with PHPR 483.

584. International Health Care and Pharmaceutical Systems (1-3) [Rpt.] III Graduate-level requirements include a more extensive final report. May be convened with PHPR 484.

589. Clinical Pharmacotherapy of Mental Disorders (2) I For a description of course topics see PHPR 489. Graduate-level requirements include a research paper on a single topic of psycho-pharmacotherapy. (Identical with PHL 589). May be convened with PHPR 489.

593. Internship (1-6) [Rpt.]

596. Seminar

a. Medicinal and Natural Products Chemistry (1) [Rpt. /5] I II

b. Pharmaceutical Chemistry Research (1) [Rpt. /5] I II

c. Pharmaceutics Research (1-2) [Rpt/ 12 units] I II
d. Pharmaceutics (1) [Rpt. /4] I II
e. Pharmacy Administration (1) I II
f. Pharmacy Administration Research (1) I II

599. Independent Study (1-5) [Rpt.]

601. Advanced Physical Pharmacy (3) I Applications of physical pharmacy to pharmacy. P, physical pharmacy or physical chemistry. Open to majors only.


606. Industrial Manufacturing Pharmacy (3) I II Pharmaceutical as applied to various aspects of industrial pharmacy. Field trips.


611. Pharmaceutical Education Research (3) I Cultural, social, behavioral, and organizational foundations of pharmacy, including the development of the present state of practice. (Identical with PHL 611).

612. Pharmaceutical Outcomes Research (3) II Survey of research methodology for studying administrative, social and behavioral aspects of health care and pharmacy practice; strategy for selecting and modifying existing research tools for particular purposes. (Identical with PHL 612).

621. The Pharmaceutical Industry (3) II Economic and organizational factors in the development, production, and distribution of drugs and the structure of the industry. (Identical with PHL 621).

630A - 630B. Advanced Organic Medicinals (4) I Rational drug design, receptor site theories, mechanism of drug action, and metabolic pathways of medicinal agents; chemical and enzymatic synthesis of important pharmaceuticals. P, PHSC 437B, PCOL 471B.

632A - 632B. Natural Medicinal Products (3-3) I Origin and isolation of steroid and alkaloid drugs and other natural products of interest. P, PHSC 437B, PCOL 471B.

634. Biomedical Applications of Mass Spectrometry (3) I Principles of mass spectrometry including instrumental design, interpretation of spectra, and applications to biomedical and related problems. P, CHEM 241B.

694. Practicum

a. Clinical Clerkship (1-15) I II
b. Administrative Clerkship (1-15) I II

695. Colloquium

a. Research in Gerontology (1) I II (Identical with GERO 695A, which is home).

699. Independent Study (1-5) [Rpt.]

815L. Research (5) [Rpt. /1] (Identical with PHPR 815L, which is home).

900. Research (1-5) [Rpt.]

910. Thesis (1-5) [Rpt.]

920. Dissertation (1-9) [Rpt.]

930. Supplementary Registration (1-9) [Rpt.]

Pharmacology (PHCL)

599. Independent Study (1-5) [Rpt.]

691. Preceptorship (3) [Rpt.]

800. Research (1-6) [Rpt.] I II

801. The Pharmacological Basis of Therapeutics (6) [Rpt./ I II Actions of chemical agents upon living material at all levels of organization.
with emphasis on mechanisms of action of prototype drugs; foundation for a rational approach to human therapeutics and toxicology. P, PSIO 580 or PSIO 601; and course equivalent to BIOC 462A. Available as both PHCL 801 and PCOL 501.

815. Pharmacy Subspeciality
a. Clinical Pharmacology (3-6) [Rpt./] I II

1. Research (5) (identical with PHPR 8151, which is home).

825. Human Neuroscience (6) II (identical with MED 825, which is home).

991. Preceptorship
a. Pharmacology (3-12) [Rpt./12 units] I II

1. Perfusion Science (1-3) [Rpt./25] students register for 3 units Fall and Spring semesters and one unit Summer Session I and II. (Identical with SURG 891L).

999. Independent Study (1-3) [Rpt./] I II

1. Research (1-12) [Rpt./]

990. Thesis (1-8) [Rpt./]

1. Dissertation (1-9) [Rpt./]

1. Supplementary Registration (1-12) [Rpt./]

Pharmacy Practice and Science (PHPR)

195. Colloquium
a. Perspectives on Health Care: Current Issues and Trends (1) I

1. Medication Misadventures (1) I

299. Independent Study (1-3) [Rpt./]

394. Practicum (1-4) [Rpt./]

399. Independent Study (1-4) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./]

400. Pharmaceutical Calculations (1) I

Chemical calculations pertinent to the selection, formulation, preparation, dosage and administration of drugs and their dosage forms.

401. Dosage Form Design (2) II Application of physical-chemical principles to pharmaceutical dosage forms, including a discussion of the biopharmaceutical considerations which influence the efficacy of pharmaceutical formulations. P, PHPR 402, PHPR 406.

402. Pharmacetics (3) I Discussion of the physical and chemical factors that relate to the development of pharmaceutical products and delivery systems. Emphasis is placed on newly emerging technologies and an industrial perspective. P, PHYS 102, PHYS 182, CHEM 103B, CHEM 104B.

403A. Beginning Pharmacy Practice (1) I Orientation to career opportunities for pharmacists; medical terminology and abbreviations.

403B. Beginning Pharmacy Practice (1) II Orientation to career opportunities for pharmacists; medical terminology and abbreviations.

404. Interviewing and Counseling Skills (1-2) I Basic communication skills and thinking strategies needed for effective medication history interviewing and patient counseling.

406A. Pharmaceutics Lab (1) I P or CR, PHPR 402.

406B. Pharmaceutics Lab (1) II P, PHPR 406A.


408A. Pharmacokinetics Discussion (1) I II Discussion related to the application of pharmacokinetic principles with case-study examples. CR, PHPR 407.

408B. Pharmacokinetics Discussion (1) II Discussion related to the application of pharmacokinetic principles with case-study examples. CR, PHPR 485.

410. Research Options in Pharmacy (1) I Introduction to research in the pharmacy disciplines, career opportunities in pharmacy research: grants, contracts, and patents; confidentiality and ethics.

411. Perspectives in Professional Practice (2) I II Orientation to professional practice issues; pharmacy practice site visitations. Involves weekly discussions, site visits to various pharmacy practices, and a written paper. Open to majors only. Field Trips.

413. Pharmacy Practice (2) II Application of pharmaceutical care principles, pharmacy problem-solving skills, role playing and documentation of pharmaceutical care. P, PHPR 407, PCOL 471B.

414. Pharmacy Practice Lab (1) II Laboratory for 413.

415. Toxicokinetics (3) II Introduction to the principles of pharmacokinetics as they are applied to the biological and chemical sciences for the quantitative study of drugs and toxic agents. Toxicokinetics involves the development of quantitative models to describe the time course of absorption and tolerance, and tissue distribution. Influence of social, behavioral and economic factors associated with the prescribing, dispensing, and use of medications.

417. The Internet: Application and Use (3) I II Skills and principles of drug information, biostatistics, and literature evaluation needed to evaluate biomedical literature. P, PHPR 403.

425. Preparation for Pharmacy Clerkships (1) I Weekly discussion to prepare students for pharmacy clerkships. Includes presentations by clerkship preceptors, curriculum vitae preparation, and professional portfolio development. P, open only to majors in 3rd year.

427. Anti-neoplastic Drugs (2) II Discovery and development of natural and synthetic anti-neoplastic drugs; pre-clinical and toxicity evaluation; phase I, II, and III clinical studies in humans. P or CR. PHPR 437B.

432. Managed Health Care (2) II An introduction to the concepts and various aspects of managed health care systems within the United States and roles for pharmacists. P, PHPR 445.

442. Professional Practice Management (3) I Management of professional situations and the interaction among patients, colleagues, and other health-care providers, with application to institutional, community, and clinical pharmacy practice. P, PHPR 445.

443. Pharmacy Laws (2) I Legal concepts covering professionalism, negligence, liability, legal processes and semantics; pertinent federal, state and local statutes and regulations.

454. Medication Use and the U.S. Health Care System (3) I An overview of the U.S. health care system and the consumers, providers, payers, and regulators that create it. The role of the pharmacist and pharmacists within the health care system will be explored, including an examination of social, behavioral, and economic factors associated with the prescribing, dispensing, and use of medications.

458. Perspectives in Geriatrics Laboratory (3) I II P, PHPR 448. (Identical with GERO 448, N SC 448).

459. Perspectives in Geriatrics (2) I Multidisciplinary approach to the health-care needs of the elderly, including medication use, nutrition, health care agencies and roles of individual health care professionals. P, PHPR 448. Open to nonmajors only. (Identical with GERO 448, N SC 448).

454. Drug Information and Drug Literature Evaluation (3) I II Skills and principles of drug information, biostatistics, and literature evaluation needed to evaluate biomedical literature. P, PHPR 403.

461. Methodology in Pharmacy Research and Drug Literature Evaluation (3) I II Application of research design, statistical methods, evaluation techniques, and ethical dimensions to critically evaluate published literature, research reports and proposals. P, MATH 263.

475A. Pharmacotherapeutics (6) I II Common diseases that afflict humans. Their management based on pharmacotherapeutic considerations of epidemiology, etiology, diagnosis, pathophysiology, and prognosis. P, BIOC 460, PSIO 480.

475B. Pharmacotherapeutics (6) I II Common diseases that afflict humans. Their management based on pharmacotherapeutic considerations of epidemiology, etiology, diagnosis, pathophysiology, and prognosis. P, BIOC 460, PSIO 480.
didactic course work in the first three professional years.

810B. Surgery (5) [Rpt./] P, available only after completion of all required and didactic course work in the first three professional years.

810C. Pediatrics (5) [Rpt./] P, available only after completion of all required and didactic coursework in the first three professional years.

810D. Geriatrics/Gerontology (5) [Rpt./] P, available only after completion of all required and didactic course work in the first three professional years.

810E. Outpatient Practice (5) [Rpt./] P, available only after completion of all required and didactic course work in the first three professional years.

810F. Emergency Services (5) [Rpt./] P, available only after completion of all required and didactic course work in the first three professional years.

810G. Acute Care (5) [Rpt./] P, available only after completion of all required and didactic course work in the first three professional years.

810H. Clinical Pharmacokinetics (5) [Rpt./] I II available only after completion of all required and didactic course work in the first three professional years.

810I. Psychopharmacy/Neurology (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

810J. Nutrition Support (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

810K. Specialty Institution (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815A. Hematology/Oncology (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815B. Cardiology (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815C. Pulmonary (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815D. Endocrine (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815E. GI/Renal (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815F. Obst/Gyn/Neonatal (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815G. Infectious Disease (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815H. Rheumatology/Immunology (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815I. Dermatology (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815J. Poison Information/Toxicology (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815K. Administrative (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815L. Research (5) [Rpt./] I available only after completion of all required and didactic course work in the first three professional years.

815M. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815N. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815O. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815P. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815Q. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815R. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815S. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815T. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815U. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815V. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815W. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815X. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815Y. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

815Z. Independent Study (1-4) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

816. Seminar

900. Research (1-6) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

910. Thesis (1-6) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

920. Dissertation (1-9) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

930. Supplementary Registration (1-9) [Rpt./] available only after completion of all required and didactic course work in the first three professional years.

PHILOSOPHY (PHIL)
Social Sciences Bldg., Rm. 213
The University of Arizona
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Tucson AZ 85721-0027
Phone: (520) 621-3129
FAX: (520) 621-9599
E-mail: hickman@ccit.arizona.edu
URL: http://www.arizona.edu/~phil/

Baccalaureate Degree
Bachelor of Arts (B.A.)

Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/ oncourse/data/interface/. Minor requirements are available on line at: http://www.arizona.edu/ academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Philosophy (PHIL)
110. Logic and Critical Thinking (3) I available only after completion of all required and didactic course work in the first three professional years.

Designed to improve ability to reason and think critically; emphasis on evaluating and presenting arguments. Includes a basic introduction to logic and scientific reasoning.
with LING 432, which is home). May be convened with PHIL 532.

433. Aesthetics (3) I II Classical and contemporary theories of art; the aesthetic experience, form and content, meaning, problems in interpretation and criticism of works of art. May be convened with PHIL 533.

434. Social and Political Philosophy (3) I II Fundamental concepts of politics; leading social and political theories, such as anarchism, social contract, Marxism. May be convened with PHIL 534.

436. Games and Decisions (3) I Classical theory of subjective probability, utility, and rational choice, with applications to games theory and social welfare theory. P, MATH 119. May be convened with PHIL 536.

438A. Philosophy of Law (3) I Nature and validity of law; law and morality, judicial reasoning, law and liberty. (Identical with POL 438A). May be convened with PHIL 538A.

438B. Philosophy of Law (3) I Problems about justice, compensation and contracts and/or responsibility and punishment. (Identical with POL 438B). May be convened with PHIL 538B.

440. Metaphysics (3) I II Topics include free will and determinism; causation; personal identity; necessity and essence; truth, realism and ontology. May be convened with PHIL 540.

441. Theory of Knowledge (3) I II Critical examination of some of the major problems concerning evidence, justification, knowledge, memory, perception and induction. May be convened with PHIL 541.

442. Knowledge and Cognition (3) I Issues in philosophy and psychology of knowledge, with emphasis on cognitive mechanisms. Perception, memory, concept, mental representation, problem solving, reasoning and rationality. P, two philosophy courses. May be convened with PHIL 542.


445. Neural Network Modeling: What and Why (3) I (Identical with PSYC 445, which is home). May be convened with PHIL 545.

450. Philosophy of Mind (3) I II Topics include the nature of mental states; the relation between mind and brain; and analysis of perception, emotion, memory and action. May be convened with PHIL 550.

451. Philosophy and Psychology (3) I Investigation of philosophical issues arising from current work in psychology including perception, reasoning, memory, motivation and action. May be convened with PHIL 551.

455. Philosophy and Artificial Intelligence (3) I II Interdisciplinary problems lying at the interface of philosophy and artificial intelligence. (Identical with PSYC 455). May be convened with PHIL 555.

463. Philosophy of Language (3) I II Survey of basic issues in the philosophy of language such as: speech acts, reference, meaning, logical form. (Identical with LING 463). May be convened with PHIL 563.

465. Pragmatics (3) I II Study of language use, its relationship to language structure and context; topics such as speech acts, presupposition, implication, performatives, conversations (Identical with LING 465). May be convened with PHIL 565.

467. Early Analytic Philosophy (3) I II The 50 year rise of analytic philosophy from Frege through early Russell to Wittgenstein’s Tractatus. May be convened with PHIL 567.

470. Greek Philosophy (3) I II Topics in Greek philosophy. May be selected from the pre-Socratics, Socrates, Plato, Aristotle and post-Aristotelian philosophy. (Identical with CLAS 470). May be convened with PHIL 570.

471A. Rationalism and Empiricism (3) I Rationalists of the 17th and 18th centuries: Descartes, Spinoza, Leibniz, and Kant. May be convened with PHIL 571A.

471B. Rationalism and Empiricism (3) II Empiricists of the 17th and 18th centuries: Locke, Berkeley, Hume. May be convened with PHIL 571B.

472A. Ancient Philosophy (3) I II A philosophical introduction to the major works of Plato. (Identical with CLAS 472A). May be convened with PHIL 572A.

472B. Ancient Philosophy (3) I II A philosophical introduction to the major works of Aristotle. (Identical with CLAS 472B). May be convened with PHIL 572B.

493. Internship I Legislative Internship (1-6) I

498. Senior Capstone (3) I II

498H. Honors Thesis (3) [Rpt./] I II

499. Independent Study (1-4) [Rpt./]

499H. Honors Independent Study (3) [Rpt./] I II

502. Mathematical Logic (3) I (Identical with MATH 502, which is home). May be convened with PHIL 502.

503. Foundations of Mathematics (3) I (Identical with MATH 503, which is home). May be convened with PHIL 503.

509A-509B. Symbolic Logic (3-3) I II For a description of course topics see PHIL 409A-409B. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with PHIL 409A-409B.

510A-510B. History of Moral and Political Philosophy (3-3) I II For a description of course topics see PHIL 410A-410B. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with PHIL 410A-410B.

512. Readings in Greek Philosophy (3) [Rpt./] I II (Identical with GRK 512, which is home). May be convened with PHIL 512.

514. Philosophical Logic (3) I II For a description of course topics see PHIL 414. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with PHIL 414.

516. Philosophy of Mathematics (3) I I For a description of course topics see PHIL 416. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with PHIL 416.

519. Induction and Probability (3) I I For a description of course topics see PHIL 419. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with PHIL 419.

521. Philosophy of the Biological Sciences (3) I For a description of course topics see PHIL 421. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with PHIL 421.

522. Linguistic Semantics and Lexicology (4) I (Identical with LING 522, which is home).

523A-523B. Philosophy of the Physical Sciences (3) I For a description of course topics see PHIL 423A-423B. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with PHIL 423A-423B.

524. Philosophy of Social Sciences (3) I For a description of course topics see PHIL 424. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with PHIL 424.

525. Philosophical Issues in Feminism (3) I For a description of course topics see PHIL 425. Graduate-level requirements include an in-depth research project on a central theme or topic of this course. May be convened with PHIL 425.

530A-530B. Ethical Theory (3) I For a description of course topics see PHIL 430A-430B. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with PHIL 430A-430B.

532. Psychology of Language (3) I I (Identical with LING 532, which is home). May be convened with PHIL 432.

533. Aesthetics (3) I I For a description of course topics see PHIL 433. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with PHIL 433.

534. Social and Political Philosophy (3) I I For a description of course topics see PHIL 434. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with PHIL 434.

536. Games and Decisions (3) I For a description of course topics see PHIL 436. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with PHIL 436.

537. Psycholinguistics (3) I (Identical with LING 537, which is home).
538A-538B. Philosophy of Law (3) I For a description of course topics see PHIL 438A-438B. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. (Identical with POL 538A). May be convened with PHIL 438A-438B.

540. Metaphysics (3) I II For a description of course topics see PHIL 440. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with PHIL 440.

541. Theory of Knowledge (3) I II For a description of course topics see PHIL 441. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with PHIL 441.

542. Knowledge and Cognition (3) I For a description of course topics see PHIL 442. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with PHIL 442.

543. Knowledge and Society (3) II For a description of course topics see PHIL 443. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. (Identical with LI S 543). May be convened with PHIL 443.

545. Neural Network Modeling: What and Why (3) II (Identical with PSYC 545, which is home). May be convened with PHIL 445.

550. Philosophy of Mind (3) I II For a description of course topics see PHIL 450. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with PHIL 450.

551. Philosophy and Psychology (3) I II For a description of course topics see PHIL 451. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with PHIL 451.

555. Philosophy and Artificial Intelligence (3) I II For a description of course topics see PHIL 455. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. (Identical with PSYC 555). May be convened with PHIL 455.

556. Philosophy of Language (3) I II For a description of course topics see PHIL 463. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. (Identical with LING 563). May be convened with PHIL 463.

564. Formal Semantics (3) I (Identical with LING 564, which is home).

565. Pragmatics (3) II For a description of course topics see PHIL 465. Graduate-level requirements include a greater number of assignments and a higher level of performance. (Identical with LING 565). May be convened with PHIL 465.

567. Early Analytic Philosophy (3) I II For a description of course topics see PHIL 467. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with PHIL 467.

570. Greek Philosophy (3) [Rpt/ 1] I II For a description of course topics see PHIL 470. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. (Identical with CLAS 570). May be convened with PHIL 470.

571A-571B. Rationalism and Empiricism (3-3) I For a description of course topics see PHIL 471A-471B. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with PHIL 471A-471B.

572A. Ancient Philosophy (3) I For a description of course topics see PHIL 472A. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. (Identical with CLAS 572A). May be convened with PHIL 472A.

572B. Ancient Philosophy (3) [Rpt/ 1] II For a description of course topics see PHIL 472B. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. (Identical with CLAS 572B). May be convened with PHIL 472B.

593. Internship

I. Legislative Internship (1-9) I II

596. Seminar

a. Ethics (3) [Rpt/ 2] I II

b. Metaphysics (3) [Rpt/ 2] I II
c. Epistemology (3) [Rpt/ 2] I II
d. Social and Political Philosophy (3) [Rpt/ 2] I II
e. Philosophy of Law (3) I II (Identical with LAW 596G).
f. Philosophy of Social Science (3) [Rpt/ 2] I II (Identical with PHYS 596H).

599. Independent Study (1-4) [Rpt/]

900. Research (1-4) [Rpt/]

910. Thesis (1-4) [Rpt/]

920. Dissertation (1-9) [Rpt/]

930. Supplementary Registration (1-9) [Rpt/]

PHYSICAL EDUCATION (PE)

McKale Center 228
The University of Arizona
PO Box 210096
Tucson AZ 85721-0096
Phone: (520) 621-6993
FAX: (520) 621-6989
E-mail: bbb@U.arizona.edu

Baccalaureate Degree
Bachelor of Science in Health Sciences
(B.S.H.S.)*

Graduate Degrees
The department does not offer a graduate degree.

Major and Degree
Physical education (B.S.H.S. *)

*The department’s degree program was under review when this manual went to press. For more information about the baccalaureate program, contact the department.

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Report (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors.

For graduate programs requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Physical Education (PE)

208. Aerobic Dance Fitness (1) I II

211. Badminton (1) I II

212. Volleyball (2) I II

214. Cooperative Activity Learning (1) I II

217. Folk Dancing (1) I II

218. Football (1) I II

219. Golf (1) I II

221. Women’s Gymnastics (2) I

223. Handball-Racket Ball (1) I II

225. Soccer (2) I II

227. Softball (1) I II

228. Strength and Conditioning Training (1) I

229. Swimming-Lifeguard Training (2) I II

230. Tennis (2) I II

231. Track and Field (2) I

232. Volleyball (2) I II

260. Water Safety Instructor (2) I II

261. Advanced First Aid and Emergency Care (2) I II

262. Lifeguard Training Instructor (2) I II

267. Controlling Stress and Tension (2)

Psychophysiology of stress and its relationship to health, with emphasis on understanding personal stress patterns and learning appropriate stress management techniques such as relaxation, cognitive intervention strategies, meditation, autogenic training, and physical activity.

269. Peak Performance (2) I II

279. Motor Development (2) I II

285. Principles of Teaching Physical Activities (3) I II
286A. Sports Officiating: Basketball (Men's and Women's Rules) (1) I
286B. Sports Officiating: Baseball-Softball (1) I
286F. Sports Officiating: Volleyball (1) I
Guiding principles and standards; rules, mechanics and procedures for officiating sports common to secondary school interscholastic and community club programs. Consult department before enrolling.
288. Historical and Philosophical Perspectives of Sport and Physical Education (3) I II
293. Internship (1-3) [Rpt./] I II
294. Practicum
a. Movement Experiences for Children (1) [Rpt./] I
299. Independent Study (1-2) [Rpt./] I II
299H. Honors Independent Study (1-3) [Rpt./] I
320. Psychological Foundations for Exercise and Sport (3) I II
350. Movement Experiences for Elementary School Children (2) I
351. Elementary School Physical Education (2)
354A. Theory of Coaching: Aquatics (2) II
354B. Theory of Coaching: Baseball (2) I
354C. Theory of Coaching: Basketball (2) I
354F. Theory of Coaching: Softball (2) I
354G. Theory of Coaching: Tennis (2) II
354H. Theory of Coaching: Track and Field/ Cross Country (2) II
354I. Theory of Coaching: Volleyball (2) I
355. Physical Education Instruction Strategies (2) I
360. Functional Kinesiology (3) II (Identical with PSIO 360, which is home).
371. Special Physical Education (3) I II
373. Physiological Basis of Physical Education and Athletics (3) I (Identical with PSIO 373, which is home).
374. Physiological Basis of Physical Education and Athletics Laboratory (1) I (Identical with PSIO 374, which is home).
377. Techniques in Prevention and Treatment of Athletic Injuries (3) I II
380. Motor Learning (3) I II
381. Measurement and Evaluation (3) I II
385. Principles of Athletic Coaching (3) II
393. Internship (1-3) [Rpt./]
394. Practicum
a. Athletic Coaching (3) [Rpt./] II
b. Physical Education Teaching (1) [Rpt./] II
399. Independent Study (1-3) [Rpt./]
399H. Honors Independent Study (1-3) [Rpt./] I II
410. Sport in Contemporary Society (3) I May be convened with PE 410.
452. Teaching Physical Education in the Elementary School (3) II
477. Advanced Sport Injury Management (3) II
497. Workshop
a. Physical Education Student Teaching Forum (1) I II
498. Senior Capstone (1-3) II
498H. Honors Thesis (3) [Rpt./ 2] I II
499. Independent Study (1-3) [Rpt./]
499H. Honors Independent Study (3) [Rpt./] I II
510. Sport in Contemporary Society (3) I For a description of course topics see PE 410. May be convened with PE 410.
524. Behavioral Management of the Injured Athlete (3) II
527. Psychology of Sport and Exercise (3) I (Identical with PHL 527).
529. Psychological Interventions and Ergonomic Aids for Peak Performance (3) II
536. Administration of Sports Programs (3) I
566. Physical Activity in Aging and Chronic Diseases: Psychosocial Aspects (3) I
580. Evaluation of Athletic Injuries (3) I
581. Therapeutic Modalities (2) II
582. Anatomical Basis of Sports Injuries (3) I
583. Medical Aspects of Sports Injuries (3) II
584. Rehabilitation of Athletic Injuries (3) II
585. Issues in Athletic Training and Sports Medicine (3) II
586. Physical Education and the Law (3) I
587. Legal Aspects of Sports Administration (3) II
591. Preceptorship (1-3) [Rpt./]
593. Internship (1-3) [Rpt./]
594. Practicum (1-2) [Rpt./]
599. Independent Study (1-3) [Rpt./]
694. Practicum (1-2) [Rpt./]
791. Preceptorship (1-3) [Rpt./]
793. Internship (1-3) [Rpt./] I II
793. Internship
a. Sport Psychology (1-3) [Rpt./ 12 units] I II

PHYSICS (PHYS)
Physics and Atmospheric Sciences Bldg., Rm. 232
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E-mail: info@physics.arizona.edu
URL: http://www.physics.arizona.edu/

Baccalaureate Degrees
Bachelor of Science (B.S.)
Bachelor of Science in Engineering Physics (B.S.E.PH.)*
Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Engineering Physics (B.S.E.PH.)*
Physics (B.S., M.S., Ph.D.)*
*Administered jointly with the College of Engineering and Mines.

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.
To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Physics (PHYS)
101. Physics in the Modern World (4) I II Basic concepts and the societal impact of physics. Topics include mechanics, wave motion, energy, light, nuclear and atomic physics, and astrophysics. 3R, 3L. P, high school algebra. Open to non-majors only.
102. Introductory Physics I (3) I II CDT Designed for liberal arts and life science majors with no calculus background. Survey of the basic fields of physics, with emphasis on applications to other fields and historical development. Those wishing to take this course as a lecture-laboratory course should register concurrently with PHYS 181. P, credit will be allowed for only one of the following sequences of courses: 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.
103. Introductory Physics II (3) I II CDT Continuation of 102. P PHYS 102, lecture-lab combination requires co-registration with PHYS182, credit will be allowed for only one of the following sequences of courses: 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.
107. The Physics of Music (4) I CDT Sound production, musical instruments, frequency analysis, physics of hearing, psychological and physiological effects, harmony and scales, audio acoustics, electronic production and recording. 3R, 3L.
132. Introductory Physics with Calculus II (4) II Designed for liberal arts and life science majors...
majors with calculus background. Thermodynamics, electricity and magnetism, geometrical and physical optics, optical instruments, atomic and nuclear physics. P, PHYS 131. Lecture-lab combination requires co-registration with PHYS182, credit will be allowed for only one of the following sequences of courses; 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.

141. Introductory Mechanics (4) I II CDT Vector concepts; kinematics, static’s and dynamics for point masses, particle systems and rigid bodies; conservation laws of energy, momentum, and angular momentum; fluid static’s and dynamics. 4R, 2L. P, MATH 125A; CR, MATH 125B.

142. Introductory Optics and Thermodynamics (2-3) I II CDT Temperature scales, heat, thermodynamics and heat engines; kinetic theory and statistics of many particle systems; geometrical optics, lenses, mirrors and optical instruments; physical optics, diffraction, interference and wave theory. 2R (1R, 2L). P, PHYS 141; CR, MATH 223.

142H. Honors Introductory Optics and Thermodynamics (2-3) I II CDT Temperature scales, heat, thermodynamics and heat engines; kinetic theory and statistics of many particle systems; geometrical optics, lenses, mirrors and optical instruments; physical optics, diffraction, interference and wave theory. 2R (3L). P, PHYS 141H or PHYS 141 with consent of instructor, CR, MATH 223. Credit will be allowed for only one of the following sequences of courses; 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.

151. Introduction to Mechanics (4) I Kinematics and dynamics of particles and rigid bodies, conservation laws. 4R, 2L. P or CR, MATH 125A. Credit will be allowed for only one of the following sequences of courses; 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.

152. Introduction to Thermodynamics and Relativity (4) II Continuation of 151. Fluid statics and dynamics, first and second laws of thermodynamics and special theory of relativity. 4R, 2L. P, PHYS 151, CR, MATH 125A. Credit will be allowed for only one of the following sequences of courses; 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.

181. Introductory Laboratory I (1) I Quantitative experiments in physics, both illustrative and exploratory. Designed to accompany 102 or 131; sections are established corresponding to each course. P or CR, PHYS 102 or PHYS 131. Credit will be allowed for only one of the following sequences of courses; 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.

182. Introductory Laboratory II (1) I Quantitative experiments in physics, both illustrative and exploratory. Designed to accompany 103 or 132; sections are established corresponding to each course. P, PHYS 181; CR, PHYS 103 or PHYS 132. Credit will be allowed for only one of the following sequences of courses; 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.

195. Colloquium a. Creation of the Universe (1) I

199. Independent Study (1-6) [Rpt.]

199H. Honors Independent Study (1-3) [Rpt./] I

205. Computational Physics (3) I II S Introduction to numerical techniques for solving physics problems. Includes introduction to programming. Sample problems might include chaotic motion, nonlinear mechanics, particle trajectories, Monte Carlo simulation of phase transitions or stellar structure. P, PHYS 142 or PHYS 152.

241. Introductory Electricity and Magnetism (4) I II CDT Field concepts, electrostatics, magnetostatics, currents, electromagnetic phenomena and electromagnetic waves. 4R, 2L. P, PHYS 141, CR, MATH 223. Credit will be allowed for only one of the following sequences of courses; 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.

241H. Honors Introductory Electricity and Magnetism (4) I II Electrostatic forces, fields, and potentials; magnetostatics; dynamics of charged particles in electric and magnetic fields; electrical currents and circuit analysis, electromagnetic phenomena associated with time-dependent electric and magnetic fields; Maxwell’s equations in differential form and electromagnetic waves. Methods of vector calculus are used extensively. 3R, 3L. P, PHYS 141H or PHYS 141 with consent of instructor, CR, MATH 223. Credit will be allowed for only one of the following sequences of courses; 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.

242. Introductory Relativity and Quantum Physics (3) I II CDT Introduction to 20th century concepts. Relativity and quantum theory will be emphasized. Other topics may be chosen from the following list: atomic and molecular structure, nuclear and elementary particle physics, quantum statistics and condensed matter. P, PHYS 141, PHYS 142, PHYS 241 or OPTI 226; MATH 223. Credit will be allowed for only one of the following sequences of courses; 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.

251. Introduction to Electricity and Magnetism (4) I Laws of electric and magnetic fields, DC and AC circuits, Maxwell’s equations. 4R, 2L. P, PHYS 152; CR, MATH 223. Credit will be allowed for only one of the following sequences of courses; 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.

252. Introduction to Optics and Quantum Theory (4) I II Continuation of 251. EM waves, physical optics, geometrical optics, and quantum theory. 4R, 2L. P, PHYS 152. Credit will be allowed for only one of the following sequences of courses; 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.

299. Independent Study (1-4) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./] I

320. Optics (3) I II Electromagnetic waves; rays, interference, diffraction, scattering; applications to imaging systems, Fourier methods, holography, and crystal optics. P, PHYS 242 or PHYS 252; MATH 223.

321. Theoretical Mechanics I (3) I CDT Newton’s laws; rectilinear and rotational motion; simple, damped and rotational oscillators; Lagrangian and Hamiltonian formulations; central forces and orbital motion; noninertial reference frames; rigid bodies; coupled oscillators. P, PHYS 241H or PHYS 251; MATH 223; CR, PHYS 254.

325. Thermodynamics (3) I II Approximately equal time spent on classical and statistical thermodynamics; basic laws of thermal equilibrium; heat engines; ideal and non-ideal gases; phase transitions; irreversible processes; kinetic theory and statistical thermodynamics. P, PHYS 242 or PHYS 252; MATH 233.

331. Electricity and Magnetism I (3) I Electromagnetic phenomena leading to Maxwell’s equations; static and time-dependent solutions. P, PHYS 321 or MATH 442A.

332. Electricity and Magnetism II (3) II Continuation of 331. Transmission lines and wave guides; radiation theory, 4-vector formulation of special relativity. P, PHYS 331.

371. Quantum Theory (3) I II Introductory quantum mechanics; Schrodinger’s Equation, one-dimensional problems, operators and matrices, three-dimensional problems, two particle problems, angular momentum, the hydrogen atom and spin. P, PHYS 242 or PHYS 252; PHYS 321, MATH 254.

381. Methods in Experimental Physics I (2) II Designed to develop experimental skills and to demonstrate important concepts in classical and modern physics. Writing-Emphasis Course. 3L. P, two upper-division courses in physics, or co-registration. PHYS205 is recommended for students without programming experience.

382. Methods of Experimental Physics II (2) II Continuation of 381. Both 381 and 382 are offered each semester, but students are encouraged not to enroll simultaneously. Writing-Emphasis Course.

396H. Honors Proseminar (3)

399. Independent Study (1-6) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I

402. Medical Physics (3) I CDT Basic physics of the human body: the principles of mechanics, electricity, sound, light and radiation as they apply to physiology, with emphasis on instrumentation for diagnosis and treatment. P, PHYS 103 or PHYS 132, MATH 124 or equivalent. Writing-Emphasis Course. (Identical with MCB 402). May be convened with PHYS 502.

402. Theoretical Mechanics II (3) I II Advanced classical mechanics and modern dynamical systems. Topics include: canonical transformations, Hamilton-Jacobi theory, continuum mechanics, fluid dynamics and nonlinear systems. Special topics covered in the latter may include discrete maps, fractals, chaos, differential flows and solitons. P, PHYS 321; MATH 254.

430. Introduction to Biophysics (2) I CDT Concepts and experimental techniques of
of the five-week lectures listed as 445A through 445D. Credit can only be given once for each topic. P, PHYS 241 or PHYS 151 or PHYS 251 or consult department before enrolling; PHYS 321, PHYS 141, PHYS 142, PHYS 145, PHYS 152, PHYS 154A is not prerequisite to PHYS 445B or D. May be convened with PHYS 545A.

445B. Experimental Acoustics (1) Laboratory experiments with sound sources, oscilloscopes, detectors, light collection optics, spectral recording and analysis. Students select one to three sections from the five-week lectures listed as 445A through 445D. Credit can only be given once for each topic. P, PHYS 241 or PHYS 151 or PHYS 251 or consult department before enrolling; PHYS 321, PHYS 141, PHYS 142, PHYS 152, PHYS 154A is not prerequisite to PHYS 445B or D. May be convened with PHYS 545B.

445C. Experimental Microscopy, Light Scattering and Optics of Small Particles (1) Laboratory experiments with microscopes and polarized scattered light to characterize small particles and surfaces, optical constant, lasers, remote sensing. Students select one to three sections from the five-week lectures listed as 445A through 445D. Credit can only be given once for each topic. P, PHYS 241 or PHYS 151 or PHYS 251 or consult department before enrolling, PHYS 321, PHYS 141, PHYS 142, PHYS 152, PHYS 154A is not prerequisite to PHYS 445B or D. May be convened with PHYS 545C.

445D. Experimental Geometrical and Physical Optics (1-3) Experimental measures of geometrical and optical properties of basic optical elements: lenses, prisms, gratings, optical fibers, etc. Students select one to three sections from the five-week lectures listed as 445A through 445D. Credit can only be given once for each topic. P, PHYS 241 or PHYS 151 or PHYS 251 or consult department before enrolling, PHYS 321, PHYS 141, PHYS 142, PHYS 152, PHYS 154A is not prerequisite to PHYS 445B or D. May be convened with PHYS 545D.

445. Experimental Physics (1-3) [Rpt.] Sections a, b, c, d. Students select one to three sections from the five-week lectures listed below. Each section is available for one unit of credit. Credit can only be given once for each topic. None is prerequisite to any other P, PHYS 141, PHYS 142, PHYS 241 or PHYS 151, PHYS 152, PHYS 251, or consult department before enrolling. May be convened with PHYS 445A-PHYS 445B-PHYS 445C-PHYS 445D.

445A. Experimental Spectroscopy (1) Laboratory experiments with spectroscopic sources, spectrometers, instrument functions, detectors, light collection optics, spectral recording and analysis. Students select one to three sections from the five-week lectures listed as 445A through 445D. Credit can only be given once for each topic. P, PHYS 241 or PHYS 151 or PHYS 251 or consult department before enrolling; PHYS 321, PHYS 141, PHYS 142, PHYS 152, PHYS 154A is not prerequisite to PHYS 445B-C or D. May be convened with PHYS 545A.

445B. Experimental Acoustics (1) Laboratory experiments with sound sources, oscilloscopes, detectors, light collection optics, spectral recording and analysis. Students select one to three sections from the five-week lectures listed as 445A through 445D. Credit can only be given once for each topic. P, PHYS 241 or PHYS 151 or PHYS 251 or consult department before enrolling; PHYS 321, PHYS 141, PHYS 142, PHYS 152, PHYS 154A is not prerequisite to PHYS 445B-C or D. May be convened with PHYS 545B.

445C. Experimental Microscopy, Light Scattering and Optics of Small Particles (1) Laboratory experiments with microscopes and polarized scattered light to characterize small particles and surfaces, optical constant, lasers, remote sensing. Students select one to three sections from the five-week lectures listed as 445A through 445D. Credit can only be given once for each topic. P, PHYS 241 or PHYS 151 or PHYS 251 or consult department before enrolling, PHYS 321, PHYS 141, PHYS 142, PHYS 152, PHYS 154A is not prerequisite to PHYS 445B-C or D. May be convened with PHYS 545C.

445D. Experimental Geometrical and Physical Optics (1-3) Experimental measures of geometrical and optical properties of basic optical elements: lenses, prisms, gratings, optical fibers, etc. Students select one to three sections from the five-week lectures listed as 445A through 445D. Credit can only be given once for each topic. P, PHYS 241 or PHYS 151 or PHYS 251 or consult department before enrolling, PHYS 321, PHYS 141, PHYS 142, PHYS 152, PHYS 154A is not prerequisite to PHYS 445B-C or D. May be convened with PHYS 545D.
For a description of course topics see PHYS 445A. Graduate-level requirements include an in-depth report on a topic selected in consultation with the instructor. May be convened with PHYS 445B.

563. Experimental Condensed Matter Physics (3) II Topics in experimental condensed matter physics will include thin film theory, methods, characterization; high vacuum deposition technologies; evaporation sputtering, MBE, CVD, LPE, Ion Beam Deposition; epitaxial films; diffraction theory; x-ray, electron probes: RBS, XPS, Auger; magnetic films; superconductivity.

570A-570B. Quantum Mechanics (3-3) I II Principles of quantum mechanics; wave mechanics and matrix mechanics; applications to atomic structure and spectroscopy. P, PHYS 475, PHYS 476 recommended but not required.

570C. Intermediate Quantum Mechanics (3) II Formal quantum mechanics; scattering theory; relativistic wave equations; applications of Dirac equation; angular momentum; symmetry; optical theorem; dispersion relations and path integral formulations.

572. Quantum Theory II (3) II For a description of course topics see PHYS 472. Graduate-level requirements include additional homework problems. May be convened with PHYS 472.

573. Atomic and Molecular Spectroscopy for Experimentalists I (3) I For a description of course topics see PHYS 473. Graduate-level requirements include homework problem assignments at an advanced level. (Identical with OPT 573.) May be convened with PHYS 473.

574. Atomic and Molecular Spectroscopy for Experimentalists II (3) II For a description of course topics see PHYS 474. Continuation of 573. (Identical with OPT 574.) May be convened with PHYS 474.

575. Methods of Mathematical Physics I (3) I For a description of course topics see PHYS 475. Graduate-level requirements include advanced examinations, as determined by the instructor. May be convened with PHYS 475.

576. Methods of Mathematical Physics II (3) II For a description of course topics see PHYS 476. Graduate-level requirements include advanced examinations, as determined by the instructor. May be convened with PHYS 476.

579A-579B. Advanced Relativistic Quantum Mechanics (3-3) I II Continuous groups; scattering theory; relativistic wave equations; quantum electrodynamics, Feynman diagrams, dispersion theory, renormalization; strong and weak interactions. P, PHYS 515B, PHYS 570B.

581. Elementary Particle Physics (3) I Production, interaction, and decay of mesons, baryons and leptons; high energy scattering of elementary particles; particle classification and symmetries; theoretical interpretation. P, PHYS 472.

582. High Energy Astrophysics (3) II (Identical with ASTR 582, which is home).

e. Issues in Science and Technology Policy (3) II (Rpt/6 units) (Identical with OPTI 596E).

f. Topics in Cosmology (3) P, PHYS 476.

h. Philosophy of Physical Science (3) (Rpt/ 2) I II (Identical with PHIL 596H, which is home).

599. Independent Study (1-6) (Rpt/)

685. Graduate Physics Laboratory (3) (Rpt/ 2) II Introduction to modern research methods and experiments. Problems in low-temperature physics; solid-state, atomic, and nuclear spectroscopy; computer-based data acquisition and analysis; solar-energy physics; and others.

695. Colloquium

a. Current Problems in Physics (1) (Rpt/ 4 units) I II

697. Workshop

a. Problems in Computational Science (3) (Rpt/ 1) I II (Identical with MATH 697A, which is home).

b. Applied Mathematics Laboratory (3) II S (Identical with MATH 697B, which is home).

900. Research (1-4) (Rpt/)

909. Master's Report (1-9) (Rpt/ I II

910. Thesis (1-4) (Rpt/)

920. Dissertation (1-9) (Rpt/)

PHYSIOLOGICAL SCIENCES (PS)

The University of Arizona
PO Box 245051
Tucson AZ 85724-5051
Phone: (520) 626-2898 or 621-2785
FAX: (520) 626-2382
E-mail: coronado@u.arizona.edu (M.S. program)
rholly1@u.arizona.edu (Ph.D. program)
URL: http://www.physiol.arizona.edu/

Baccalaureate Degrees

The program does not offer a baccalaureate degree.

Graduate Degrees

Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Major and Degrees

Physiological Sciences (M.S., Ph.D.)

Program requirements

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.
Physiological Sciences (PS)

503. Cellular and Molecular Physiology (5) I (Identical with PSIO 503, which is home).
549. Survival Skills for Students (2) I II (Identical with SP H 549, which is home).
699. Independent Study (1-3) [Rpt./] I II
700. Research Methods in Physiological Sciences (1-3) [Rpt./8 units] I II
900. Research (1-9) [Rpt./] I II
910. Thesis (1-6) [Rpt./] I II
920. Dissertation (1-9) [Rpt./] I II
930. Supplementary Registration (1-9) [Rpt./] I II

PHYSIOLOGY (PSIO)

Department of Physiology
1501 N. Campbell Ave.
The University of Arizona
P.O. Box 245050
Tucson, AZ 85724
Phone: (520) 626-6511
FAX: (520) 621-8170
E-mail: illig@U.Arizona.EDU
URL: http://www.physiol.arizona.edu/COLL/

Baccalaureate Degree
Bachelor of Science in Health Sciences (B.S.H.S.)

Graduate Degrees
The department participates in the graduate interdisciplinary program in physiological sciences. See the entry under “Physiological Sciences” in this manual for more information.

Majors and Degrees
Physiological sciences (B.S.H.S.)

Program requirements
For undergraduate academic program requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/onecourse/data/ interface/Minor requirements are also available on line at: http://www.arizona.edu/academic/onecourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental offices listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Physiology (PSIO)

120. Human Physiology: The Facts of Life (4) I II Introduction to human biological function ranging from the cellular to the organ system level with a focus on situations encountered in daily life. (Identical with MCB 120).

195. Colloquium
a. How the Body Works (1) I
199. Independent Study (1-3)
199H. Honors Independent Study (1-3)
201. Human Anatomy and Physiology I (4) I Study of structure and function of the human body. Topics include cells, tissues, integumentary systems, skeletal system, muscular system, and nervous system. Primarily for majors in exercise sciences, health education, medical technology, nursing, nutritional sciences, occupational safety and health, physical education, speech and hearing sciences. 3R, 3L.
202. Human Anatomy and Physiology II (4) II Continuation of structure and function of the human body. Topics include endocrine, circulatory, respiratory, digestive, urinary and reproductive systems. Primarily for majors in exercise sciences, health education, medical technology, nursing, nutritional sciences, occupational safety and health, physical education, speech and hearing sciences. 3R, 3L.

403. Introduction to Cell Physiology (4) How cells work and how the workings of different types of cells provide the foundation for how organisms work and how organisms function. P, MATH 124 or MATH 125A; CHEM 243B, PHYS 103.
418. Physiology for Engineers (4) I Designed to bring to engineering students an awareness of the structure and function of whole organisms, their component organs, and organ systems. Open to non-majors only. (Identical with CHEE 418, ECE 418).
419. Physiology Laboratory (2) I Laboratory experiments in physiology intended to provide experience with organ systems and measurement techniques. Designed for engineering students enrolled in the clinical engineering and biomedical engineering options. 6L. P or CR, PSIO 418. Open to non-majors only. (Identical with CHEE 419, ECE 419).
454. Evaluation and Regulation of Body Build and Composition (3) I Laboratory and field assessment of body fat, lean body mass and comatocyte, anthropometry; body build and composition of the athlete: morphology of fat and lean tissue; exercise and dietary regulation of obesity and chronic underweight. P, PSIO 201, PSIO 202. May be convened with PSIO 545.
466. Physiology Laboratory (3) I I (Identical with ECOL 466, which is home). May be convened with PSIO 566.
467. Endocrine Physiology (3) I I Mammalian endocrine regulation from an integrative perspective. Primary focus is on calcium and fuel metabolism, stress, fluid balance, reproduction, and growth and development. P, PSIO 201 or PSIO 202 and MCB 181R or MCB 182. (Identical with CBA 467, MCB 467).
468. Comparative Physiology (3) I I (Identical with ECOL 468, which is home). May be convened with PSIO 568.
480. Human Physiology (5) II Principles of physiology with emphasis on the human, including discussion intended to reinforce principles of physiological phenomena; designed primarily for students in pharmacy and health-related sciences. P, CHEM 243B, MATH 123,
a. Research in Physiological Sciences (1-2) I II
b. Biomechanics (2) I S P, PSIO 462.
c. Environmental Physiology (2) [Rpt./ 1] II P, PSIQ 420. May be convened with PSIO 595D.
d. Endocrinology and metabolism (2) [Rpt./ 1] II P, PSIO 420. May be convened with PSIO 595E.

e. Integrative Cardiorespiratory Physiology (2) [Rpt./ 1] I S P, PSIO 420. May be convened with PSIO 595F.

f. Kinesiology (2) [Rpt./ 1] II P, PSIO 462. May be convened with PSIO 595G.
g. Body Composition (2) [Rpt./ 1] II P, PSIO 445 or PSIO 545. May be convened with PSIO 595L.
h. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ ]

499. Independent Study (1-6) [Rpt./ ]

499H. Honors Independent Study (1-6)

502. Principles of Neuroanatomy (4) II

(Identical with CBA 502, which is home.)

503. Cellular and Molecular Physiology (5) I

Through examination of fundamental cellular processes, the integrated function of diverse cell types is discussed. Topics include: mechanisms involved in protein expression, intracellular protein targeting, and regulation of protein function; membrane transport phenomena; cell signaling mechanisms-excitability, ion channels, synaptic function; muscle and vascular function. R CHEM 103B, CHEM 104B, CHEM 241B, CHEM 243B, PHYS 103, MATH 125A, MATH 125B, BIOC 460. (Identical with PS 503).

512. Biological Electron Microscopy (4) I II

(Identical with MCB 512, which is home.)

520. Exercise and Environmental Physiology (3) I

For a description of course topics see PSIO 420. Graduate-level requirements include a research-review paper on an approved topic. P, BIOC 460 or BIOC 462A; CHEM 103A, CHEM 103B, CHEM 104A, CHEM 104B, CHEM 241A, CHEM 241B, CHEM 243A, CHEM 243B, PSIO 201, PSIO 202, MATH 118, MATH 211, PHYS 102, PHYS 103. May be convened with PSIO 420.

521. Physiological Sciences Laboratory (3) I

For a description of course topics see PSIO 421. Graduate-level requirements include additional laboratory reports. P or CR, PSIO 520. May be convened with PSIO 421.

545. Evaluation and Regulation of Body Build and Composition (3) I

For a description of course topics see PSIO 445. Graduate-level requirements include an additional research project and case report. P, PSIO 201 and PSIO 202. May be convened with PSIO 445.

549. Survival Skills for Students (2) I II

(Identical with SP H 549, which is home.)

562. Neuromechanical Kinesiology (3) I II

a. Research in Physiological Science (1-2) I II

Graduate-level requirements include a research paper. P, PSIO 201, PSIO 202, MATH 118, PHYS 102, PHYS 103, PHYS 181, PHYS 182. May be convened with PSIO 426.

568. Comparative Physiology (3) II

(Identical with ECOL 568, which is home). May be convened with PSIO 468.

570. Research Design in Physiological Sciences (2) II

Study of research designs, methodologies and data analysis procedures pertinent to the physiological sciences; emphasis is on the selection of research problems and interpretation of research articles.

571. Laboratory in Research Design for Physiological Sciences (1) II

Laboratory experiences in literature retrieval systems; data analysis procedures by calculator, microcomputer, and mainframe computer; critical analysis procedures of research articles, and participation in a research project. CR, PSIO 570.

573. Statistical Analysis (3) I

Analysis of research designs and data analysis procedures in the field of exercise and sport sciences with emphasis on the appropriateness of selected designs and interpretation of various data analysis procedures. Statistical power, reliability, covariance and multiple regression techniques and uses of micro- and mainframe data analysis software. P, PSIO 570, PSIO 571.

575. Special Topics In Biological Imaging (2) I II

(Identical with CBA 575, which is home). P, PSIO 570, PSIO 571.

580. Systems Physiology (5) II

Principles of systems physiology. Designed for graduate students throughout the University. Consent department before enrolling. P, PSIO 503 or equivalent, MATH 123, PHYS 103, CHEM243B. (Identical with PCOL 580).

582. Topics in Neural Development (2) I

(Identical with NRSC 582, which is home).

585. Neural Mechanisms of Behavior (2) II

(Identical with NRSC 585, which is home).

588. Principles of Cellular and Molecular Neurobiology (4) I

(Identical with NRSC 588, which is home).

589. Principles of Systems Neurobiology (4) I

(Identical with NRSC 589, which is home).

593. Internship (1-3) [Rpt./ ]

595. Colloquium

a. Research in Physiological Science (1-2) II

May be convened with PSIO 495A.

d. Environmental Psychology (2) II P, PSIO 420. May be convened with PSIO 495D.
en. Endocrinology and Metabolism (2) [Rpt./ 1] II P, PSIO 420. May be convened with PSIO 495E.
f. Integrated Cardiorespiratory Physiology (2) [Rpt./ 1] I S P, PSIO 420. May be convened with PSIO 495F.
g. Kinesiology (2) [Rpt./ 1] II P, PSIO 462. May be convened with PSIO 495G.
i. Body Composition (2) [Rpt./ 1] II P, PSIO 445 or PSIO 545. May be convened with PSIO 495I.

j. Molecular Neurobiology (2) II P, open to graduate students in PS, PCOL, and NEUR, consent of instructor.

k. Mathematical Techniques In Physiology (2) II

F P, MATH 125A, MATH 125B, PSIO 160.

l. Muscle Physiology (2) I II P, PSIO 503.

m. Assignments in Motor Control (1) P, PSIO 480 or equivalent, consult department before enrolling.

n. Endocrinology (2) I

o. Renal Physiology (2) I II P, PSIO 580 or equivalent.

p. Molecular and Cell Excitability (2) I

q. Peripheral Vascular Physiology (2) II I II P, PSIO 580 or equivalent.
r. Membranes and Transport (2) I

s. Systems Neurophysiology (2) I II

(Identical with MCB 512, which is home).

596. Seminar

i. Principles in Cellular and Molecular Cardiovascular Biology (3) [Rpt./ 2] I

(Identical with SURG 561, which is home).

599. Independent Study (1-6) I II

601. Systems Physiology (6) II

Comprehensive coverage of systemic physiology with emphasis on the underlying principles of function. Consent required to enroll; consult instructor before registering. P, consult department before enrolling.

602. Readings in Systems Physiology (1) I

Readings of primary literature coordinated with Systems Physiology 601 lectures. Includes 3 laboratory sessions for Cardiovascular, Respiratory, and Renal systems. P, PSIO 601.

610. Research Methods in Physiology (1-3) [Rpt./ 10 units] I II

Laboratory course providing students with an understanding of the types of research available in the department. (Maximum length is 8 weeks). P, consult department before enrolling.

620. Introduction to Systems Neurophysiology (2) II

An interdisciplinary overview of selected aspects of systems neurophysiology specifically designed for graduate students in physiological sciences who do not specialize in neuroscience. The course focuses upon the generalized mammalian nervous system, with occasional reference to lower vertebrate and invertebrate systems. The course focuses upon key features of segmental (spinal, periphery sensory afferent, neuroeffector) and suprasegmental (brain) mechanisms that control and/or modulate sensorimotor, cardiorespiratory, and endocrine systems. Open to non-majors. P, PSIO 503 or PSIO 588 with consent of instructor.

625. Human Neuroscience (6)

(Identical with MED 625, which is home).

695. Colloquium


696. Seminar

a. Physiology Series (1) [Rpt./ 3] I II Open to majors only.
The program does not offer a baccalaureate degree.

Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Major and Degrees
Planetary Sciences (M.S., Ph.D.)

Minor
The program offers both a graduate and an undergraduate minor.

Program requirements
For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Planetary Sciences (PTYS)

106. Survey of the Solar System (3) I II
Interdisciplinary synthesis of planetary and space science; the sun, planets, satellites, interplanetary gas, comets, small bodies, space missions. Designed for nonscientists. 3R, 3L. P, MATH 116 recommended, not required.


109L. Exploration and Discovery in Planetary Science (1) I II Hands-on laboratory experiments with tools and procedures used to reconstruct the origin and evolution of the Solar System. Activities include observation of planets, image processing, and studies of radioactivity, light, and gravity. CR, may be taken with PTYS106 or PTYS107. (Identical with ASTR 106, GEOS 106).

112H. Undergraduate Research in Planetary Science (4) II Student research using spacecraft or ground-based telescopic data to investigate various topics of current interest in planetary science. Open to honors students only.

191H. Honors Preceptorship (1-5)

299. Independent Study (1-3) [Rpt./]

391. Preceptorship

H. Honors Independent Study (1-5) [Rpt./]

403. Physics of the Solar System (3) I II Survey of planetary physics, planetary motions, planetary interiors, planetary atmospheres, asteroids, comets, origin of the solar system. P, PHYS 142 or PHYS 251. (Identical with ASTR 403, GEOS 403). May be convened with PTYS 403.


411. Geology of the Solar System (4) I (Rpt./I) Geologic processes and landforms on satellites and the terrestrial planets, their modification under various planetary environments, and methods of analysis. 3R, 3L. P, GEO 101 or equivalent, and MATH 125B or equivalent. (Identical with GEOS 411). May be convened with PTYS 411.

418. Modern Astronomical Instrumentation and Techniques (3) I (Identical with ASTR 418, which is home). May be convened with PTYS 418.

419. Physics of the Earth (3) II (Identical with GEOS 419, which is home). May be convened with PTYS 419.

430. The Chemical Evolution of Earth (3) I (Identical with GEOS 430, which is home). May be convened with PTYS 430.

441A-441B. Dynamic Meteorology (3) I (Identical with ATM 441A-441B, which is home). May be convened with PTYS 441A-441B.

449. Image Processing for Scientific Discovery (3) I Image processing as a tool for exploration, discovery and analysis in a wide range of subjects. Suitable for both science and non-science majors, as well as pre-service and in-service mathematics and technology teachers. May be convened with PTYS 449.

491H. Honors Preceptorship (3) I II

498. Senior Capstone (1-3) I II

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (1-5) [Rpt./]

503. Physics of the Solar System (3) II For a description of course topics see PTYS 403. Graduate-level requirements include an in-depth research paper on a selected topic and an oral class presentation. (Identical with ASTR 503, GEOS 503). May be convened with PTYS 503.


507. Chemistry of the Solar System (3) I For a description of course topics see PTYS 407. Graduate-level requirements include an original research paper or critical review. May be convened with PTYS 407.


517. Atmospheres and Remote Sensing (3) II Structure, composition, and evolution of atmospheres; atomic and molecular spectroscopy; radiative transfer and spectral line formatting.

518. Modern Astronomical Instrumentation and Techniques (3) I (Identical with ASTR 518, which is home). May be convened with PTYS 418.

519. Physics of the Earth (3) II (Identical with GEOS 519, which is home). May be convened with PTYS 419.

520. Meteorites (3) II Classification; chemical, mineralogical and isotopic composition; cosmic abundances; ages; interaction with solar and cosmic radiation; relation to comets and asteroids. P, PTYS 510. (Identical with GEOS 520).


530. The Chemical Evolution of Earth (3) I (Identical with GEOS 530, which is home). May be convened with PTYS 430.

541A-541B. Dynamic Meteorology (3) I (Identical with ATMO 541A-541B, which is home). May be convened with PTYS 441A-441B.

544. Physics of High Atmospheres (3) II Physical properties of upper atmospheres, including gaseous composition, temperature and density, ozonosphere, and ionospheres, with emphasis on chemical transformations and eddy transport. (Identical with ATMO 544).

545. Stellar Atmosphere (3) I (Identical with ASTR 545, which is home).

549. Image Processing for Scientific Discovery (3) II For a description of course topics see PTYS 449. Graduate-level students are required to present advanced-level documentation. May be convened with PTYS 449.


554. Evolution of Planetary Surfaces (3) II The geologic processes and evolution of terrestrial planet and satellite surfaces including the Galilean and Saturnian and Uranian satellites. Course includes one or two field trips to Meteor Crater or other locales. Field trips. (Identical with GEOS 554).

555. Remote Sensing of Planetary Surfaces (3) II Exploration of planetary surfaces, including that of the Earth, with remote sensing. Emphasis on compositional determination using visible and infrared methods. Basic principles, image and spectroscopic analysis techniques, and case studies in planetary remote sensing. (Identical with ASTR 555, GEOS 555).


565. The Outer Solar System (3) I Fundamental aspects of outer system studies presented at the beginning graduate level: solar system formation and solar nebula chemistry; outer planet atmospheres; outer planet interiors, satellite surface processes; ring phenomenology and physics; and Triton, Pluto/Charon, and Kuiper belt.

567. Inverse Problems in Geophysics (3) II I (Identical with GEOS 567, which is home).

571. Terrestrial Planets (3) I Geophysical and geochemical techniques used to deduce composition and evolution of terrestrial planets. Topics include the Earth, Moon, Mars, Venus, and meteorites. P, PTYS 510, PTYS 554. (Identical with GEOS 571).

582. High Energy Astrophysics (3) II (Identical with ASTR 582, which is home).

583. Physical Geochemistry (3) I II (Identical with GEOS 583, which is home).

589. Topics in Theoretical Astrophysics (3) [Rpt./1] (Identical with PHYS 589, which is home).

591. Preceptorship (1-5) [Rpt./]

594. Practicum
a. Planetary Geology Field Studies (1) [Rpt./] 3 II Field Trips.

596. Seminar
a. The Origin of Life in the Solar System (3)

597. Workshop
h. Planetary Astronomy (3) S
i. Image Processing: Teaching (1)

599. Independent Study (1-5) [Rpt./]

691. Preceptorship (1-5) [Rpt./]

699. Independent Study (1-5) [Rpt./]

791. Preceptorship (1-5)

900. Research (1-8) [Rpt./]

909. Master's Report (3-5) [Rpt./]

910. Thesis (2-4) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

**PLANNING (PLAN)**

Architecture Bldg., Rm. 214
The University of Arizona
PO Box 210075

Tucson AZ 85721-0075
Phone: (520) 621-9597
FAX: (520) 621-9820
E-mail: youngk1@ccit.arizona.edu
URL: http://w3.arizona.edu/~archplan/

**Baccalaureate Degree**

The program does not offer a baccalaureate degree.

**Graduate Degree**

Master of Science (M.S.)

**Major and Degree**

Planning (M.S.)

**Program requirements**

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

**Planning (PLAN)**

110. Regional Land Use (3) II Problems of regional environments in relation to the use and development of activities on the land. Emphasis on field study of actual land uses and introduction to the analysis and mapping of these using microcomputers. The relation of land use to taxation, zoning, and real estate transfer and development. (Identical with GEOG 110).

301. Introduction to Regional Planning (3) I II Introduction to the principles and techniques used for planning in metropolitan and rural regions. Field trips. (Identical with GEOG 301).

379. Urban Growth and Development (3) I II (Identical with GEOG 379, which is home).

393. Internship (4) [Rpt./]

394. Practicum (4) [Rpt./]

399. Independent Study (2-5) [Rpt./]

401. Introduction to Planning (3) I Development of cities and urban planning profession; function and scope; principles and practices in community, environmental land use, transportation, and borderlands planning. Field trips. (Identical with GEOG 401). May be convened with PLAN 501.

416. Geographic Information Systems for Geography and Regional Development (3) II (Identical with GEOG 416, which is home). May be convened with PLAN 516.

427. Aging and Public Policy (3) II (Identical with PA 427, which is home). May be convened with PLAN 527.

444. Site Planning (3) I Studies relating to design determinants for development of outdoor space. Lectures and exercises dealing with individual design criticism, including topography, hydrology, climate, and vegetation. Final project summarizing and applying all criteria to a realistic development project is required. (Identical with ARCH 444). May be convened with PLAN 544.

453. Locational Analysis (3) I (Identical with GEOG 453, which is home). May be convened with PLAN 553.
456. The American City (3) I (Identical with GEOG 456, which is home).

457. Statistical Techniques in geography, Regional Development and Planning (3) I (Identical with GEOG 457, which is home). May be convened with PLAN 557.

459. Land Use and Growth Controls (3) II (Identical with GEOG 459, which is home). May be convened with PLAN 559.

461. Environmental and Resource Geography (3) II (Identical with GEOG 461, which is home).

468. Urban Transportation Planning (3) II CDT (Identical with C E 468, which is home). May be convened with PLAN 568.

471. Problems in Regional Development (3) I II (Identical with GEOG 471, which is home). May be convened with PLAN 571.

473. Geology and the Urban Environment (3) II (Identical with GEOS 473, which is home). May be convened with PLAN 573.

476. The Land Development Process (3) [Rpt./I] (Identical with GEOG 476, which is home). May be convened with PLAN 576.

483. Geographic Applications of Remote Sensing (3) II (Identical with GEOG 483, which is home). May be convened with PLAN 583.

484. Planning the Built Environment (2) I (Identical with ARCH 484, which is home). May be convened with PLAN 584.

497. Workshop

i. Interdisciplinary Studio for Community Design (3-6) I (Identical with ARCH 497I, which is home). May be convened with PLAN 597I.

498. Senior Capstone (1-3) I II

499. Independent Study (1-3) [Rpt./I] I II

500. Ecosystems for Urban Planning (3) I (Identical with HWR 500, which is home).

501. Introduction to Planning (3) I For a description of course topics see PLAN 401. Graduate-level requirements include an additional term paper and presentation. (Identical with GEOG 501). May be convened with PLAN 401.

504. Public and Policy Economics (3) II (Identical with PA 504, which is home).

510. Development of Regional Planning (3) I Survey of the historical development of the planning profession; the evolution of American planning as a response to urbanization. Credit allowed for one of these courses: PLAN 510, PLAN 401. Open to majors only. (Identical with GEOG 510).

514. Analytic Methods in Local Planning and Management (3) II (Identical with PA 514, which is home).

516. Geographic Information Systems for Geography and Regional Development (3) II (Identical with GEOG 516, which is home). May be convened with PLAN 416.

523. Health and Public Policy (3) II (Identical with PA 523, which is home).

527. Aging and Public Policy (3) II (Identical with PA 527, which is home). May be convened with PLAN 427.

535. Zoning, Ethics and Equity (3) I II Extensive look at zoning and regulation of uses of land and buildings and how it relates to the public health, safety, morals, and welfare. Field trips.

544. Site Planning (3) I For a description of course topics see PLAN 444. Graduate-level requirements include an in-depth research paper focusing on one particular aspect of developing new techniques in the field. (Identical with ARCH 544). May be convened with PLAN 444.

550. Metropolitan and Regional Planning (3) I Survey and evaluation of concepts and examples, including metropolitan, economic development, state and national, and environmental plans in the U.S. and abroad. (Identical with GEOG 550).

553. Locational Analysis (3) I (Identical with GEOG 553, which is home). May be convened with PLAN 453.

555. Introduction to Transportation (3) II Graduate survey and policy analysis course, focusing on the policy environment surrounding several major transportation issues. Field trips.

557. Statistical Techniques in geography, Regional Development and Planning (3) I (Identical with GEOG 557, which is home). May be convened with PLAN 457.

559. Land Use and Growth Controls (3) II (Identical with GEOG 559, which is home). May be convened with PLAN 459.

561. Resource Management (3) I (Identical with GEOG 561, which is home).

563. Perception of Environment (3) I II (Identical with GEOG 563, which is home).

565. Project Planning and Modeling (3) II (Identical with C E 565, which is home).

567. Geographical Annals of Population (3) II (Identical with GEOG 567, which is home).

568. Urban Transportation Planning (3) II CDT (Identical with C E 568, which is home). May be convened with PLAN 468.

571. Problems in Regional Development (3) I II (Identical with GEOG 571, which is home). May be convened with PLAN 471.

573. Geology and the Urban Environment (3) II (Identical with GEOG 573, which is home). May be convened with PLAN 473.

576. The Land Development Process (3) [Rpt./I] I (Identical with GEOG 576, which is home). May be convened with PLAN 476.

583. Geographic Applications of Remote Sensing (3) II (Identical with GEOG 583, which is home). May be convened with PLAN 483.

584. Planning the Built Environment (2) I (Identical with ARCH 584, which is home). May be convened with PLAN 484.

596. Seminar

a. Interdisciplinary Environmental-Behavior-Design (3) [Rpt./I] I II (Identical with PSYC 596u, which is home).

604. History of Planning (1) The history of planning in the United States with emphasis on the twentieth century and the direction of planning into the next century. Planning and other countries and cultures will be discussed where relevant. P. PLAN 584.

693. Internship (1-6) [Rpt.]

696. Seminar

b. Financing Public Services (3) I (Identical with ARCH 696B).
Baccalaureate Degree

The program does not offer a baccalaureate degree.

Graduate Degrees

Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Major and Degrees

Plant Pathology (M.S., Ph.D.)

Program requirements

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Plant Pathology (PL P)

195. Colloquium

b. Agriculture As a Science (1) II (Identical with PL S 195B, which is home).

197. Workshop

a. Genetic Engineering (1) S (Identical with PL S 197A, which is home).

299. Independent Study (1-3) I II

299H. Honors Independent Study (1-3) [Rpt./] I II

305. Introductory Plant Pathology (3) I Detailed study of representative plant diseases, with emphasis on basic concepts of diagnosis, cause, epidemiology, and control. P. PL P 100 or MCB 181. (Identical with MIC 305).

393. Internship (1-6) [Rpt./] I II

399. Independent Study (1-3) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./] I II

402. Agriculture and the Environment: Focus on Pesticides (3) II (Identical with AGTM 502, which is home). May be convened with PL P 402.

512. Biological Electron Microscopy (4) I II (Identical with MCB 512, which is home).

516. Plant Nematology (2) II The nature, ecology, classification, and control of nematode diseases in plants. P, PL P 551 or consent of instructor.

528. Microbial Genetics (3) II For a description of course topics see PL P 428. Graduate-level requirements include: analyzing three additional current research papers; analyzing unknown DNA sequence of an entire operon; extensive requirements include additional assignments. May be convened with PL P 428.

550. Graduate Plant Pathology (4) I Topics include major concepts in classical and molecular genetics of plant-pathogenic interactions; physiology, biochemistry, and molecular biology of plant pathogenesis; principles of plant epidemiology and theories and practices of plant disease control. P, PL P 305 or consent of instructor.

551. Biolog \ and Characterization of Plant Pathogenic Agents (4) II For a description of course topics see PL P 451. Graduate-level requirements include additional assignments. May be convened with PL P 451.

575. Advanced Mycology (3) I II Biology of fungi, including morphology, physiology, classification, genetics, ecological significance, and economic importance; emphasis on plant pathogens and environmentally essential fungi. P, PL P 427R or consent of instructor.

593. Internship (1-6) [Rpt./] I II

596. Seminar

a. Contemporary TPCS Plant Path (1-3) [Rpt./ 39 units] I II

b. Research Discussions (1-3) [Rpt./ 9 units] I II

498. Senior Capstone (1-3) I II

499. Independent Study (1-5) [Rpt./]

502. Agriculture and the environment: Focus on Pesticides (3) II (Identical with AGTM 502, which is home). May be convened with PL P 402.

512. Biological Electron Microscopy (4) I II (Identical with MCB 512, which is home).

516. Plant Nematology (2) II The nature, ecology, classification, and control of nematode diseases in plants. P, PL P 551 or consent of instructor.

528. Microbial Genetics (3) II For a description of course topics see PL P 428. Graduate-level requirements include: analyzing three additional current research papers; analyzing unknown DNA sequence of an entire operon; extensive requirements include additional assignments. May be convened with PL P 428.

550. Graduate Plant Pathology (4) I Topics include major concepts in classical and molecular genetics of plant-pathogenic interactions; physiology, biochemistry, and molecular biology of plant pathogenesis; principles of plant epidemiology and theories and practices of plant disease control. P, PL P 305 or consent of instructor.

551. Biolog \ and Characterization of Plant Pathogenic Agents (4) II For a description of course topics see PL P 451. Graduate-level requirements include additional assignments. May be convened with PL P 451.

575. Advanced Mycology (3) I II Biology of fungi, including morphology, physiology, classification, genetics, ecological significance, and economic importance; emphasis on plant pathogens and environmentally essential fungi. P, PL P 427R or consent of instructor.

593. Internship (1-6) [Rpt./] I II

596. Seminar

a. Contemporary TPCS Plant Path (1-3) [Rpt./ 39 units] I II

b. Research Discussions (1-3) [Rpt./ 9 units] I II

498. Senior Capstone (1-3) I II

499. Independent Study (1-5) [Rpt./]

502. Agriculture and the environment: Focus on Pesticides (3) II (Identical with AGTM 502, which is home). May be convened with PL P 402.

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551. Biolog \ and Characterization of Plant Pathogenic Agents (4) II For a description of course topics see PL P 451. Graduate-level requirements include additional assignments. May be convened with PL P 451.
For graduate program requirements consult the Graduate Catalog and the departmental office listed above.
To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Plant Sciences (PL S)

120. Microcomputing Applications (3) I II (Identical with ABE 120, which is home).
130. Plant Biology (4) I Introduction to plant growth, development, reproduction, and evolution; the economic and ecological importance of plants/Intended for majors in all fields of biology. 3R, 3L, Field trips.
195. Colloquium
b. Agriculture As a Science (1) I (Identical with ENTO 195B, PL P 195B).
197. Workshop
210. Cultivated Plants and Their Environment (2) II The response of plants to light, water, carbon dioxide, nutrients, temperature, weeds, insects and diseases. The distribution, characteristics, growing requirements, and uses of plants. P, PL S 102 or PL S 130.
299. Independent Study (1-3) [Rpt./]
299H. Honors Independent Study (1-3) [Rpt./] I
306. Crop Science and Production (3) II An examination of the fundamental aspects of plant science as applied to crop production. Laboratory exercises will be field-oriented and will involve several field trips. 2R, 3L, P, PL S 130, SWES 200; Field trips.
312. Plant Genetics (4) II The principles of heredity as they apply to all living organisms, with an emphasis on plants, from molecular to populations with laboratory experience and problem solving. 3R, 3L, P, PL S 100 or PL S 130; MCB 182, CHEM 103A, CHEM 104A.
330. Plant Propagation I: Sexual and Asexual Reproduction (3) I Principles and practices of plant propagation by seed and asexual methods, including use of growth regulators, rooting media and misting systems. Physiological basis of propagation methods will be emphasized. Writing-Emphasis Course. 2R, 3L, P, PL S 130, MCB 181.
340. Intro To Biotechnology (3) I Survey of the basic concepts and techniques used in the analysis and improvement of biological organisms by genetic engineering. P, PL S 130 or MCB 181R; CHEM 130A, CHEM 130B.
354. Landscape Horticulture (3) II Horticulture practices which influence performance of plants in the landscape. Installation, establishment and maintenance of plants in the landscape. 2R, 3L, P, PL S 130, SWES 200.
355. Turfgrass Management (3) I Species adaptation, growth and development, establishment and cultural practices affecting use. P, PL S 130 or MCB 181R.
361. Principles of Plant Physiology Laboratory (1) [Rpt./] I II Laboratory exercises in plant physiology. P or CR, PL S 360. (Identical with MCB 361).
393. Internship (1-6) I II
399. Independent Study (1-3) [Rpt./]
399H. Honors Independent Study (1-3) [Rpt./] I II
400. Cotton Crop Production (3) I II Principles and practices of growing and harvesting cotton crops, with emphasis on cotton production, fiber technology, and utilization. P, PL S 130 or equivalent, basic biology knowledge, consent of instructor.
403. Citrus Production (3) II Cultural practices used in citrus production and the physiological basis for those practices. P, basic biology knowledge, consent of instructor.
408. Ecology and Sustainable Agriculture (3) II Physical and biotic environment of crops in relation to crop culture, production, and geographical distribution; relations among the human population, crop productivity, and man's environment. P, ECOL 260, PL S 130.
410. Cell Biology (3) II (Identical with MCB 410, which is home).
415. Principles of Plant Improvement (3) I Application of the principles of genetics, botany and statistics to the improvement of plants. Writing-Emphasis Course. P, PL S 312 or ECOL 320. May be convened with PL S 515.
439. Plant Cell Biology (3) I In-depth analysis of the empirical evidence, experimental methods, and theoretical background that underlies our understanding of modern plant cell biology. P, MCB 410 or equivalent. (Identical with MCB 439). May be convened with PL S 539.
450. Developmental Plant Anatomy (4) II Structure, function, and development of vascular plants. 3R, 3L, P, PL S 100 or PL S 130 or MCB 181. May be convened with PL S 550.
455. Turfgrass science: Environmental Stress (3) I Environmental interactions of turfgrasses.
596. Seminar
d. Plant-Insect Interactions (1) [Rpt./ S] I II (Identical with ENTO 596D, which is home). May be convened with PL S 496D.

599. Independent Study (1-5) [Rpt./]

620. Plant Biochemistry (3) I Current topics in bioengineering, photosynthesis, carbohydrate, nitrogen and lipid metabolism. This course deals with biochemical processes specific to plants and allows students to gain an understanding and appreciation of how chemical components are synthesized and utilized by the plant during growth and development. P, BIOC 462A, BIOC 462B, PL S 560.

627. Advanced Genetics (3) II Fundamental concepts of genetic analyses with an emphasis on application to current topics in plant genetics. Theoretical background and experimental approaches will be emphasized. Topics will include, but are not limited to, chromosome structure and function, gene regulation, transposable elements and genomics. P, PL S 312 or ECOL 320. (Identical with GENE 627).


693. Internship (1-6) I II

695. Colloquium
a. Plant Biology (1) I (Identical with PL P 695A, which is home).

b. Plant Pathology (1) II (Identical with PL P 695B, which is home).

696. Seminar
a. Plant Sciences (1) [Rpt./] I II

699. Independent Study (1-5) [Rpt./]

900. Research (1-8) [Rpt./]

909. Master's Report (1-8) I II

910. Thesis (1-8) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

PROGRAM REQUIREMENTS

For undergraduate academic program requirements consult the "On Course! Academic Program Requirements" reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/oncourse/data/interface/Minor/.

For graduate program requirements consult the "Graduate Catalog" and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the online catalog or contact the department at one of the addresses above.

POLITICAL SCIENCE (POL)

100. Introduction to Politics (3) I II Issues in contemporary political analysis; human values and political goals; how governments differ and why they change; how nations influence one another. P, not open to students with previous credit in POL 140, POL 120, and POL 160.


120. Introduction to International Relations (3) I II Study of the international system, actors and their capabilities; ends and means of foreign policy; international tension, conflict, and cooperation.

140. Introduction to Comparative Politics (3) I II Survey of the major political systems and analysis of comparative political concepts, with a view to preparation for more advanced study.

160. Introduction to Political Ideas (3) I II Basic issues in political thought, with emphasis on contemporary problems of democracy, liberty, authority, obligation, and ideology.

195. Colloquium
a. First Year Colloquium (1) I P, open to freshmen only.

199. Independent Study (1-3) [Rpt./]


206. Public Policy and Administration (3) II Theory and practice of executive agencies, including policy making and other functions, processes, personnel and fiscal management, and administrative law. P, POL 102. (Identical with PA 206).

214. Arizona Government (1) Arizona constitution. Offered through correspondence only.


231. American Political Parties (3) I II American two-party system; history of political parties; role of parties in nominations, campaigns
and elections; functions of parties in government; discussion of party organization and party activists; speculation on the future of party politics. P. POL 102.

240. Canadian Government and Politics (3) I Canadian and American political systems, role of government. P. POL 102, POL 140 or PHIL 110, PHIL 113.

241. Government and Politics in Latin America (3) I Survey of political systems, emphasis on history, ideology, political movements, and current political issues. P. POL 102, POL 140 or PHIL 110.

242. Western European Political Systems (3) I Examination of the ideological framework, political culture, functions and processes of the Western European political systems. P. POL 140.

244. British Politics (3) I An examination of the British process of politics and government, the political system that both gave birth to our own and which also stands today as the major alternative way of democratic politics to that of the United States, P. POL 140.

247. Introduction to Latin-American Politics (3) I Survey of the political forces and social groups important in shaping contemporary Latin America; examination of Indians, slaves, peasants, landlords, labor, the middle sectors, and the military; discussion of theories of instability. P. POL 140.

250. Contemporary International Politics (3) I II Analysis of conflicts of national interests; decision making in the present international system; role-playing and simulation experience. P. POL 120.

270. Colonization and Native People (3) I II An overview of various colonial models and definitions. Includes individual studies of the relations between the Ainu and Japan, American Indians and the United States, the Sami and Norway, and the Maori and New Zealand. (Identical with AIS 270).

290. Politics and the Novel (3) I II Discussion and analysis of significant political questions as seen through the eyes of 19th and 20th century novelists, including Camus, Forster, Naipaul, Penn Warren, Didion, Dostoevsky, and Zola. (Identical with ENGL 290).

293. Internship (1-6) [Rpt./]

297. Workshop
a. United Nations (1) II P. open to participants in Model U.N. program only.

299. Independent Study (1-4) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./] I


315. Political Sociology (3) I (Identical with SOC 315, which is home).

321. Ancient and Medieval Political Theory (3) I Development of Western political theory from the Greeks through Machiavelli, Writing-Emphasis Course. P. POL 102, POL 160 or PHIL 110.

322. Early Modern Political Theory (3) II Western political theory from the Reformation to the French Revolution. Writing-Emphasis Course. P. POL 102, POL 160 or PHIL 110.

323. Late Modern Political Theory (3) I II Western political theory from the Utilitarians through the 1930s. Writing-Emphasis Course. P. POL 102, POL 160 or PHIL 110, PHIL 113 or PHIL 121.

326. American Political Thought (3) II American political ideas from colonial times to the present. Writing-Emphasis Course. P. POL 102, POL 160 or PHIL 110, PHIL 113, or PHIL 121.

330. Minority Groups and American Politics (3) I II Political problems of the poor; analysis of systematic poverty in the U.S. and theories of causation; selected policy problems: education, housing, job training, enforcement of anti-discrimination statutes; future of "power" movements. (Identical with AFAS 330, MAS 330).

332. Politics of the Mexican-American Community (3) II Political structure and processes of the Mexican-American community, with emphasis on history, schooling, political behavior, and class; future trends; bibliography. (Identical with MAS 332).

334. Politics and American Indians (3) II Examination of public policy on American Indians and analysis of the political culture of American Indian communities. (Identical with AIS 334).

335. Gender and Politics (3) I II Examination of politics through the lens of gender hierarchy. Emphasis on how constrictions of masculinity and femininity shape and are shaped by interacting economic, political and ideological practices. P. W S 100. (Identical with W S 335).

340. Politics in Advanced Industrialized States (3) I II Analysis of how variations in social structures and political configurations influence governmental policy and determine international competitiveness of states. Industrial sectors in five major economies are examined to determine how political systems differ, what kinds of policies enhance competitiveness, and where countries rank in terms of innovation of key industrial sectors. P. POL 140.

341. Comparative Public Policy (3) I II Analysis of social and economic policies and policy making, using examples from Western Europe, Scandinavia, and North America. Special attention to how global and regional political and economic forces are leading to significant changes in the “what” and “how” of government action. P. POL 140.

350. Politics and the Health Care System (3) I II Analysis of social, economic, political, ethical and legal problems in the practice, administration and allocation of health care services, and discussion of proposals for alternative arrangements.

360. International Political Economy (3) I II Analysis of politics of international economics and, to a lesser extent, of the economic determinants of international politics. Survey of the history of international political economy and theories that seek to explain it. P. POL 120.

361. International Organizations (3) I II Basic acquaintance with the United Nations and other major international organizations. One of the fundamental trends in the present and future world is the increasing and ever more complex interdependence between nations. To cope with that, conventional unilateral and bilateral means are insufficient. Multilateral approach - cooperative and competitive simultaneously - proves indispensable.

373. Political Geography (3) I II (Identical with GEOG 373, which is home).

377. Modern Israel (3) I (Identical with JUS 377, which is home).


393. Internship (1-6) [Rpt./]

393H. Honors Internship (1-6) [Rpt./] 6 units

399. Independent Study (1-3) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II

406. Bureaucracy, Politics, and Policy (3) I Description and analysis of the executive branch of government: how federal agencies capture policy-making; why bureaucracy develops; the rules of bureaucratic culture; who controls the administrative branch. P. POL 102. (Identical with PA 406). May be convened with POL 506.

407. Congress and American Politics (3) I II Examination of election politics, personalities, and career patterns of congressional members, the organization and structure of Congress, and the role of Congress in policy leadership and representation of the public. P. POL 102. May be convened with POL 507.

410. Struggle for the Presidency (3) I (Identical with COMM 410, which is home). May be convened with POL 510.

412. Local Government and Administration (3) I II Examination and analysis of local decision-making structures and their policy outputs. P. POL 102, POL 230. May be convened with POL 512.

425. Liberalism and Its Critics (3) I II Recent theories of liberalism and the major criticisms of liberal ideas, such as communitarianism and feminism. P. POL 160 or PHIL 110. May be convened with POL 525.

427. The Marxist Legacy (3) I II A critical survey of the main currents of Marxism from Marx to the present. P. POL 160 or PHIL 110; junior status, Writing-Emphasis Course. May be convened with POL 527.

428. Problems in Contemporary Political Theory (3) I II Intensive examination of selected
429. The U.S.-Mexican Borderlands in Comparative Perspective (3) I Describes and analyzes the Mexican-United States Borderlands emphasizing several elements of the Borderlands culture, society, economy, and polity, as well as the evolution of borderlands in comparative perspective. P, POL 102. (Identical with LA S 429, MAS 429). May be convened with POL 529.

430. Political Culture and the Dynamics of Change in American Society (3) I Examination of the manner in which attitudes about politics and political problems are acquired from exposure to music and television, and the manner in which such attitudes lead to political action. P, POL 102. May be convened with POL 531.

431. Feminist Political Theory (3) I Examines the tradition of Western political theory through a gender-sensitive lens and surveys the development of feminist political theory. P, POL 102. May be convened with POL 532.

432. Quantitative Analysis of Political Problems (3) I Introduction to the use of statistics on political data, with emphasis on statistical manipulation; evaluation and interpretation of statistical explanations of political phenomena. P, POL 102, POL 102.

433. Public Opinion and Voting Behavior (3) I II Attitude and opinion formation and socialization; public opinion in the political process; the relationship between attitudes, opinion, and voting behavior in American politics. May be convened with POL 533.

434. Violent Crime and Political Order (3) II Description and analysis of how and why people wield, and respond to, authority. Based on presumption that people’s reactions to the public order are influenced by the private order—disorder—of their minds and the way they learned to respond to the private authorities of their childhoods. P, POL 102, introductory level in psychology, sociology, or anthropology. Writing-Emphasis Course. May be convened with POL 536.

435. Democracies, Emerging and Evolving (3) I Analysis of conditions of stability and breakdown of democratic regimes with particular emphasis on the developing democracies of the third world. Writing-Emphasis Course. P, POL 102. (Identical with LA S 437). May be convened with POL 537. 438A-438B. Philosophy of Law (3) I (Identical with PHIL 438A-438B, which is home). May be convened with POL 538A-538B.


441#. Arab-Israeli Conflict (3) I Traces the birth and growth of the Arab-Israeli conflict since 1948 with particular attention to the internal impediments to conflict resolution on both the Arab and Israeli sides. Also surveys the role of the Great Powers in Middle East politics generally. P, POL1 02. (Identical with NES 441). May be convened with POL 541.

442. Transformation of Agrarian Societies in the Middle East (3) I (Identical with NES 442, which is home).

443. Soviet and Post-Soviet Politics (3) I Surveys the Leninist system and the transition to post-Soviet institutions and norms. Focus on decision-making and models of autocracy and pluralism. Particular attention to Russia, but overview of other post-Soviet successor states. P, POL 120. (Identical with R SS 443). May be convened with POL 543.

444. East European Politics (3) I Divergent models of Communist development, from East Germany to Yugoslavia; political, economic, social, and cultural reform. P, POL 140. May be convened with POL 544.

445. Comparative Political Revolution (3) I Examination of the causes and consequences of 20th-century revolutions and the revolutionary process, with emphasis on contemporary events. P, POL 140, Writing-Emphasis Course. May be convened with POL 545.

446. Comparative Political Elites (3) I Survey of political elite studies, cross-cultural and interdisciplinary, with linkage to world and domestic politics. National case studies will vary by instructor. P, POL 140 or POL 120 or consent of instructor. May be convened with POL 546.

447. Latin-American Political Development (3) I Presentation of strategies for development in Latin America; examination of case studies from Cuba, Brazil, Chile, Guatemala, and other countries. P, POL 140, open to juniors and seniors only. (Identical with LA S 447). May be convened with POL 547.

448. Government and Politics of Mexico (3) I Description and analysis of Mexico’s political economy, its political system, and its foreign policy, with emphasis on Mexican-U.S. relations. P, POL 140. (Identical with LA S 448, MAS 448). May be convened with POL 548.

449. The Politics of Cultural Conflict (3) I Comparative examination of the approaches of different types of political systems to domestic conflict of a racial, religious, lingual, and/or ethnic nature. P, POL 140. May be convened with POL 549.


454. Theories of International Relations (3) I Introduction to theories of international relations on the levels of man, the nation-state, and the international system, with a logical and empirical evaluation of approaches and theories. P, POL 102, POL 120. May be convened with POL 554.

455. American Foreign Policy (3) I II Analysis of the Cold War: Congressional-Executive clashes over foreign policy control; approaches to policy analysis. P, POL 102. May be convened with POL 555.

456. International Law (3) I The international state system; legal-political problems, including territory, environment, seas. Writing-Emphasis Course. P, POL 120. May be convened with POL 556.

457. Inter-American Politics (3) I Survey and analysis of the leading political and economic issues at controversy between the United States and Latin America. P, POL 140 or POL 102. (Identical with LA S 457). May be convened with POL 557.

460. Modern Chinese Foreign Relations (3) I Survey of the developments and trends in Chinese foreign relations in the modern period, focusing mainly on the relationship between the theoretical and actual objectives of China’s foreign policies from 1949 to the present. P, POL 120. (Identical with CHN 460). May be convened with POL 560.

461. Feminist and IR Theories (3) I Issues in epistemology; survey and integration of feminist and IR theories; application of feminist theories to IR. P, W S 100 and POL 120 or POL 250. (Identical with W S 461). May be convened with POL 561.

464. International Relations of East Asia (3) I II National interests, issues and conflicts, relations, and influence of domestic politics in interstate relations in East Asia. P, POL 120. (Identical with EAS 464). May be convened with POL 564.

467. Population and Development in the Middle East (3) I (Identical with NES 467, which is home).
slaves were led onto the beach at Jamestown, to approximately 1910 when segregation had replaced slavery. P, POL 102. (Identical with AFAS 487A, AIS 487A). May be convened with POL 587A.

487B. Race and Public Policy (3) II Examination of the race issue in the context of American politics. Focuses on race related events and policies during the urban/industrial transformation, the Depression and New Deal, World War to the Brown Decision of 1954, the Civil Rights years to the present. P; POL 487A. (Identical with AFAS 487B, AIS 487B). May be convened with POL 587B.

488. Governing Science and Technology (3) II (Identical with GEOG 488, which is home).

489. Public Choice (3) I II (Identical with ECON 489, which is home). May be convened with POL 589.

491. Preceptorship (1-4)

493. Internship (2-9) [Rpt/]

493. Internship I. Legislative Internship (1-12) [Rpt/]

495. Colloquium

496. Seminar

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt/]

499. Independent Study (1-3) [Rpt/]

500. Bureaucracy, Politics, and Policy (3) I For a description of course topics see POL 406. Graduate-level requirements include an additional research paper. (Identical with PA 506). May be convened with POL 406.

507. Congress and American Politics (3) I II For a description of course topics see POL 407. Graduate-level requirements include a much higher level of performance on term paper or research paper. May be convened with POL 407.

510. Struggle for the Presidency (3) I (Identical with COMM 510, which is home). May be convened with POL 410.

512. Local Government and Administration (3) I II For a description of course topics see POL 412. Graduate-level requirements include a reading assignment of at least two additional textbooks and writing an essay on each. May be convened with POL 412.

525. Liberalism and Its Critics (3) I II For a description of course topics see POL 425. Graduate-level requirements include additional essays in greater depth. May be convened with POL 425.

527. The Marxist Legacy (3) I II For a description of course topics see POL 427. Graduate-level requirements include a research term paper of 15-25 pages with a bibliography, as well as a beginning research bibliography. May be convened with POL 427.

528. Problems in Contemporary Political Theory (3) II For a description of course topics see POL 428. Graduate-level requirements include an additional research paper and readings. May be convened with POL 428.

529. The U.S.-Mexican Borderlands in Comparative Perspective (3) I II For a description of course topics see POL 429. Graduate-level requirements include additional research paper and reading. (Identical with LA S 529, MAS 529). May be convened with POL 429.

531. Political Culture and the Dynamics of Change in American Society (3) I For a description of course topics see POL 431. Graduate-level requirements include additional research paper and reading. (Identical with HWR 481, AIS 481). May be convened with POL 431.

532. Pressure Groups (3) I II For a description of course topics see POL 432. Graduate-level requirements include a much higher level of performance on term paper or research paper. May be convened with POL 432.

533. Feminist Political Theory (3) I For a description of course topics see POL 433. Graduate-level requirements include an additional research paper and readings. (Identical with W S 533). May be convened with POL 433.

535. Public Opinion and Voting Behavior (3) I II For a description of course topics see POL 435. Graduate-level requirements include an extensive research paper. May be convened with POL 435.

536. Violent Crime and Political Order (3) II For a description of course topics see POL 436. Graduate-level requirements include an extensive research paper. May be convened with POL 436.

537. Democracies, Emerging and Evolving (3) I For a description of course topics see POL 437. Graduate-level requirements include an extensive research paper. (Identical with HWR 537). May be convened with POL 437.

538-A.438B. Philosophy of Law (3) I (Identical with PHIL 538A-538B, which is home). May be convened with POL 438A-438B.

541. Arab-Israeli Conflict (3) I II For a description of course topics see POL 441. Graduate-level requirements include an extensive research paper. May be convened with POL 441.

542. Transformation of Agrarian Societies in the Middle East (3) I (Identical with NES 542, which is home).

543. Soviet and Post-Soviet Politics (3) I For a description of course topics see POL 443. Graduate-level requirements include an extensive research paper. (Identical with RS 543). May be convened with POL 443.

544. East European Politics (3) I II For a description of course topics see POL 444. Graduate-level requirements include an extensive research paper. (Identical with HWR 544). May be convened with POL 444.
545. Comparative Political Revolution (3) I
For a description of course topics see POL 445.
Graduate-level requirements include extensive
reading and a research paper. May be convened
with POL 445.

546. Comparative Political Elites (3) I
For a description of course topics see POL 446.
Graduate-level requirements include class
presentations and additional readings. May be
convened with POL 446.

547. Latin-American Political Development (3)
II For a description of course topics see POL 447.
Graduate-level requirements include additional
course readings. (Identical with LA S 547). May be
convened with POL 447.

548. Government and Politics of Mexico (3) I
For a description of course topics see POL 448.
Graduate-level requirements include a book
review and related discussion with the instructor.
(Identical with LA S 548). May be convened
with POL 448.

549. The Politics of Cultural Conflict (3) II
For a description of course topics see POL 449.
Graduate-level requirements include additional
readings, research, and paper(s). May be convened
with POL 449.

550. Religion and Politics (3) II For a
description of course topics see POL 450.
Graduate-level requirements include extensive
reading plus a research paper. May be convened
with POL 451.

551. Soviet and Post-Soviet Foreign Policy (3)
I For a description of course topics see POL 451.
Graduate-level requirements include extensive
reading, research, and paper(s). May be convened
with POL 451.

552. Politics in the European Union (3) II For
a description of course topics see POL 452.
Graduate-level requirements include extra
readings and a seminar-length paper. May be convened
with POL 452.

554. Theories of International Relations (3) I
For a description of course topics see POL 454.
Graduate-level requirements include additional
assignment/paper. May be convened with POL 454.

555. American Foreign Policy (3) II For
a description of course topics see POL 455.
Graduate-level requirements include additional
assignment/paper. May be convened with POL 455.

556. International Law (3) I For a description
of course topics see POL 456. Graduate-level
requirements include research readings and
paper(s). May be convened with POL 456.

557. Inter-American Politics (3) I For a
description of course topics see POL 457.
Graduate-level requirements include a book
review and related discussion with the instructor.
(Identical with LA S 557). May be convened
with POL 457.

558. Civil Military Relations in the Third
World (3) For a description of course topics see
POL 458. Graduate-level requirements include
an extensive research paper. May be convened
with POL 458.

560. Modern Chinese Foreign Relations (3) II
For a description of course topics see POL 460.
Graduate-level requirements include an
additional research paper. (Identical with CHN
560). May be convened with POL 460.

561. Feminist and IR Theories (3) II For a
description of course topics see POL 461.
Graduate students will do a classroom presenta-
tion, an additional paper, or more extensive
writing on papers. (Identical with W S 561). May be
convened with POL 461.

564. International Relations of East Asia (3) II
For a description of course topics see POL 464.
Graduate-level requirements include an
additional research paper. (Identical with EAS
564). May be convened with POL 464.

567. Population and Development in the
Middle East (3) I (Identical with NES 567,
which is home).

568. Government and Politics of Africa (3) II
For a description of course topics see POL 471.
Graduate-level requirements include an
additional paper and readings. May be convened
with POL 471.

570. Constitutional Law: Civil Liberties (3) I
II For a description of course topics see POL 470.
Graduate-level requirements include an
additional paper and readings. May be convened
with POL 470.

571. Constitutional Law: Civil Liberties (3) I II
For a description of course topics see POL 471.
Graduate-level requirements include an
additional paper and reading. May be convened
with POL 471.

573. Government and Economic Well-being (3)
II For a description of course topics see POL 473.
Graduate-level requirements include additional
reading assignments and a more
detailed paper. (Identical with PA 573). May be convened
with POL 473.

574. Administrative Law (3) I For a
description of course topics see POL 474.
Graduate-level requirements include an additional
paper and readings. May be convened with POL 474.

576. Women and the Law (3) I For a
description of course topics see POL 476.
Graduate-level requirements include additional research,
readings, and paper(s). May be convened
with POL 476.

578. American Indians and the Supreme Court
(3) For a description of course topics see POL 478.
Graduate-level requirements include additional research,
readings, and paper(s). (Identical with AIS 578). May be convened
with POL 478.

579. Research Design (4) I Introduction
to experimental and quasi-experimental research
design; survey research; the use of aggregate
statistics; historical documents and life-history
materials; participant observation; unobtrusive
methods.

580. Methods of Political Inquiry (3) II
Systematic examination of problems of scope
and methods in inquiry in the discipline of
political science; intended to acquaint students
with the discipline and to prepare them for
scholarly research in the field.

581. Environmental Policy (3) II For a
description of course topics see POL 481.
Graduate-level requirements include additional
readings and a substantial research paper of at
least 25 pages in length. (Identical with HWR
581, PA 581, RNR 581). May be convened
with POL 481.

582. Research and Methodology (4) II
Quantitative techniques and computer applica-
tions in political science.

583. Urban Public Policy (3) II For a
description of course topics see POL 483.
Graduate-level requirements include additional
readings, research, and paper(s). May be convened
with POL 483.

584. Development of Federal Indian Policy (3)
II European colonial predecessors through the
treaty-making period; federal policy from treaty-
making to the present. (Identical with AIS 584,
LAW 584).

585. Political Risk and Intelligence Analysis (3)
II Examination of political risk and intelligence
analysis with emphasis on forecasting political
developments in nations.

587A-587B. Race and Public Policy (3) I For
a description of course topics see POL 487A-
487B. Graduate-level requirements include
additional paper, usually bibliographic in nature.
(Identical with AIS 587A-587B). May be convened
with POL 487A-487B.

589. Public Choice (3) II (Identical with
ECON 589, which is home). May be convened
with POL 489.

590. Teaching Political Science (3) I II Methods
and problems involved with college teaching in
general, and specifically in Political Science.
Students are required to take this course as early
as possible in their curriculum. Students must
Teach in the classroom under the supervision of a
faculty member. P, graduate status.

593. Internship (1-6) [Rpt./] I II

593. Internship

1. Legislative Internship (1-9) [Rpt./] II

595. Colloquium

a. American Politics (3) I II
c. Political Theory (3) I II
d. Comparative Politics (3) I II
e. International Relations (3) I II
g. Public Policy (3) I II (Identical with PA 595G).

596. Seminar

a. American Politics (3) I II
c. Political Behavior (3) [Rpt./] 2 I II
c. Political Theory (3) [Rpt./] 2 I II
d. Comparative Politics (3) [Rpt./] 2 I II
e. International Relations (3) [Rpt./] 2 I II
g. Public Policy (3) [Rpt./] 2 I II
h. American Indian Law and Policy (3) I II
(Identical with AIS 596H).

599. Independent Study (1-5) [Rpt./]
Psychology (PSYC)

101. Introduction to Psychology (3) Survey of psychology including history, systems, and methods; structure and functions of the nervous and endocrine systems; learning; motivation and emotion; sensation and perception; memory; thought and language; personality; development; social interaction; psychopathology and psychotherapy.

195. Colloquium

a. When Bad Things Happen (1) I II
b. Psychology of Death in our life (1) I II
c. Nature and Nurture of Creativity (1) I
d. Major Issues in Law and Legal Policy Making (1) I

199. Independent Study (1-3) [Rpt./]

205H. Do Animals Think? (3) I (Identical with ECON 205H, which is home).


240. Developmental Psychology (3) II Survey of research and theory in child development. Examines age-related change in the social, emotional, cognitive, and linguistic domains from infancy to adolescence. Emphasizes the exploration of the empirical literature in psychology, biology, and social science as it relates to developmental issues. P, PSYC 101.

254. The Psychology of Love and Compassion (3) I Introduction to theory and research on the psychology of love and caring, with applications to mental, physical, and spiritual health. P, PSYC 101.

273. Psychology of Human Performance (3) II Psychological theories, research, and intervention strategies relevant to performance in life settings as diverse as academics, career, athletics, performing arts, and interpersonal relations.

277. Law and Society (3) I II Interdisciplinary consideration of the origins, definitions, operations, theories, and trajectories of law and legal systems in contemporary society. Excellent preparation for upper-division courses on law and legal topics in the topics of social and behavioral sciences or public administration. (Identical with SOC 277).

290. Research Methods (3) Students will gain experience in a range of psychological research methods. 2R, 3L. P, PSYC 101, PSYC 230; CR, PSYC 290 should be taken in conjunction with 297A.

294. Practicum (1-3) [Rpt./]

296H. Honors Proseminar (3) II P, acceptance into the honors program.

297. Workshop

a. Introductory Laboratory in Psychology (3) P or CR, PSYC 290; P, PSYC 101, PSYC 230. PSYC 297 should be taken in conjunction with 297A. PSYC 297A is prerequisite for all psychology courses 400 and above.

299. Independent Study (1-3) [Rpt./]

302. Introduction to Biopsychology (3) Survey of the basic principles of nervous system function in relation to perception, learning, memory, emotion, and thinking. P, PSYC 290 or 8 units of biology lab science.

312. Primate Behavior (3) I II Survey of psychological research on non-human primates; includes sensory processes, learning, development, social and abnormal behaviors. P, PSYC 290.


326. Human Memory (3) I II Introduction to scientific study of human memory including structures and processes, memory failures, acquisition and retention of knowledge, memory development, and memory disorders. P, PSYC 101.


341. Language Development (3) I Introduction to theory and research on language development, with emphasis on word learning and grammatical development. P, PSYC 101 or LING 101 or consult department before enrolling. (Identical with LING 341).

346. Minds, Brains and Computers (3) [Rpt./1] I (Identical with PHIL 346, which is home).

352. Personality (3) I II Basic concepts and issues in personality theory and research; approaches to personality description and assessment. P, PSYC 101.

357. Psychology of Religion and Spirituality (3) [Rpt./1] I Examines the psychology of religion and spirituality, addressing theory, research and applications to health, virtue, and love. Integrates empirical science and personal experience; features how psychology enriches our understanding of religion and spirituality, and how religion and spirituality enriches our understanding of psychology. P, PSYC 101 or equivalent.

358. Psychology of Consciousness (3) II Introduction to theory and research on both normal and altered states of consciousness, from a natural science and cognitive psychology viewpoint. Topics reviewed include philosophical foundations, brain systems and consciousness, introspection, sleep and dreaming, hypnosis, meditation, and psychedelic drugs. P, PSYC 101, PSYC 230, PSYC 290.

PORTUGUESE (PORT)

For more information about Portuguese courses, see the entry for the Department of Spanish and Portuguese in this manual.

PSYCHOLOGY (PSYC)

Psychology Bldg., Rd. 312
The University of Arizona
PO Box 210068
Tucson AZ 85721-0068
Phone: (520) 621-7448
FAX: (520) 621-9306
URL: http://w3.arizona.edu/psych/

Baccalaureate Degrees
Bachelor of Arts (B.A.)
Bachelor of Science (B.S.)

Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major and Degrees
Psychology (B.A., B.S., M.A., Ph.D.)

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Colonization and Native Peoples (3) I II (Identical with AIS 670, which is home).

Advanced Research Methods (3) [Rpt./1] I Advanced quantitative techniques and computer applications in political science. P, POL 579, POL 582.

Seminar
International Water Resource Management (1-3) [Rpt./9 units] I (Identical with HWR 696I, which is home).

Public Choice I (3) II (Identical with ECON 696V, which is home).

Public Choice II (3) I (Identical with ECON 696W, which is home).

Independent Study (1-3) [Rpt./1 II

Research (2-4) [Rpt./

Thesis (2-6) [Rpt./

Dissertation (1-9) [Rpt./

Supplementary Registration (1-9) [Rpt./

670. Colonization and Native Peoples (3) I II (Identical with AIS 670, which is home).

682. Advanced Research Methods (3) [Rpt./1] I Advanced quantitative techniques and computer applications in political science. P, POL 579, POL 582.

696. Seminar

i. International Water Resource Management (1-3) [Rpt./9 units] I (Identical with HWR 696I, which is home).

v. Public Choice I (3) II (Identical with ECON 696V, which is home).

w. Public Choice II (3) I (Identical with ECON 696W, which is home).

699. Independent Study (1-3) [Rpt./1 II

900. Research (2-4) [Rpt./

910. Thesis (2-6) [Rpt./

920. Dissertation (1-9) [Rpt./

930. Supplementary Registration (1-9) [Rpt./

696. Seminar

i. International Water Resource Management (1-3) [Rpt./9 units] I (Identical with HWR 696I, which is home).

v. Public Choice I (3) II (Identical with ECON 696V, which is home).

w. Public Choice II (3) I (Identical with ECON 696W, which is home).

699. Independent Study (1-3) [Rpt./1 II

900. Research (2-4) [Rpt./

910. Thesis (2-6) [Rpt./

920. Dissertation (1-9) [Rpt./

930. Supplementary Registration (1-9) [Rpt./

For more information about Portuguese courses, see the entry for the Department of Spanish and Portuguese in this manual.

Political Science -Psychology

URL: http://w3.arizona.edu/psych/

FAX: (520) 621-9306
Phone: (520) 621-7448
PO Box 210068
Psychology Bldg., Rm. 312
Tucson AZ 85721-0068

For more information about Portuguese courses, see the entry for the Department of Spanish and Portuguese in this manual.

PSYCHOLOGY (PSYC)

Psychology Bldg., Rd. 312
The University of Arizona
PO Box 210068
Tucson AZ 85721-0068
Phone: (520) 621-7448
FAX: (520) 621-9306
URL: http://w3.arizona.edu/psych/

Baccalaureate Degrees
Bachelor of Arts (B.A.)
Bachelor of Science (B.S.)

Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major and Degrees
Psychology (B.A., B.S., M.A., Ph.D.)

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.
360. Social Psychology (3) Introduction to major theories and research findings of social psychology; to provide an understanding of the roles of cognitive and motivational processes in social behavior. P, PSYC 101 or 8 units of biology lab science.

364. Human Sexuality (3) I II Social-psychological and developmental aspects of human sexuality. Examples of topics include: courtship, pregnancy and delivery, sexual health, and sex education.

374. Environmental Psychology (3) I Basic concepts in environmental psychology; the relationship between the individual and the large-scale environment. P, PSYC 101.

375. Industrial-Organizational Psychology (3) Application of the principles of psychology to industrial and social organizations, including personnel, human factors, organizational and consumer psychology. P, PSYC 101.

381. Abnormal Psychology (3) I Survey of the symptoms and syndromes of abnormal behavior, with emphasis on a scientific, empirical view; primary focus is the description of various symptoms and diagnosis of illness, but research and theories concerning etiology and treatment also will be briefly covered. P, PSYC 101.

393. Internship (1-6) [Rpt./]

394. Practicum (1-3) [Rpt./]

396H. Honors Proseminar (3)

399. Independent Study (1-3) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II

401A. Principles of Psychophysics (3) I II Overview, principles, theory, and applications of physiological assessment; an introduction to theory and research in major areas of human psychophysics with a particular emphasis on psychophysiological correlates and physiological substrates of cognition, affect, and psychopathology. May be taken alone or concurrently with 401B. P, PSYC 290, PSYC 297A, PSYC 302, PSYC 490. May be convened with PSYC 501A.

401B. Psychophysiology Laboratory (1) I II Provides a pragmatic “hands-on” experience in psychophysiological recording and analysis. Involves learning all facets of psychophysiological signal acquisition and analysis. Writing-Emphasis Course. P, PSYC 290, PSYC 297A, PSYC 302. May be convened with PSYC 501B.

402. Brain and Cognition (3) I II Introduction to the field of cognitive neuroscience: the study of brain mechanisms of attention, memory and language.

403A. Principles of Mammalian Systems Neurophysiology (3) I Topics in the neurophysiology of sensation, perception, cognition, and action in mammals illustrating the application of modern research methods to the understanding of higher brain function. Enrollment is restricted to those concurrently enrolled in the lab. Writing-Emphasis Course. P, PSYC 297A, NRSC 586; CR, PSYC 403B. Open only to psychology and IDS majors with a psychology subject area. (Identical with NRSC 403A). May be convened with PSYC 503A.

403B. Laboratory in Mammalian Systems Neurophysiology (3) I II Neurophysiology laboratory including stereotoxic surgery, microelectrode recording of neural signals, electrical and chemical stimulation, and principles of analog and digital signal processing. Writing-Emphasis Course. P, PSYC 290, PSYC 297A, PSYC 302; CR, PSYC 403A. Open only to psychology and IDS majors with a psychology subject area. (Identical with NRSC 403B). May be convened with PSYC 503B.

406. Neural Encoding, Memory, and Computation in the Mammalian Brain (3) I II Theoretical principles and biological mechanisms by which information is represented, categorized, stored, and recalled in specific central nervous systems (CNS) circuits in the course of adaptive behavior.


412. Animal Learning (3) I II Animal learning with emphasis on interspecies comparisons. Writing-Emphasis Course. P, PSYC 290, PSYC 297A. Open only to psychology and IDS majors with a psychology subject area. May be convened with PSYC 512.

413. Drugs, Brain and Behavior (3) I II Physiological, neurotoxic and behavioral effects of drugs on individual neurotransmitter systems in the brain. Special emphasis will be given to the historical use and political significance of the major drugs of abuse. P, PSYC 101, PSYC 230, PSYC 290, PSYC 302. May be convened with PSYC 513.

414. The Design of the Mind: Genes, Adaptation, and Behavior (3) I II Overview of the processing systems that underlie behavior, evolution, genetics, and natural selection, as well as the factors influencing evolutionary processes. Part II: Historical approaches that converge upon the broadly defined research program of behavioral evolution, theoretical perspectives, and empirical contributions made by each of these approaches, and current controversies in the field, framed as a single integrated area of study in which multiple approaches and perspectives can contribute to a comprehensive understanding. Writing-Emphasis Course. P, PSYC 297A, PSYC 230, PSYC 290, PSYC 240 or PSYC 340, or consent of instructor. (Identical with PS 415). May be convened with PSYC 514.

415. Invertebrate Behavioral Laboratory (3) I II Animal behavior laboratory in behavioral manipulation, observation, and data recording with invertebrate animals. Writing-Emphasis Course. 3L, 2R. P, PSYC 101, PSYC 230, PSYC 290, PSYC 297A. May be convened with PSYC 515.


426. Advanced Human Memory (3) I II Examines the processing systems that underlie human learning, memory and cognition; emphasizing cognitive, neuroscientific and computational approaches to research and theory. Writing-Emphasis Course. P, PSYC 290, PSYC 297A, PSYC 325. May be convened with PSYC 526.


432. Psychology of Language (3) I II (Identical with LING 432, which is home).

438. Computational Linguistics (3) I (Identical with LING 438, which is home). May be convened with PSYC 538.

439. Animal-Human Communication (3) I (Identical with ECOL 439, which is home). May be convened with PSYC 539.

440. Advanced Cognitive Development (3) [Rpt./] I II Examination of major theories and research findings in cognitive development, with emphasis on infant cognition and conceptual development through childhood. Topics include concept representation and development, naive theories of the world and knowledge restructuring. Topics will vary. May be convened with PSYC 540.

441. Language Acquisitions (3) II (Identical with SP H 441, which is home). May be convened with PSYC 541.

443. Advanced Language Development (3) I II Current theory and data on first language acquisition with special focus on research that relates linguistic theory and learnability theory to empirical studies of children's linguistic abilities. Writing-Emphasis Course. P, senior status or consult department before enrolling, PSYC 297A, one lower-division course in cognitive psychology, developmental psychology or linguistic theory. (Identical with LING 443). May be convened with PSYC 543.

445. Neural Network Modeling: What and Why (3) I Hands-introduction to basic neural modeling. Examination of ways in which modeling is and is not relevant to understanding the architecture of cognitive systems. P, PSYC 297A, and PSYC 325 or PSYC 346 or PSYC 402 or graduate status, college level algebra skills, computer familiarity either PC or Mac. (Identical with PHIL 445). May be convened with PSYC 545.
447. Psychology of Values and Preferences (3)  
I II Variable content (consult schedule): learning, cognition, perception, psycholinguistics, emotion, others. Writing-Emphasis Course. P, PSYC 290, PSYC 297A, 6 units of upper-division psychology or graduate status, open only to psychology and IDS majors with a psychology subject area. May be convened with PSYC 547.

450. Psychological Assessment and Testing (3)  
I II Evaluation of assessment processes and of measurements of intelligence, aptitudes, personality, and interests; test theory; social implications. Writing-Emphasis Course. P, PSYC 290, PSYC 297A. May be convened with PSYC 550.

455. Philosophy and Artificial Intelligence (3) I II (Identical with PHIL 455, which is home). May be convened with PSYC 555.

456. Psychology of Death and Loss (3)  
I II Basic concepts in a psychology of death and loss, with emphasis on both the adjustment to death and loss, and the underlying phenomenal, humanistic and current social considerations. Writing-Emphasis Course. P, PSYC 297A, PSYC 290 or graduate status. May be convened with PSYC 556.

458. Violence and Youth (3)  
I II Explores the etiology of youth violence from developmental and socio-cultural perspectives, the influence of societal factors such as media, guns, and gangs on violence among youth. P, PSYC 101, PSYC 290, PSYC 297A, PSYC 381; CR, PSYC 403B. (Identical with PS 458, SOC 458). May be convened with PSYC 558.

459. Adult Development and Aging (3)  
I II Change and continuity in cognition, personality, and adjustment during adulthood, with emphasis on aging processes and late life. Writing-Emphasis Course. P, PSYC 290 or PSYC 101; PSYC 297A. (Identical with GERO 459). May be convened with PSYC 559.

460. Advanced Social Psychology (3)  
I II Social psychology, with emphasis on theory and method. Writing-Emphasis Course. P, PSYC 290, PSYC 297A. Open only to psychology and IDS majors with a psychology subject area. May be convened with PSYC 560.

461. Social Cognition (3)  
I II Analysis of social phenomenon from a cognitive perspective: perception, memory, thought, and language concerning self, others, and social situations. Writing-Emphasis Course. P, PSYC 360, PSYC 290, PSYC 297A, PSYC 325, or consent of instructor. May be convened with PSYC 561.

462. Mental Health Law & Policy (3)  
[Rept./3] I II Theory, research and practice in law and mental health interactions and in the delivery of mental health services. Writing-Emphasis Course. P, PSYC 297A, upper division status or honors student.

463A-463B. Forensic Assessment: Intervention and Treatment (3-3)  
I II Theory, research and practice in the assessment and treatment of, and intervention with, persons involved with the legal process who have clinical problems. P, PSYC 297A, consent of instructor. May be convened with PSYC 563A-563B.

467. Social Psychology and the Cinema (3)  
I II Social psychology theories and research in combination with contributions from the cinema to examine aspects of human behavior, e.g., death, meaning, aggression, prejudice, relationships. Writing-Emphasis Course. P, PSYC 101, PSYC 297A, PSYC 360. (Identical with HUMS 467).

468. Speech Perception (3)  
I II (Identical with SP H 468, which is home). May be convened with PSYC 568.

470. Foundations of Artificial Intelligence (3)  
I II (Identical with C SC 470, which is home). May be convened with PSYC 570.

473. Stress, Coping, and Health/Performance (3) I II Examines within a biopsychosocial framework the concept of stress as it relates to performance and the etiology of stress-related health disorders. Also examines and applies stress management interventions to enhance performance and promote health. P, PSYC 290. May be convened with PSYC 573.

474. Field Methods in Environmental Psychology (3)  
I II Behavior and man-made or managed environments, with emphasis on objective methods; designed for students having a professional interest in environmental design or management. (Identical with ARCH 474). May be convened with PSYC 574.

476. Environmental Cognition (3)  
[Rept./1] I II Recent advances in the area of environmental cognition, with an emphasis on cognitive aspects of environmental psychology. May be convened with PSYC 576.

477A-477B. Psychology, Law and Social Policy (3)  
I II Critical review of theory, methods and research in the psychology, law and social policy interface. P, PSYC 297A, PSYC 360, 6 units of social science or graduate status. May be convened with PSYC 577A-577B.

478. Sleep and Sleep Disorders (3)  
I II Topics include sleep-wake rhythms, sleep deprivation, dreams, and the diagnosis and treatment of sleep disorders. P, PSYC 290, PSYC 297A, PSYC 302. May be convened with PSYC 578.

481. Psychopathology (3)  
I II In-depth study of current theoretical and research formulations in psychological disorders; various approaches to behavior change. Writing-Emphasis Course. P, PSYC 290, PSYC 297A, PSYC 381. May be convened with PSYC 581.

483. Biological Basis of Psychopathology (3)  
I II Etiology and treatment of major psychological disorders with emphasis on behavioral genetics, imaging, psychopharmacology and animal models of schizophrenia, affective disorders and anxiety disorders. P, PSYC 381, PSYC 101, PSYC 230, PSYC 290, PSYC 297A, PSYC 302 or graduate status. May be convened with PSYC 583.

484. Advanced Health Psychology (3)  
[Rept./1] I II Current research and theory concerning psychological contributions to health maintenance, illness prevention and treatment, and the organization of health services. Writing-Emphasis Course. P, PSYC 297A. May be convened with PSYC 584.

485. Contemporary Issues in Psychology (3)  
[Rept./1] I II Variable content (consult schedule): major topical problems in psychological research, theory, and applications. Writing-Emphasis Course. P, PSYC 290, PSYC 297A, 6 units upper-division psychology, open only to psychology and IDS majors with a psychology subject area. May be convened with PSYC 585.

486. Ethical Issues in Psychology (3)  
I II A consideration of issues in the derivation of ethical criteria, selection of the appropriate subset of criteria to guide ethical decision-making, and the utilization of the criteria when making a decision in psychological research or practice. Writing-Emphasis Course. P, PSYC 297A, upper division status or honors student. May be convened with PSYC 586.

489. History of Psychology (3)  
I II Growth of psychology as a science; major schools and theories; contributions of famous investigators and major advances; psychology as an art and a science today. Writing-Emphasis Course. P, PSYC 297A, 6 units upper-division psychology. May be convened with PSYC 589.

491. Preceptorship (1-3)  
[Rept./I] I II

493. Internship (1-6)  
[Rept./]

494. Practicum (1-3)  
[Rept./]

496. Seminar
a. Social Psychology (3)  
[Rept./3] I II P. Writing-Emphasis Course. May be convened with PSYC 596A.

b. Cognitive Psychology (3)  
[Rept./1] I II (Identical with LING 496F). May be convened with PSYC 596F.

c. Honors seminar (3) I II

498. Senior Capstone (1-3)  
[Rept./]

499H. Honors Thesis (3)  
[Rept./2] I II

499. Independent Study (1-3)  
[Rept./]

499H. Honors Independent Study (3)  
[Rept./1] I II

500A-500B. Current Issues in Psychological Theory and Research (3-3) I II An intensive examination of a range of content areas addressed in contemporary psychological theory and research.

501A-501B. Principles of Psychophysics (3)  
I II For a description of course topics see PSYC 401A-401B. Graduate-level requirements include a more comprehensive literature review. May be convened with PSYC 401A-401B.

502. Principles of Neuroanatomy (4)  
I II (Identical with CBA 502, which is home).

503A. Principles of Mammalian Systems Neurophysiology (3)  
I II For a description of course topics see PSYC 403A. Graduate-level requirements include an additional term paper pertinent to current topics in neurophysiology of sensation, perception, cognition, and action in mammals illustrating the application of modern research methods to the understanding of higher brain function. (Identical with NRSC 503A). May be convened with PSYC 403A.

503B. Laboratory in Mammalian Systems Neurophysiology (3)  
I II For a description of
course topics see PSYC 403B. Graduate-level requirements include an in-depth research paper on a single aspect of a current problem in neurological psychology. (Identical with NRSC 503B). May be convened with PSYC 403B.


506. Neural Encoding: Memory and Comprehension in the Mammalian Brain (3) I Graduate-level requirements include an in-depth research paper on a single aspect of neural encoding. P, PSYC 507B. (Identical with NRSC 506).

507A. Statistical Methods in Psychological Research (3) I Statistical research design, methods and metascience. Variants and extensions of the general linear model including bivariate and multiple regression, analysis of variance and covariance, planned orthogonal contrasts and multiple comparisons, simultaneous and sequential canonical correlation analysis, discriminant function analysis and multivariate analysis of variance.

507B. Statistical Methods in Psychological Research (3) II Statistical research design, and metascience. Application of the structural equations modeling to manifest variable (path analysis) and latent variable (multivariate) causal analysis, confirmatory and exploratory factor analysis, and hierarchical (variance component) linear models, including generalizability theory, meta-analytic, and growth curve parameter models.

508. Methods for Field Research (3) I II Research problems and methods particularly relevant to field research. The logic of inquiry and approaches to data analysis appropriate to field trials and quasi-experimental research.

509. History of Psychological Theories and Research (3) II Development of psychology as a science; schools, systems, theories, major advances, famous investigators. Open to majors only.

511. Animal Behavior (3) I For a description of course topics see PSYC 411. Graduate-level requirements include an in-depth research paper on a single aspect of animal behavior. May be convened with PSYC 411.

512. Animal Learning (3) II For a description of course topics see PSYC 412. Graduate-level requirements include an in-depth research paper on an aspect of animal learning. May be convened with PSYC 412.

513. Drugs, Brain and Behavior (3) I II For a description of course topics see PSYC 413. Graduate-level requirements include an additional term paper pertinent to the course topic. May be convened with PSYC 413.

515. The Design of the Mind: Genes, Adaptation, and Behavior (3) I For a description of course topics see PSYC 415. Graduate-level requirements include in-class oral presentations. (Identical with FS 515). May be convened with PSYC 415.

517. Invertebrate Behavioral Laboratory (3) II For a description of course topics see PSYC 417. Graduate-level requirements include an additional paper or presentation to the class. May be convened with PSYC 417.

519. Field-Based Human Learning (3) II For a description of course topics see PSYC 419. Graduate-level requirements include advanced research applications in psychology or related areas. May be convened with PSYC 419.

524. Gerontology: A Multidisciplinary Perspective (3) I II For a description of course topics see PSYC 424. Graduate-level requirements include an in-depth research paper on a single aspect of gerontology. (Identical with GERO 524, NRSC 524). May be convened with PSYC 424.

526. Advanced Human Memory (3) II For a description of course topics see PSYC 426. Graduate-level requirements include an in-depth research paper on human memory and cognition. May be convened with PSYC 426.

528. Cognitive Neuroscience (3) [Rpt. 2] I II Recent advances in analysis of the neural bases of cognitive functions, such as learning, memory, and thinking.

529. Advanced Perception (3) [Rpt. 1] I II For a description of course topics see PSYC 429. Graduate-level requirements include an additional paper on a particular issue. May be convened with PSYC 429.

530. Neural Basis of Language (3) I The neural basis of language comprehension and production, with reference to its relationship to other perceptual, cognitive and motor skills. P, graduate status. (Identical with NRSC 530).

532. Psychology of Language (3) II (Identical with LING 532, which is home).

533. Visual Cognition (3) I II Recent advances in the area of perception and attention, with emphasis on visual process.

537. Psycholinguistics (3) II (Identical with LING 537, which is home).

538. Computational Linguistics (3) I (Identical with LING 538, which is home). May be convened with PSYC 438.

539. Animal-Human Communication (3) I (Identical with ECOL 539, which is home). May be convened with PSYC 439.

540. Advanced Cognitive Development (3) [Rpt. 1] I For a description of course topics see PSYC 440. Graduate-level requirements include an in-depth research paper on an aspect of cognitive development. May be convened with PSYC 440.

541. Language Acquisition (3) II (Identical with SP H 541, which is home). May be convened with PSYC 441.

542. Topics in Psycholinguistics (3) [Rpt. 1] I For a description of course topics see PSYC 442. Recent advances in the area of psycholinguistics, with an emphasis on sentence processing and the contribution of linguistic theory to an understanding of psychological mechanisms. (Identical with LING 542).

543. Advanced Language Development (3) I II For a description of course topics see PSYC 443. Graduate-level requirements include a written paper on a subject pertinent to topic area. (Identical with LING 543). May be convened with PSYC 443.

545. Neural Network Modeling: What and Why (3) I II For a description of course topics see PSYC 445. Graduate-level requirements include a more substantial modeling project. (Identical with PHIL 545). May be convened with PSYC 445.

547. Psychology of Values and Preferences (3) I II For a description of course topics see PSYC 447. Graduate-level requirements include an in-depth research paper on an aspect of cognitive and affective bases of behavior. May be convened with PSYC 447.

548. Topics in Language and Cognition (3) [Rpt. 1] I II For a description of course topics see PSYC 448. Graduate-level requirements include an in-depth research paper on psychological research applications in psychology or related areas. May be convened with PSYC 448.

550. Psychological Assessment and Testing (3) I II For a description of course topics see PSYC 450. Graduate-level requirements include an in-depth research paper on psychological assessment and testing. May be convened with PSYC 450.

552. Advanced Personality (3) I II Graduate-level requirements include an in-depth research paper on an aspect of personality study.

555. Philosophy and Artificial Intelligence (3) I II (Identical with PHIL 555, which is home). May be convened with PSYC 455.

556. Psychology of Death and Loss (3) I I (Identical to GERO 556, which is home).

558. Violence and Youth (3) I For a description of course topics see PSYC 458. Graduate-level requirements include a research paper. (Identical with FS 558). May be convened with PSYC 458.

559. Adult Development and Aging (3) I For a description of course topics see PSYC 459. Graduate-level requirements include an in-depth research paper on an aspect of a specific psychological problem of the aged. (Identical with GERO 559). May be convened with PSYC 459.

560. Advanced Social Psychology (3) I II For a description of course topics see PSYC 460. Graduate-level requirements include an in-depth research paper on a single aspect of the theory or method of social psychology. May be convened with PSYC 460.

561. Social Cognition (3) I II For a description of course topics see PSYC 461. Graduate-level requirements include a research paper pertinent to the topic of social cognition. May be convened with PSYC 461.

562. Mental Health Law and Policy (3) [Rpt. 3] I II Graduate-level requirements include an extra term paper which ultimately could be...
prepared for publication as well as an additional oral class presentation. (Identical with LAW 562).

563A. Forensic Assessment: Intervention and Treatment (3) I For a description of course topics see PSYC 463A. Graduate-level requirements include a different grading system for class participation and exams. May be convened with PSYC 463A.

563B. Forensic Assessment: Intervention and Treatment (3) II For a description of course topics see PSYC 463B. Graduate-level requirements include a different grading system for class participation and exams. May be convened with PSYC 463B.

564. Methods for Psychosocial Research (3) II Logic of inquiry and issues of philosophy of science as they apply to psychosocial research. Problems encountered by researchers in personality, family studies, social and clinical psychology, and creative approaches to their data analysis and methodological design resolutions.

567. Experimental Phonetics: Physiology (3) I (Identical with SP H 567, which is home). May be convened with PSYC 467.

568. Speech Perception (3) II (Identical with SP H 568, which is home). May be convened with PSYC 468.

570. Foundations of Artificial Intelligence (3) I (Identical with C SC 570, which is home). May be convened with PSYC 470.

573. Stress, Coping, and Health/Performance (3) I II For a description of course topics see PSYC 473. Graduate-level requirements include an extra term paper, and a project in connection with another student. May be convened with PSYC 473.

574. Field Methods in Environmental Psychology (3) II For a description of course topics see PSYC 474. Graduate-level requirements include an in-depth research paper on an aspect of environmental psychology field methods. (Identical with ARCH 574, LAR 574). May be convened with PSYC 474.

576. Environmental Cognition (3) [Rpt./ 1] I II For a description of course topics see PSYC 476. Graduate-level requirements include an in-depth research paper on a single aspect of environmental cognition. May be convened with PSYC 476.

577A. Psychology, Law and Social Policy (3) I For a description of course topics see PSYC 477A. For a description of course topics see 477a. May be convened with PSYC 477A.

577B. Psychology, Law and Social Policy (3) II For a description of course topics see PSYC 477B. For a description of course topics see 477b. May be convened with PSYC 477B.

578. Sleep and Sleep Disorders (3) I II For a description of course topics see PSYC 478. Graduate-level requirements include a critical review of the research literature of a relevant topic. May be convened with PSYC 478.

579. Issues in Rural Health (3) II (Identical with NURS 579, which is home).

580. Clinical Neuropsychology (3) [Rpt./ 1] I II Cognitive and affective sequelae of human central nervous system disease/damage, with emphasis on clinical evaluation, management and rehabilitation.

581. Psychopathology (3) II For a description of course topics see PSYC 481. Graduate-level requirements include an in-depth research paper on psychopathology. May be convened with PSYC 481.

582. Advanced Psychopathology (3) [Rpt./ 1] I II Advanced survey of current theory and research in symptoms, causes and treatment of the major psychological disorders.

583. Biological Basis of Psychopathology (3) II For a description of course topics see PSYC 483. Graduate-level requirements include presentations and an in-depth research paper on an aspect of biological bases of psychopathology. May be convened with PSYC 483.

584. Advanced Health Psychology (3) [Rpt./ 1] I II For a description of course topics see PSYC 484. Graduate-level requirements include an additional paper pertaining to the course topic. May be convened with PSYC 484.

585. Contemporary Issues in Psychology (3) [Rpt./ 1] I II For a description of course topics see PSYC 485. Graduate-level requirements include an in-depth research paper on an aspect of contemporary psychological research. May be convened with PSYC 485.

586. Ethical Issues in Psychology (3) I II For a description of course topics see PSYC 486. Graduate-level requirements include an in-depth research paper on a single aspect of the course topic. May be convened with PSYC 486.

589. History of Psychology (3) I For a description of course topics see PSYC 489. Graduate-level requirements include an in-depth research paper on an aspect of history of psychology. May be convened with PSYC 489.

593. Internship (1-6) I II

594. Practicum (1-3) [Rpt./]

596. Seminar a. Social Psychology (3) [Rpt./ 3] I II For a description of course topics see PSYC 496A. May be convened with PSYC 496A.

b. Developmental Psychology (3) [Rpt./ 4] I II

c. Biopsychology (3) [Rpt./ 1] I II f. Cognitive Psychology (3) [Rpt./ 1] I II For a description of course topics see PSYC 496F. May be convened with PSYC 496F.

g. Clinical Psychology (3) [Rpt./ 1] I II h. Law, Psychology, and Policy (3) I II (Identical with LAW 596H).

i. Quantitative Methods (3) [Rpt./ 1] I II j. Pediatric Neuropsychology (3) II P or CR, PSYC 502 or PSYC 504; Field Trips.

k. Psycho-politics (2) [Rpt./ 1] I II


597. Workshop a. Statistical Models For Psychological Research (3) I CR, PSYC 507A, PSYC 507B. Open to majors only.

b. Statistical Models For Psychological Research (3) II CR, PSYC 507A, PSYC 507B. Open to majors only.

c. Advanced Statistical Methods (3) [Rpt./ 3] CR, PSYC 507A, PSYC 507B.

d. Program Evaluation (1-3) [Rpt./ CR, PSYC 507A, PSYC 507B. Open to majors only.

599. Independent Study (1-4) [Rpt./]

621. Clinical Assessment Methods (3) II Therapeutic practice in interview techniques and cognitive and personality assessment. Open to majors only.

625A. Psychosocial Interventions (4) I Introduction to psychotherapy and psychotherapy research. Principles of behavior therapy. Marital and family therapy. P. Graduate status.

625B. Psychosocial Interventions (4) II Issues of therapy integration and factors common to all treatments. P. Graduate status.

693. Internship (1-9) [Rpt./]

694. Practicum (1-3) [Rpt./]

696. Seminar f. Linguistic Investigations and Applications (3) [Rpt./ 3] I II (Identical with PSIO 695A, which is home).

696. Seminar

694. Practicum

695. Colloquium a. Motor Control (2) [Rpt./ 3] I II (Identical with PSIO 695A, which is home).

696. Seminar

695. Colloquium

694. Practicum

693. Internship

900. Research (1-3) [Rpt./]

909. Thesis (1-4) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

SCHOOL OF PUBLIC ADMINISTRATION AND POLICY (PA)

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FAX: (520) 621-4171
E-mail: rtrautman@bpa.arizona.edu
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URL: http://www.bpa.arizona.edu/programs/spap.html

Baccalaureate Degree
Bachelor of Science in Public Administration (B.S.P.A.)
Graduate Degree

Master of Public Administration (M.P.A.)

Majors and Degrees

Public Administration (M.P.A.)

Management (B.S.P.A.)

Health and Human Services Administration (B.S.P.A.)

Criminal Justice Administration (B.S.P.A.)

Program Requirements

For undergraduate academic program requirements consult the Online Course Catalog. Program Requirements Reports (APRPRs) are available on line at: http://www.arizona.edu/departmental/onlinecourse/data/interface. Minor requirements are available on line at: http://www.arizona.edu/departmental/onlinecourse/data/interface/minors.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Public Administration and Policy (PA)

204. Introduction to the Analysis of Data for Decision Making (3) I II Informal and exploratory approaches to the analysis of empirical data in a managerial context. P, MATH 119.

206. Public Policy and Administration (3) I II (Identical with POL 206, which is home).

221. Social Policy (3) I II Policy issues and options analyzed in the area of social welfare. Emphasis on specialized needs of vulnerable groups such as children and the socially disadvantaged. (Identical with SOC 221, SOC 221).


299. Independent Study (1-3) [Rpt./]

321. Health Care Policy and Institutions (3) I II Policy analysis and program planning. Issues related to health care and the implications of for-profit health care provision will be discussed. (Identical with SOC 416). May be convened with PA 516.

400. Quantitative Methods for Administrators (3) I II Quantitative techniques and their applications. Equations and their graphs, systems of linear equations, matrix algebra, linear programming, fundamental probability, expected value; functions and limits, applications of differential calculus. P, open to graduate students only.

405. Program Planning and Evaluation (3) I II Introduces processes of program planning and evaluation in the public and non-profit sectors. Includes goals setting and needs assessment methods, and qualitative and quantitative techniques of program planning and evaluation.

406. Bureaucracy, Politics, and Policy (3) I II (Identical with POL 406, which is home). May be convened with PA 506.

410. Introduction to Public and Nonprofit Financial Management (3) I II Issues and techniques of financial management and budgeting in the public and nonprofit sectors. P, ACCT 200 or ACCT 272; ECON 300.

416. Health, Ethics and Public Policy (3) I II Dealing with ethical and public dimension of health care. Policy issues include who pays for health care, who can access to health care and the implications of for-profit health care provision will be discussed. (Identical with SOC 416). May be convened with PA 516.

422. Introduction to Health Economics (3) I II Applies microeconomic theory, industrial organization and public finance to efficiency and equity problems in the acute and chronic health-care sectors and explores solutions to these problems at an introductory level. P, ECON 300 or ECON 361; PA 321. (Identical with ECON 422).

424. Management of Long Term Care Facilities and Programs (3) I II Problems and principles of management of facilities and community based programs providing health and social services to the chronically impaired. May be convened with PA 524.

427. Aging and Public Policy (3) I II Policy framework for administration of programs, plans, priorities, and legislation related to the needs of the aging in modern society. (Identical with GER 427, PLAN 427). May be convened with PA 527.

435. International Management (3) I II (Identical with MAP 435, which is home).

441. Women and Youth in the Justice System (3) I II Examines the treatment of juveniles and women in the American criminal justice system. (Identical with SOC 441).

446. Crime and Public Policy (3) I II Role of government in the prevention and control of crime. (Identical with SOC 446). May be convened with PA 546.

457. Law of the Elderly (3) I II (Identical with GER 457, which is home). May be convened with PA 557.


473. Government and Economic Well-being (3) I II (Identical with POL 473, which is home). May be convened with PA 573.

480. Formation of Public Policy (3) I II (Identical with POL 480, which is home).

481. Environmental Policy (3) I II (Identical with POL 481, which is home). May be convened with PA 581.

493. Internship (1-3) I II

493. Internship

l. Legislative Internship (1-12) [Rpt./]

498. Senior Capstone (3) I II

498H. Honors Thesis (3) [Rpt./]

499. Independent Study (1-6) [Rpt./]

501. Public Organization Theory (3) I II Focuses on understanding and analyzing interactions, effectiveness and complexities of organization structures.


503. Politics and the Policy Process (3) I I Various theories of how public policy is formulated.

504. Public and Policy Economics (3) I II Applications of economics to the analysis of public policy and planning problems. (Identical with PLAN 504).

505. Methods for Policy Analysis and Program Evaluation (3) I II Techniques for analyzing the effects of public policies and programs. P, MKTG 552 or consent of instructor.

506. Bureaucracy, Politics, and Policy (3) I (Identical with POL 506, which is home). May be convened with PA 406.


513. Government and the Nonprofit Sector (3) III In the past twenty years, governments have drastically altered the way they deliver public services. While government spending on services has grown, nonprofit organizations under contract to government increasingly are the providers of the services in health, welfare and many many other areas. This course will map the dimensions of this new relationship; discuss the consequences of third party management of public services; and develop skills in contracting, monitoring and measuring performance.

514. Analytic Methods in Local Planning and Management (3) I II Methods and models for program planning and policy analysis; forecasting, demand, facility location in capital investment programming, program analysis and evaluation. P, GEOG 557
262 ◆ Public Administration & Policy—Public Health

or consent of instructor, MKTG 552. (Identical with GEOG 514, PLAN 514).

516. Health, Ethics and Public Policy (3) II For a description of course topics see PA 416. Graduate-level requirements include individual presentations. (Identical with SOC 516). May be convened with PA 416.

521. Social Policy (3) I Design, implementation and outcomes of social policy initiatives in the U.S. and abroad. Themes include historical overview of antipoverty policy in the U.S., competing explanations for conditions of inequality, and examination of policy solutions. (Identical with SOC 521).

522. Analysis of Health Systems (3) I Introduces the student to the scope and nature of public and private health systems in the U.S.; examines roles of government and private enterprise in the development and operation of health institutions.

523. Health and Public Policy (3) II Examines public policy issues in health, including recent developments in health policy and planning at the national, state and local levels, and their impact on administrative behavior. (Identical with PLAN 523).

524. Management of Long Term Care Facilities and Programs (3) II For a description of course topics see PA 424. Graduate-level students will be required to produce more papers for the class at administrative level. May be convened with PA 424.

525. Comparative Management in Health Administration (3) I Assists students in applying general management principles to particular types of health agencies. Models of organizational behavior are used to develop a paradigm for comparative analysis. P, PA 5 22.

526. Health Economics (3) I Applies microeconomic theory, industrial organization and public finance to efficiency and equity problems in the acute and chronic health-care sectors. Explores solutions to these problems. P, ECON 500 or consent of instructor, PA 5 22. (Identical with ECON 526).

527. Aging and Public Policy (3) II For a description of course topics see PA 427. Graduate-level students will be required to produce more papers for the class at higher level. (Identical with GERO 527, PLAN 527). May be convened with PA 427.

528. Topics in Public and Nonprofit Financial Management (3) II Advanced issues in public sector financial management. P, PA 508; FIN 511. (Identical with FIN 528).

530. Aging and Social Sciences (3) I (Identical with GERO 530, which is home).

535. Studies in International Management (3) (Identical with MAP 535, which is home).


541. Deviance and Social Control (3) I II (Identical with SOC 541, which is home).


546. Crime and Public Policy (3) [Rpt./] I II For a description of course topics see PA 446. Graduate-level requirements include additional reading and paper along with facilitation of a class. (Identical with SOC 546). May be convened with PA 446.

557. Law of the Elderly (3) II (Identical with GERO 557, which is home). May be convened with PA 457.

573. Government and Economic Well-being (3) II (Identical with POL 573, which is home). May be convened with PA 473.

581. Environmental Policy (3) II (Identical with POL 581, which is home). May be convened with PA 481.

593. Internship (1-6) [Rpt./] I II

595. Colloquium (Identical with POL 595G, which is home).

596. Seminar I Management and Policy for Ecological Sustainability (3) [Rpt./] I II (Identical with POL 596I, which is home).

599. Independent Study (1-6) [Rpt./] I

699. Independent Study (1-3) I II

900. Research (1-9) I II

910. Thesis (1-6) I II

920. Dissertation (1-9) I II

930. Supplementary Registration (1-9) I II

PUBLIC HEALTH (PHL)

Arizona Graduate Program in Public Health
AHSC
The University of Arizona
Tucson, AZ 85724
Phone: 520-626-3200
Fax: 520-626-3206
E-mail: apearson@u.arizona.edu
URL: http://www.ahc.arizona.edu/pub-hlth/Baccalaureate Degree
The program offers no baccalaureate degree.

Graduate Degrees
Master of Public Health (M.P.H.)

 Majors and Degrees
Public Health (M.P.H.)

Concentrations:
Community Health
Community Health Nursing
Cultural and Behavioral Dimensions of Public Health
Environmental and Occupational Health Epidemiology
Health Administration and Policy

Health Education and Health Promotion
International Health
Public Health Nutrition
Generalist
an MD/MPH program for medical students

Program requirements
For graduate program requirements consult the Graduate Catalog and the department offices listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Public Health (PHL)

425. Topics in Latino Health (3) I (Identical with MAS 425, which is home). May be convened with PHL 525.

500. Research (3-12) [Rpt./48 units] I II (Identical with F CM 500, which is home).

502. Organization Theory and Behavioral Relations (3) I II (Identical with MAP 502, which is home).

511. Health Care Systems (3) I (Identical with PHSC 511, which is home).

513. Pharmaceutical Economics (3) II (Identical with PHSC 513, which is home).

525. Topics in Latino Health (3) I (Identical with MAS 525, which is home). May be convened with PHL 425.

527. Psychology of Sport and Exercise (3) I (Identical with EXSS 527, which is home).

530. Methods in Nursing Research (3) II (Identical with NURS 530, which is home).

548. Perspectives in Geriatrics (2) II (Identical with PHSC 548, which is home).

553. Toxicology and Chemical Exposure (2-4) I (Identical with OSH 553, which is home).

570. Issues and Trends in Public Health (3) (Identical with F CM 570, which is home).

571. International Comprehensive Health Care System (3) (Identical with F CM 571, which is home).

572. Population Dynamics and Family Planning (3) (Identical with F CM 572, which is home).

573. Health Issues of Women and Children (3) (Identical with F CM 573, which is home).

574. Health Administration and Policy (3) (Identical with F CM 574, which is home).

575. Environmental and Occupational Health (3) (Identical with F CM 575, which is home).

576. Biostatistics in Public Health (3) (Identical with F CM 576, which is home).

577. Social and Behavioral Basis of Public Health (3) (Identical with F CM 577, which is home).

578. Public Health Nutrition (3) II (Identical with F CM 578, which is home).

579. Issues in Rural Health (3) II (Identical with NURS 579, which is home).
580. Community Based Research Methodologies (3) II (Identical with F CM 580, which is home).

581. Introduction to Community Health (3) I (Identical with F CM 581, which is home).

586. Maternal and Child Health (3) I Focuses on current health problems and diseases affecting both pregnant women and children worldwide. The impact of various common health problems at different stages of the life cycle and their functional outcomes in terms of morbidity, mortality, psychological well-being, reproduction and growth will be highlighted. Students will become acquainted with the epidemiology of maternal and childhood diseases in developed and developing countries. Programs and resources available to combat health and nutritional problems will be evaluated. The role of different international organizations will be discussed in the context of socioeconomic development and current political/economic policies and realities.

587. Poverty and Health (3) II (Identical with NURS 587, which is home).

589. Clinical Pharmacological Mental Disorder (3) I (Identical with PHSC 589, which is home).

593. Internship
a. Public Health (1-12) [Rpt./] I II (Identical with F CM 593A, which is home).

596. Seminar
a. Basic Principles of Epidemiology (3) [Rpt/] I II (Identical with EPI 596A, which is home).

b. Occupational Disease (1-2) II (Identical with F CM 596G, which is home).

h. Prevention and Control of Disease (1) I (Identical with F CM 596H, which is home).

i. Seminar for Clinical Educators (4) I II (Identical with F CM 596J, which is home).

j. Health Policy: Leadership and Current Issues (2-3) II (Identical with F CM 596J, which is home).

m. Practice of Community-Oriented Medicine in Rural Areas (2) II (Identical with F CM 596M, which is home).

n. International Nutrition (2-3) II (Identical with F CM 596N, which is home).

p. Managed Health Care (3) II (Identical with F CM 596P, which is home).

q. Health Care Leadership/Medical Management (2-3) [Rpt.] I II (Identical with F CM 596Q, which is home). Open to medical and graduate students only.

s. AIDS, Cancer, Nutrition Immunity (1) II (Identical with F CM 596S, which is home).

t. Tropical Disease Problems (2) I II (Identical with F CM 596T, which is home).

v. Alcohol, Drugs: Biology to Treatment (3) II (Identical with F CM 596V, which is home).

w. Diet and Disease Prevention (2) II (Identical with F CM 596W, which is home).

599. Independent Study (1-6) [Rpt./] I II

602A. Biotoxicology (3) I (Identical with PCOL 602B, which is home).

602B. Biotoxicology Laboratory (1) I (Identical with PCOL 602B, which is home).

603. Public Health Science (3) I (Identical with NURS 603, which is home).

607. Cross-Cultural Nursing (3) S (Identical with NURS 607, which is home).

611. Pharmaceutical Education Research (3) I (Identical with PHSC 611, which is home).

612. Pharmaceutical Outcomes Research (3) II (Identical with PHSC 612, which is home).

620. Communication Theory II (3) II (Identical with COMM 620, which is home).

621. The Pharmaceutical Industry (3) II (Identical with PHSC 621, which is home).

622. Nurse Educator Role (3) II (Identical with NURS 622, which is home).

624. Administrative Process (3) I (Identical with NURS 624, which is home).

633. Evaluation Research (3) I (Identical with NURS 633, which is home).

634. Data Management in Health Care Systems (3) II (Identical with NURS 634, which is home).

660. Infectious Disease Epidemiology (3) II (Identical with EPI 660, which is home).

800. Research (2-16) [Rpt./] I II (Identical with F CM 800, which is home).

815B. The Dying Patient (3) [Rpt./] I II (Identical with F CM 815B, which is home).

896. Seminar
a. International Health: Clinical and Community Care (3) S (Identical with F CM 896A, which is home).

b. Principles and Practice of Home Health (2) I II (Identical with F CM 896B, which is home).

c. International Nutrition (2-3) II (Identical with F CM 896C, which is home).

q. Health Care Leadership/Medical Management (2-3) [Rpt./] I II (Identical with F CM 896Q, which is home). Open to medical and graduate students only.

t. Tropical Disease Problems (2) I II (Identical with F CM 896T, which is home).

930. Supplementary Registration (1-9) [Rpt./]

RADIATION ONCOLOGY (RONC) & RADIOLOGY (RADI)

For more information about radiation oncology and radiology courses see the College of Medicine entry in this manual.

RANGE MANAGEMENT (RA M)

For more information about range management courses, see the entry for the School of Renewable Natural Resources in this manual.

RELIGIOUS STUDIES (RELI)

Modern Languages Bldg., Rm. 371
The University of Arizona
PO Box 210067
Tucson AZ 85721-0067
Phone: (520) 621-0067
FAX: (520) 621-3678
URL: http://www.coh.arizona.edu/rel_studies/rel.html

Baccalaureate Degree
Bachelor of Arts (B.A.)
Graduate Degree
The department does not offer a graduate degree.
Major and Degree
Religious Studies (B.A.)
Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.
For graduate program requirements, consult the Graduate Catalog and the departmental office listed above.
To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Religious Studies (RELI)

122. Introduction to African/Diaspora Religion and Culture (3) (Identical with AFAS 122, which is home).

126. Greek Mythology II (3) I II (Identical with CLAS 126, which is home).

130. Asian Religions (3) I II (Identical with EAS 130, which is home).

142. Chinese Humanities (3) II (Identical with CHN 142, which is home).

144. Japanese Humanities (3) II (Identical with JPN 144, which is home).

150. The Worlds of Buddhism (3) II (Identical with EAS 150, which is home).

204. Inter-African/Diasporational Relations and Culture (3) I II (Identical with AFAS 204, which is home).

220. Japanese Religion (3) I II (Identical with JPN 220, which is home).

220A-220B. Literature of the Bible (3) I II (Identical with ENGL 220A-220B, which is home).

225. Introduction to Women and Religion (3) I Ways in which women's religious practices have interacted with religious traditions' constructions of gender. The course asks students to consider how the study of religion can illuminate their own self-understandings and cultural locations. (Identical with W S 225).

233. Philosophy of Religion (3) I (Identical with PHIL 233, which is home).

245. Existential Problems (3) I II (Identical with PHIL 245, which is home).
271. The History of Christianity (3) S (Identical with HIST 271, which is home).

273. Introduction to Judaism (3) I (Identical with JUS 273, which is home).


303. Epistles of Saint Paul (3) I Examination of the religious and cultural background in the Greco-Roman world during the lifetime of Saint Paul; analysis of Paul’s thought in Acts and the Epistles.

305. Greek and Roman Religion (3) (Identical with CLAS 305, which is home).

306. The Transformation of Society: Christianity in the Greco-Roman World (3) I (Identical with CLAS 306, which is home).

307. Spirituality in the Arts (3) I (Identical with HUMS 307, which is home).

310. Apocalyptic Imagination (3) II (Identical with JUS 310, which is home).

320. Tudor-Stuart England (3) I (Identical with HIST 320, which is home).

321. Women in Judaism (3) II (Identical with JUS 321, which is home).

322. Sociology of Religion (3) (Identical with SOC 322, which is home).

324. Women and Religion in the U.S. (3) I II Considers the place of women in multicultural U.S. society by placing them in historical perspective with regard to religious communities. Pursues historical encounters between women and their religions. (Identical with W S 324).

326. Religion and Sexuality (3) I II Places questions of religion and sexuality in historical perspective as well as investigating the import which issues of sexuality continue to have for religion and society.

331. Taoist Traditions of China (3) I (Identical with CHN 331, which is home).

333. Buddhist Meditation Traditions (3) I (Identical with EAS 333, which is home).

334. Islamic Thought (3) II (Identical with NES 334, which is home).

340. Jesus in Contemporary Thought (3) I Survey of present thinking about the meaning of Jesus, including humanistic, Jewish, and various Christian interpretations.

344. African American Religion (3) I II GRD (Identical with AFAS 344, which is home).

345. Hindu Religious Activities (3) I II (Identical with EAS 345, which is home).

348. Myth and Archetype (3) I II (Identical with CLAS 348, which is home).

350. Hindu Mythology (3) I II S (Identical with EAS 350, which is home).

370A. History of the Jews: Modern Jewish History (3) I II (Identical with JUS 370A, which is home).

370B. History of the Jews: The Jew in the Medieval World (to the 17th Century) (3) I II (Identical with JUS 370B, which is home).

372A. History and Religion of Israel in Ancient Times: Biblical Period through the Babylonian Exile (3) I (Identical with JUS 372A, which is home).

372B. History and Religion of Israel in Ancient Times: Exira-Nehemiah to the Roman Empire (3) II (Identical with JUS 372B, which is home).

374. The Holocaust (3) II (Identical with HIST 374, which is home).

379. Religion in German Culture (3) I II (Identical with GER 379, which is home).

380. Nature, the Great Mother, and Woman (3) I (Identical with HUMS 380, which is home).

382. Archaeology and the Bible (3) II (Identical with JUS 382, which is home).

399. Independent Study (1-4) [Rpt/]

399H. Honors Independent Study (1-3) [Rpt/] I II (Identical with RELI 399H)

405A-405B. Medieval Europe (3) I (Identical with HIST 405A-405B, which is home).

406. Medieval England (3) II (Identical with HIST 406, which is home).

407A. Intellectual History of Medieval Europe: High Medieval Europe (3) I (Identical with HIST 407A, which is home).

407B. Intellectual History of Medieval Europe: Late Medieval/Early Modern Europe (3) II (Identical with HIST 407B, which is home).

408. The Renaissance (3) I (Identical with HIST 408, which is home).

409. The Reformation (3) II (Identical with HIST 409, which is home).

410. History of Hell in Early Europe (3) II (Identical with HIST 410, which is home).

411. Anthropology of Religion (3) I (Identical with ANTH 411, which is home).

420. Studies in the Bible as Literature (3) II (Identical with ENGL 420, which is home).

425. Theoretical Issues in the Study of Women and Religion (3) II The study of women and religion, including religious symbols and rituals; women’s constraint and empowerment through religion; reading and writing cultures; women, religion and cross-cultural contact; women, religion and social change. (Identical with W S 425). May be convened with RELI 425.

428. Anti-Semitism (3) II (Identical with HIST 428, which is home).

430. Prophecy in Ancient Israel (3) II (Identical with JUS 430, which is home). May be convened with RELI 430.

435. Jewish Mysticism (3) II (Identical with JUS 435, which is home).

438. The Book of Psalms (3) I (Identical with JUS 438, which is home). May be convened with RELI 438.

445. Hindu Mysticism (3) II (Identical with EAS 445, which is home). May be convened with RELI 445.

450. Religion and Politics (3) II (Identical with POL 450, which is home).

453. Culture and Civilization of North Africa (3) I II (Identical with FREN 453, which is home).

454. Spanish Inquisition (3) I (Identical with HIST 454, which is home).

455. Introduction to Rabbinic Literature (3) II (Identical with JUS 455, which is home).

470. Religious History of India (3) I (Identical with HIST 470, which is home).

483. Confucianism: The Classical Period (3) I (Identical with CHN 483, which is home). May be convened with RELI 583.

484. Confucianism: The Neo-Confucian Tradition (3) II (Identical with CHN 484, which is home). May be convened with RELI 584.

485. History of Japanese Religion: Ancient (3) I (Identical with JPN 485, which is home). May be convened with RELI 585.

486. History of Japanese Religion: Medieval - Modern (3) II (Identical with JPN 486, which is home). May be convened with RELI 586.

487A. History of East Asian Buddhism (3) I (Identical with EAS 487A, which is home).

487B. History of East Asian Buddhism (3) II (Identical with EAS 487B, which is home).

488. History of Byzantium (3) II (Identical with HIST 488, which is home).

490. Indian Religions and Spirituality (3) II (Identical with AIS 490, which is home).

496. Seminar k. Early Judaism and the Beginning of Christianity (3) II (Identical with JUS 496K, which is home). May be convened with RELI 596K.

w . Feminist Approaches in the Bible (3) II (Identical with JUS 496W, which is home). May be convened with RELI 596W.

498. Senior Capstone (1-3) I II

499H. Honors Thesis (3) [Rpt/] 2 I II

499. Independent Study (1-5) [Rpt/]

499H. Honors Independent Study (1-3) [Rpt/] I II

525. Theoretical Issues in the Study of Women and Religion (3) II For a description of course topics see RELI 425. Graduate-level requirements include a longer writing project, and an additional class presentation. (Identical with W S 525). May be convened with RELI 425.

530. Prophecy in Ancient Israel (3) II (Identical with JUS 530, which is home). May be convened with RELI 430.

538. The Book of Psalms (3) I (Identical with JUS 538, which is home). May be convened with RELI 438.

545. Hindu Mysticism (3) II (Identical with EAS 545, which is home). May be convened with RELI 445.

583. Confucianism: The Classical Period (3) I (Identical with CHN 583, which is home). May be convened with RELI 483.
696. Seminar
a. Remote Sensing (1) II

RENEWABLE NATURAL RESOURCES (RA M/RNR/WS M/WFSC)

Biological Sciences East Bldg., Rm. 325
The University of Arizona
PO Box 210043
Tucson AZ 85721-0043
Phone: (520) 621-7255
Fax: (520) 621-8801
E-mail: llee@ag.arizona.edu
URL: http://www.smr.arizona.edu/

Baccalaureate Degree
The department does not offer a baccalaureate degree.

Graduate Degree
The department does not offer a graduate degree.

Minor
The program offers a Doctor of Philosophy minor.

Program requirements
For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Remote Sensing (REM)

490. Remote Sensing for the Study of Planet Earth (3) II A multidisciplinary course delineating the physical basis of electromagnetic remote sensing, the concepts of information extraction, and applications pertinent to earth systems science. (Identical with ATM 490, EN 490, GEOS 490, HWR 490, MN E 490, OPTI 490, RNR 490, SWES 490). May be convened with REM 590.

590. Remote Sensing for the Study of Planet Earth (3) II For a description of course topics see REM 490. Graduate-level requirements include an additional term paper. (Identical with ARL 590, ATM 590, GEOS 590, HWR 590, MN E 590, OPTI 590, RNR 590, SWES 590). May be convened with REM 490.

382. Rangeland Plant Communities of the West (3) II Structure and function of western U.S. range land plant communities focusing on vegetation dynamics and anthropogenic influences. Laboratory includes classroom and field identification of communities and plant species.

393. Internship (1-8) [Rpt./ II

399. Independent Study (1-3) [Rpt./

399H. Honors Independent Study (1-3) [Rpt./ II

436. Grazing Ecology and Management (3) I Application of animal diet and nutrition, grazing behavior, and vegetation-soil-herbivore interactions in management of grazing animals for improved livestock production, wildlife habitat, watershed protection, forest reproduction or other land use objectives. Includes design of water developments, fences and other structural range improvements. May be convened with RA M 536.

446. Range and Forest Management (4) II Principles and technical procedures associated with management of range land and forest plant communities. Manipulations will focus on controlling species composition to achieve management objectives, and include chemical, biological, and cultural treatments. P, RNR 316. May be convened with RA M 546.

456. Range and Forest Management Plan (2) II Conduct a field inventory, develop management alternatives, and provide environmental and economic analyses of alternative management proposals in a written plan. Writing-Emphasis Course. May be convened with RA M 556.

487. Rangeland Management Plan (2) II Conduct a field inventory, develop management alternatives, and provide environmental and economic analyses of alternative management proposals in a written plan. Writing-Emphasis Course. All-day field trips. P, RA M 456; Field Trips. May be convened with RA M 587.

493. Internship (1-8) [Rpt./ II

494. Practicum

r. Research (3) [Rpt./ I II P, ENGL 101, MATH 117, ABE 120, consent of instructor.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ II

499. Independent Study (1-5) [Rpt./

536. Grazing Ecology and Management (3) I For a description of course topics see RA M 436. Graduate-level requirements include additional required readings and research paper on selected topic. May be convened with RA M 436.

546. Range and Forest Management (4) II For a description of course topics see RA M 446. Graduate-level requirements include a research paper on an aspect of range land improvements. May be convened with RA M 446.

556. Rangeland Inventory and Monitoring (3) I For a description of course topics see RA M 456. Graduate-level requirements include
additional assigned readings and discussion periods. May be convened with RA M 487.

570. Functional Ecology of Arid Land Plants (2) II Concepts and current approaches in physiological ecology of arid land plants, focusing on processes at whole plant and ecosystem levels. Hands-on experience with instrumentation and methods used to measure plant-water relations, gas exchange, isotopic variation, and ecosystem fluxes. Field Trips.

587. Rangeland Management Plan (2) II For a description of course topics see RA M 487. Graduate-level requirements include development of additional management alternatives and environmental and economic analyses. May be convened with RA M 487.

593. Internship (1-8) [Rpt./] I II

595. Colloquium
  a. Rangeland Policy (3) [Rpt./] I II
  c. Diet Selection of Free-Ranging Ruminants (2) I

599. Independent Study (1-5) [Rpt./]

693. Internship (1-8) [Rpt./] I II

696. Seminar
  a. Rangeland Policy (1) [Rpt./] I II
  b. Independent Study (1-5) [Rpt./] I II

900. Research (1-8) [Rpt./]

909. Master's Report (1-3) [Rpt./]

910. Thesis (1-8) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

Watershed Management (WS M)

193. Internship (1-8) [Rpt./] I II

199. Independent Study (1-3) [Rpt./]

199H. Honors Independent Study (1-3) [Rpt./]

293. Internship (1-8) [Rpt./] I II

299. Independent Study (1-5) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./]

330. Introduction to Remote Sensing (3) I (Identical with GEOG 330, which is home).

393. Internship (1-8) [Rpt./] I II

399. Independent Study (1-3) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II

406. Applied Hydraulics (3) I GRD (Identical with ABE 406, which is home). May be convened with WS M 506.

408. Wildland Fire Management (3) I Principles of fire behavior in forest, range, and other vegetation types; interrelationships of fuels, weather, and topography; pyrolysis and combustion processes; effects of fire; fuels inventory; prevention, detection, and control techniques; fire danger rating and fire behavior modeling. May be convened with WS M 508.

426. Soil and Water Conservation Engineering (3) II S 1.5 ES. (Identical with ABE 426, which is home). May be convened with WS M 526.

435. Water Management Dryland Ecosystems (3) I Hydrologic principles as applied to arid and semi-arid ecosystems with water management applications in dryland resources management. P, MATH 160 or MATH 263, SWES 201. May be convened with WS M 535.

460. Watershed Hydrology (4) I Application of fundamental principles to quantifying the basic hydrologic processes occurring on watersheds. (Identical with HWR 460). 3R, 3L, P, GEOS 101, SWES 200, MATH 160 or MATH 263. May be convened with WS M 560.

462. Watershed Management (4) II Evaluating hydrologic impacts of management activities on watersheds to include silviculture, range, mining, and recreation use. 3R, 3L, P, WS M 460 or one course in hydrology. May be convened with WS M 562.

463. Plant-Water Relations (3) II (Identical with PL S 463, which is home). May be convened with WS M 563.

464. Introduction to Dendrochronology (4) I (Identical with GEOS 464, which is home). May be convened with WS M 564.


468. Wildland Water Quality (3) II Introduction to water quality and its influences in natural environments. Interactions with land management and relationships to the larger issues of environ-mental quality. Field trips. May be convened with WS M 568.

493. Internship (1-8) [Rpt./] I II

494. Practicum
  r. Research (3) [Rpt./] I II P, ENGL 101, MATH 117, ABE 120 and consent of instructor.

497. Workshop
c. Dendrochronology (1-4) II 3L or 6L. Field trip. (Identical with GEOS 497C, which is home). May be convened with WS M 597C.

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./] I II

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (1-3) [Rpt./] I II

506. Applied Hydraulics (3) I (Identical with ABE 506, which is home). May be convened with WS M 406.

508. Wildland Fire Management (3) I For a description of course topics see WS M 408. Graduate-level requirements include a research paper on a specific fire issue or problem in the student’s professional discipline area. May be convened with WS M 408.


526. Soil and Water Conservation Engineering (3) II S (Identical with ABE 526, which is home). May be convened with WS M 426.

531. Dryland Forest Management (3) II Utilization and management of forest resources in dry environments; biophysical and socio-economic issues related to the development of forest commodities and amenities. P, 6 units of upper-division WS M.

532. Agroforestry (3) I Ecological and socioeconomic factors related to the planning and implementation of agroforestry systems. P, 6 units of upper-division WS M.

535. Water Management in Dryland Ecosystems (3) I For a description of course topics see WS M 435. Graduate-level requirements include a report and presentation on a topic related to hydrology or water management in dryland ecosystems. For non-majors only. (Identical with ARL 535). May be convened with WS M 435.

560. Watershed Hydrology (4) I For a description of course topics see WS M 460. Graduate-level requirements include an in-depth paper on the application of hydrologic principles to problems in watershed management. (Identical with HWR 560). May be convened with WS M 460.

562. Watershed Management (4) II For a description of course topics see WS M 462. Graduate-level requirements include the development of a watershed management scenario and accompanying report. May be convened with WS M 462.

563. Plant-Water Relations (3) II (Identical with PL S 563, which is home). May be convened with WS M 463.

564. Introduction to Dendrochronology (4) I (Identical with GEOS 564, which is home). May be convened with WS M 464.

567. Advanced Watershed Hydrology (3) I For a description of course topics see WS M 467. Graduate students will be required to do additional exercises. (Identical with ABE 567, HWR 567). May be convened with WS M 467.

568. Wildland Water Quality (3) II For a description of course topics see WS M 468. Graduate-level requirements include a class report and presentation on a negotiated topic of interest. May be convened with WS M 468.

569. Spatial Analysis of Hydrology and Watershed Management (2) Geographic information systems (GIS) as a tool for hydrologists and environmental managers. Topics relate to the application of GIS including classification and suitability analysis, interpolation techniques, terrain analysis, model integration, and visualization. Examines sources of potential error and the ramifications. 1R, 3L, P, RNR 417 or RNR 517. (Identical with HWR 569).

571. Water Quality Control (3) II (Identical with C E 571, which is home).

577. Advanced Topics in the Economics of Environmental Regulation (3) I (Identical with AREC 577, which is home).

593. Internship (1-8) [Rpt./] I II

595. Colloquium
e. Dendrochronology (1-4) [Rpt./ 9 units] I II (Identical with GEOS 595E, which is home).
f. Dendrochronology: Biological Applications (3) [Rpt./ 2] I II (Identical with GEOS 595F, which is home).

g. Dendrochronology: Chronometric Applications (3) [Rpt./ 2] I II (Identical with GEOS 595G, which is home).

597. Workshop

c. Dendrochronology (1-4) II (Identical with GEOS 597C, which is home). May be convened with WS M 497C.

599. Independent Study (1-5) [Rpt./]


605. Watershed Modeling (3) I Distributed modeling of hydrological and sedimentation processes at the watershed scale; emphasis on current concepts and applications.

693. Internship (1-8) [Rpt./] I II

696. Seminar

a. Watershed Management (1-2) [Rpt./ 4 units] I II

699. Independent Study (1-5) [Rpt./] I II

900. Research (1-8) [Rpt./]

909. Master's Report (1-3) [Rpt./]

910. Thesis (1-8) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

Wildlife and Fisheries Sciences (WFSC)

125. Introduction to Wildlife Conservation (3)
Survey of conservation history, ecological principles, wildlife management techniques, and contemporary wildlife conservation issues. Intended for non-majors.

126. Wildlife Conservation Laboratory (1) I Laboratory exercises and field trips covering conservation techniques; animal census, habitat analysis, population dynamics, and management techniques. 3L. Field trips. P or CR, WFSC 125.

193. Internship (1-8) [Rpt./] I II

199. Independent Study (1-3) [Rpt./]

199/1. Honors Independent Study (1-3) [Rpt./] I II

213. Animal Genetics (3) I (Identical with AN S 213, which is home).

293. Internship (1-8) [Rpt./] I II

299. Independent Study (1-5) [Rpt./]

299/1. Honors Independent Study (1-3) [Rpt./]

330. Nutritional Biology (3) I (Identical with AN S 330, which is home).

393. Internship (1-8) [Rpt./] I II

399. Independent Study (1-3) [Rpt./]

399/1. Honors Independent Study (1-3) [Rpt./] I II

405. Aquatic Entomology (4) II (Identical with ECOL 480, which is home).

441. Limnology (4) I Study of lakes and streams; biological characteristics, as related to physical, chemical, geological, and historical processes operating on fresh waters. 2R, 6L.

597. Workshop

c. Dendrochronology (1-4) II (Identical with GEOS 597C, which is home). May be convened with WS M 497C.

599. Independent Study (1-5) [Rpt./]


605. Watershed Modeling (3) I Distributed modeling of hydrological and sedimentation processes at the watershed scale; emphasis on current concepts and applications.

693. Internship (1-8) [Rpt./] I II

696. Seminar

a. Watershed Management (1-2) [Rpt./ 4 units] I II

699. Independent Study (1-5) [Rpt./] I II

900. Research (1-8) [Rpt./]

909. Master's Report (1-3) [Rpt./]

910. Thesis (1-8) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

Wildlife and Fisheries Sciences (WFSC)

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126. Wildlife Conservation Laboratory (1) I Laboratory exercises and field trips covering conservation techniques; animal census, habitat analysis, population dynamics, and management techniques. 3L. Field trips. P or CR, WFSC 125.

193. Internship (1-8) [Rpt./] I II

199. Independent Study (1-3) [Rpt./]

199/1. Honors Independent Study (1-3) [Rpt./] I II

213. Animal Genetics (3) I (Identical with AN S 213, which is home).

293. Internship (1-8) [Rpt./] I II

299. Independent Study (1-5) [Rpt./]

299/1. Honors Independent Study (1-3) [Rpt./]

330. Nutritional Biology (3) I (Identical with AN S 330, which is home).

393. Internship (1-8) [Rpt./] I II

399. Independent Study (1-3) [Rpt./]

399/1. Honors Independent Study (1-3) [Rpt./] I II

405. Aquatic Entomology (4) II (Identical with ECOL 480, which is home).

441. Limnology (4) I Study of lakes and streams; biological characteristics, as related to physical, chemical, geological, and historical processes operating on fresh waters. 2R, 6L.

597. Workshop

c. Dendrochronology (1-4) II (Identical with GEOS 597C, which is home). May be convened with WS M 497C.

599. Independent Study (1-5) [Rpt./]


605. Watershed Modeling (3) I Distributed modeling of hydrological and sedimentation processes at the watershed scale; emphasis on current concepts and applications.

693. Internship (1-8) [Rpt./] I II

696. Seminar

a. Watershed Management (1-2) [Rpt./ 4 units] I II

699. Independent Study (1-5) [Rpt./] I II

900. Research (1-8) [Rpt./]

909. Master's Report (1-3) [Rpt./]

910. Thesis (1-8) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

Wildlife and Fisheries Sciences (WFSC)

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Survey of conservation history, ecological principles, wildlife management techniques, and contemporary wildlife conservation issues. Intended for non-majors.

126. Wildlife Conservation Laboratory (1) I Laboratory exercises and field trips covering conservation techniques; animal census, habitat analysis, population dynamics, and management techniques. 3L. Field trips. P or CR, WFSC 125.

193. Internship (1-8) [Rpt./] I II

199. Independent Study (1-3) [Rpt./]

199/1. Honors Independent Study (1-3) [Rpt./] I II

213. Animal Genetics (3) I (Identical with AN S 213, which is home).

293. Internship (1-8) [Rpt./] I II

299. Independent Study (1-5) [Rpt./]

299/1. Honors Independent Study (1-3) [Rpt./]

330. Nutritional Biology (3) I (Identical with AN S 330, which is home).

393. Internship (1-8) [Rpt./] I II

399. Independent Study (1-3) [Rpt./]

399/1. Honors Independent Study (1-3) [Rpt./] I II

405. Aquatic Entomology (4) II (Identical with ECOL 480, which is home).

441. Limnology (4) I Study of lakes and streams; biological characteristics, as related to physical, chemical, geological, and historical processes operating on fresh waters. 2R, 6L.

597. Workshop

c. Dendrochronology (1-4) II (Identical with GEOS 597C, which is home). May be convened with WS M 497C.

599. Independent Study (1-5) [Rpt./]


605. Watershed Modeling (3) I Distributed modeling of hydrological and sedimentation processes at the watershed scale; emphasis on current concepts and applications.

693. Internship (1-8) [Rpt./] I II

696. Seminar

a. Watershed Management (1-2) [Rpt./ 4 units] I II

699. Independent Study (1-5) [Rpt./] I II

900. Research (1-8) [Rpt./]

909. Master's Report (1-3) [Rpt./]

910. Thesis (1-8) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]
develop comprehension of the written word and to build vocabulary.

310. Russian Civilization and Cultural Identity (3) I Selected topics in Russian culture and civilization: architecture, film, fine art, literature, music and theater within their artistic, historical, ideological and sociological contexts. Taught in English. Open to majors only. Writing-Emphasis Course

316A-316B. Russian Phonetics and Intonation (1-1) I II Practice in Russian language with emphasis on phonetics and intonation of spoken Russian.

328. Women in Russian Literature and Culture (3) I Images of Russian women as reflected in literary, historical, and religious texts. Cultural attitudes revealed help to understand the status and role of women in today's Russia. (Identical with W S 328).

340. Eroticism, Religion, and Death in Tolstoy and Dostoevsky (3) I II Readings and discussion in English of representative Russian literary works of the 19th century.

350. The Soviet Experiment (3) I II Readings and discussion in English of representative Russian literary works from the 20th century.

360A-360B. Newspaper Reading in Russia I (1-1) Reading Russian newspapers and magazines.

362A-362B. Phonetics in Russia III (1-1) Russian pronunciation problems for native speakers of English.

364A-364B. Grammar in Russia III (1-1) Survey of Russian grammar. P, RUSS 301B or RUSS 305B.

366A-366B. Conversation in Russia III (1-1) Conversational situations likely to be encountered in the target culture. P, RUSS 364B or equivalent.

368A-368B. Literature IV (1-1) Survey of Russian literature. P, RUSS 464B or equivalent.

370A-370B. Composition in Russia II (1-1) Writing about the self, family and environment. P, RUSS 464B.

393. Internship

c. Business Internship (1-6) [Rpt/12 units]

396. Proseminar

h. Honors Proseminar (3) I

399. Independent Study (1-4) [Rpt/]

399R. Honors Independent Study (1-3) [Rpt/]


405A. Survey of Russian Literature (3) [Rpt/ 6 units] I Historical survey of Russian literature from the earliest times to the Soviet period; designed to acquaint students with literary terminology and facilitate comprehension of lectures in Russian. P, RUSS 301B or RUSS 305B. May be convened with RUSS 505A.

405B. Survey of Russian Literature (3) [Rpt/ 6 units] I Historical survey of Russian literature from the earliest times to the Soviet period; designed to acquaint students with literary terminology and facilitate comprehension of lectures in Russian. P, RUSS 301B or RUSS 305B. May be convened with RUSS 505B.

406A-406B. Literature II (2) Survey of Russian pronounciation for native speakers of English.

407A. Third Level Russian Oral Communication (3) I Emphasis is on political, economic and business Russian. P, RUSS 307B.

407B. Third Level Russian Oral Communication (3) II Emphasis is on political, economic and business Russian. P, RUSS 307B.

408A-408B. Composition (2-2) I II Writing on contemporary issues. P, upper division status.


412A-412B. Treasures of Russian Culture I (3-3) Survey of cultural monuments in Moscow and St. Petersburg. P, upper division status; Field Trips.

460A-460B. Newspaper Reading in Russia II (1-1) Reading Russian newspapers and magazines.

462A-462B. Phonetics in Russia IV (1-1) Russian pronunciation problems for native speakers of English P, RUSS 364B or equivalent.


466A-466B. Conversation in Russia IV (1-1) Conversational situations likely to be encountered in the target culture. P, RUSS 364B or equivalent.

468A-468B. Literature IV (1-1) Survey of contemporary Russian literature. P, RUSS 364B.

470A-470B. Composition in Russia II (1-1) Writing about the self, family and environment. P, RUSS 364B.

480. Business Level Russian II (3) I II Modern written and spoken Russian with an emphasis on business terminology and grammatical structures commonly found in commercial documents. Intermediate level.


493. Internship

a. Business Internship II (3) [Rpt/] P, two years of college level Russian or equivalent.

b. Business Internship II (3) [Rpt/] P, two years of college level Russian or equivalent.

c. Business Internship (1-6) [Rpt/12 units]

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt/ 2] I II

499. Independent Study (1-5) [Rpt/]

499H. Honors Independent Study (3) [Rpt/]

501A. Russian Stylistics (3) I Designed to improve the student's practical mastery and understanding of Russian at a higher and more sophisticated level. P, RUSS 301B.

501B. Russian Stylistics (3) II Designed to improve the student's practical mastery and understanding of Russian at a higher and more sophisticated level. P, RUSS 301B.

505A. Survey of Russian Literature (3) [Rpt/ 6 units] I For a description of course topics see RUSS 405A. Graduate-level requirements include additional assignments. May be convened with RUSS 405A.

505B. Survey of Russian Literature (3) [Rpt/ 6 units] II For a description of course topics see RUSS 405B. Graduate-level requirements include additional assignments. May be convened with RUSS 405B.

507A. Advanced Russian Conversation (3) I Emphasis is on political, economic and business Russian. (ACTFL). P, RUSS 407B.

507B. Advanced Russian Conversation (3) II Emphasis is on political, economic and business Russian. (ACTFL). P, RUSS 407B.

560A. Newspaper Reading in Russia II (1) Reading Russian newspapers and magazines. P, RUSS 464B or equivalent.

560B. Newspaper Reading in Russia II (1) Reading Russian newspapers and magazines. P, RUSS 464B or equivalent.

562A. Phonetics in Russia V (1) Russian pronunciation problems for native speakers of English, P, RUSS 462B.

562B. Phonetics in Russia V (1) Russian pronunciation problems for native speakers of English, P, RUSS 462B.

564A-564B. Grammar in Russia V (1-1) Survey of Russian grammar. P, RUSS 464B or equivalent.

566A-566B. Conversation in Russia V (2-2) Conversational situations likely to be encountered in the target culture. P, RUSS 466B or equivalent.

568A-568B. Literature V (1-1) Survey of contemporary Russian literature. P, RUSS 468B or equivalent.

570A-570B. Composition in Russia III (1-1) Writing about self, family and environment. P, RUSS 464B.

581. Russian Phonology and Morphology (3) I II Synchronic study of the phonology and morphology of modern Russian. P, RUSS 301B or RUSS 305B.

582. Russian Syntax and Semantics (3) I Introduction to theories and issues of syntax, semantics and pragmatics in Russian. Problems in text analysis will also be covered. P, three years of Russian language.

583. History of the Russian Language (3) I Diachronic study of the Russian language from Indo-European up to the modern period.

585. Linguistic and Computer-Assisted Approaches to Literature (3) II (Identical with GER 585, which is home).

587. Testing and Evaluation in Foreign/Second Language Programs (3) I II (Identical with GER 587, which is home).

593. Internship

c. Business Internship (1-6)

596. Seminar
Russian and Soviet Studies (R SS)

299. Independent Study (1-3) [Rpt./I]
305. Soviet Economic System (3) I (Identical with ECON 305, which is home).
347. The Holocaust (3) I (Identical with HIST 347, which is home).
409. Russia and the Former Soviet Union (3) II (Identical with GEOG 409, which is home).
421. History of Russia: Early Period (3) I (Identical with HIST 421, which is home).
422. History of Russia: Modern Period (3) II (Identical with HIST 422, which is home).
423. Intellectual History of Russia (3) II (Identical with HIST 423, which is home).
424. The Modernization of Russia (3) I (Identical with HIST 424, which is home).
425. History of the Soviet Union (3) I (Identical with HIST 425, which is home).
443. Soviet and Post-Soviet Politics (3) I (Identical with POL 443, which is home).
451. Soviet and Post-Soviet Foreign Policy (3) I (Identical with POL 451, which is home).
496. Seminar
a. Russian and Soviet Studies (3) II P, R SS 496A.

b. Russian and Soviet Studies (3) II P, R SS 496B.

h. Russian and Soviet Studies (3) II P, R SS 496C.

498. Senior Capstone (1-3) I II
543. Soviet and Post-Soviet Politics (3) I (Identical with POL 543, which is home). May be convened with R SS 443.

COLLEGE OF SCIENCE
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Tucson, AZ 85721-0077
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E-mail: Web@CoS.Arizona.edu
URL: http://w3.arizona.edu/~science/

The College of Science develops new knowledge about the world and about means of inquiry in significant areas of science as well as interdisciplinary areas involving science. It provides students, colleagues and the public with an understanding of the history, findings, applications, and methods of scientific inquiry they need to work and participate effectively in resolving the issues of our time.

Baccalaureate Degrees
Bachelor of Arts (B.A.)
Bachelor of Science (B.S.)
Bachelor of Science in Geosciences (B.S.G.)
Bachelor of Science in Speech and Hearing Sciences (B.S.S.)

Graduate Degrees
Master of Arts (M.A.)
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Astronomy (B.A., B.S., M.S., Ph.D.)
Atmospheric Sciences (B.S., M.S. Ph.D.)
Biochemistry (B.A., B.S., Ph.D.)
Biochemistry (B.A., B.S., M.A., Ph.D.)
Computer Science (B.S., M.S., Ph.D.)
Ecology and Evolutionary Biology (B.A., B.S., Ph.D.)
General Biology (B.S., M.S., M.D.)
Geosciences (B.S.G., M.S. Ph.D.)
Mathematics (B.A., B.S., M.A., M.S., Ph.D.)
Microbiology (B.S.)
Molecular and Cellular Biology (B.S., M.S., Ph.D.)
Physics (B.S., M.S., Ph.D.)
Planetary Sciences (M.S., Ph.D.)
Speech and Hearing Sciences (B.S.S., M.S., Ph.D.)

** The Master of Science degree with a major in Biochemistry is awarded only in rare instances when individuals admitted to the Doctor of Philosophy degree are unable to continue in the doctoral program.

*** The General Biology major is administered by the department of Veterinary Science and Microbiology in the College of Agriculture.

Undergraduate Minors
Minor requirements in the College of Science vary across programs. For more information about minor requirements of particular degree programs, contact a departmental advisor or consult the appropriate APRR.

Program requirements
For undergraduate academic program requirements consult the University catalog or contact the department at one of the addresses below.

SECOND LANGUAGE ACQUISITION AND TEACHING (SLAT)
427 N. Martin Ave.
The University of Arizona
P.O. Box 210427
Tucson, AZ 85721-0427
Phone: (520) 621-7391
FAX: (520) 621-7391
E-mail: azslat@ccit.arizona.edu
URL: http://www.coh.arizona.edu/slat/

Baccalaureate Degree
The program does not offer a baccalaureate degree.

Graduate Degree
Doctor of Philosophy (Ph.D.)

Major and Degree
Second Language Acquisition and Teaching (Ph.D.)

Program requirements
For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.
College of Social & Behavioral Sciences—Sociology

COLLEGE OF SOCIAL AND BEHAVIORAL SCIENCES
Douglass Building, Rm. 200W
The University of Arizona
PO Box 210028
Tucson AZ 85721-0028
Phone: (520) 621-1112
FAX: (520) 621-9424
URL: http://www.arizona.eduacademic/sbs.html

The study of human beings, individually and in social groups, unites the departments and programs of the College of Social and Behavioral Sciences. The college promotes fundamental research in individual behavior, cultural expression, social organization, theory and values, and public and private policy. The departments and programs provide bachelor's, master's, and doctoral degrees, with majors and minors in a number of disciplinary and interdisciplinary areas.

Baccalaureate Degrees
Bachelor of Arts (B.A.)
Bachelor of Science (B.S.)

Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Anthropology (B.A., M.A., Ph.D.)
Anthropology and Linguistics (Ph.D.)
Communication (B.A., M.A., Ph.D.)
Economics (B.A.)*
Geography (B.A., M.A., Ph.D.)
History (B.A., M.A., Ph.D.)
Information Resources and Library Science (M.A., Ph.D.)**
Journalism (B.A., M.A.)
Judaic Studies (B.A.)
Latin American Studies (B.A., M.A.)
Linguistics (B.A., M.A., Ph.D.)
Mexican American Studies (B.A.)
Near Eastern Studies (B.A., M.A., Ph.D.)
Philosophy (B.A., M.A., Ph.D.)
Political Science (B.A., M.A., Ph.D.)
Psychology (B.A., B.S., M.A., Ph.D.)
Regional Development (B.S.)
Sociology (B.A., M.A., Ph.D.)
Women's Studies (B.A., M.A.)

* Jointly administered with the College of Business and Public Administration.
**Administered by the School of Information Resources and Library Science

Undergraduate Minors
Most undergraduate programs require a minor. For more information about minor requirements of a particular degree program, consult a departmental advisor or the appropriate APRR for that program.

General education program
All undergraduate students are required to complete the university-wide general education program. Designed to provide a foundation for university learning, the program develops students' creative and analytical skills and integrates knowledge across university disciplines.

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.eduacademic/ oncource/data/interlace/. Minor requirements are available on line at: http://www.arizona.edu/academic/oncource/data/interlace/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

SOCIOLGY (SOC)

Social Sciences Bldg., Rm. 400
The University of Arizona
PO Box 210027
Tucson AZ 85721-0027
Phone: (520) 621-3531
FAX: (520) 621-3975
URL: http://wacky.ccit.arizona.edu/~soc/

Graduate Degrees
Master of Arts (M.A.)

Doctor of Philosophy (Ph.D.)

Majors and Degrees
Sociology (B.A., M.A., Ph.D.)

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.eduacademic/ oncource/data/interlace/. Minor requirements are available on line at: http://www.arizona.edu/ academic/oncource/data/interlace/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Sociology (SOC)

101. Introduction to Sociology (3) I II Sociological concepts and principles, with special reference to contemporary society.
160. Minority Relations and Urban Society (3) I II Analysis of minority relations and mass movements in urban society; trends in the modern world, with special reference to present-day race problems and social conflict. (Identical with AFAS 160).
161. The Chicano in American Society (3) II Study of Mexican Americans (Chicanos) as an ethnic-cultural group in American society, analysis of their present problems as a minority group, focus on Chicoano-Anglo relations in southwestern U.S.
189. World Population (3) I II Basic concepts of population studies; analysis of social trends, problems and solutions in relation to environmental factors, with reference to both advanced and developing nations.
195. Colloquium
a. Colloquium (1) I
h. Current Issues in Sexuality (2) I
199. Independent Study (1-3) [Rpt./]
201. American Social Problems (3) I I An examination of current theoretical perspectives and research on social problems.
220. Introduction to African American Studies (3) I (Identical with AFAS 220, which is home).
221. Social Policy (3) II (Identical with PA 221, which is home).
241. Criminal Justice Administration (3) I II (Identical with PA 241, which is home).
251. Sociology of Education (3) I II Educational system as a social and institutional structure, impact on society, and effects on students; consideration of alternative structures.
274. Social Statistics (3) I II Techniques of statistical description and elementary statistical inference as applied to sociological data. P, SOC 101.
275. Social Research Methods (3) I II Problems of conceptualization and measurement of social phenomena; design of research projects; techniques of data collection and analysis. P, SOC 274.
277. Law and Society (3) I II (Identical with PSYC 277, which is home).
293. Internship (1-6) [Rpt./]
299. Independent Study (1-4) [Rpt./]
299H. Honors Independent Study (1-3) [Rpt./]
300. Sources of Sociological Theory (3) I II Critical review of the works of leading sociologists. Writing-Emphasis Course.
303. Medical Sociology (3) I II Organization of health care in the U.S.; its impact on patients and society; health care practitioners; medical industries; policy debates.
310. Culture and the Individual (3) (Identical with ANTH 310, which is home).
313. Collective Behavior and Social Move-
ments (3) I II Study of riots, panics, crazes, reform and revolutionary movements; their origins, social bases, careers and consequences.

315. Political Sociology (3) II Current competing theories of socio-political institutions. (Identical with POL 315).

317. The Sociology of Popular Culture (3) II The place of popular culture in mass society; literature, film, popular music, and the life of the mind in general.

321. Sociology of Families and Households (3) I II Analysis of modern families and households and their characteristics in various social and historical settings.

322. Sociology of Religion (3) I II Religion as a social institution with special reference to industrial societies. (Identical with RELI 322).

324. Sociology of Sexuality (3) I II Impact of individual and community sexual attitudes and behaviors on other sociological and psychological functioning. Credit allowed for one of these courses: SOC 324, HLTH 330.

326. Sociology of Work and the Professions (3) I I Survey of the sociology of work occupations and organizations, with emphasis on such topics as productivity, work performance and workplace discrimination.

333. Group Processes (3) I II Study of processes that form, maintain, and dissolve groups, including their objectives, cohesion, norms, role leadership and power structures, communication patterns, interpersonal relations, problem solving, and effectiveness.


342. Criminology (3) I II Study of the social origins of criminal law, criminal behavior, and reactions to crime. (Identical with PA 342).

343. The Crime Problem (3) I I Identify with PA 343, which is home). Sociology students must have 56 units and 2.0, all other students must have BPA advanced standing.

344. Legal Aspects of the Criminal Justice Process (3) I II (Identical with PA 344, which is home). Sociology students must have 56 units and 2.0, all other students must have BPA advanced standing.

346. Population Geography (3) I I Identify with GEG 367, which is home)

384. Sociology of Latin American Societies (3) I I Analysis of their social structures and institutions, including government, religion, family, education, stratification, urban and rural development, economics, migration. (Identical with ANTH 384, LA S 384).

391. Preceptorship (1-6) [Rpt./]

393. Internship (1-6) [Rpt./]

396. Proseminar

h. Honors Proseminar (3) I II

399. Independent Study (1-4) [Rpt./]
399H. Honors Independent Study (1-3) [Rpt./] I II

412. Peasants and Peasant Societies (3) I II (Identical with ANTH 412, which is home).

416. Health, Ethics and Public Policy (3) I II (Identical with PA 416, which is home). May be convened with SOC 516.

420. Communication and the Legal Process (3) I (Identical with COMM 420, which is home). May be convened with SOC 520.

422. Complex Organizations (3) II Theories and research regarding large-scale organizations and their relations to the individual and society.

434. Kinship and Social Organizations (3) II (Identical with ANTH 434, which is home).

436. Social Structure and the Self (3) II Relation between the person and the group; social factors in character formation.

441. Women and Youth in the Justice System (3) I II (Identical with PA 441, which is home).

444. Group-Process Methods in Management (3) I II (Identical with MAP 444, which is home). Sociology students must have 56 units and 2.0, all other students must have BPA advanced standing.

446. Crime and Public Policy (3) I II (Identical with PA 446, which is home). May be convened with SOC 546. Sociology students must have 56 units and 2.0, all other students must have BPA advanced standing.

450. Social Inequality (3) I II Theories of social class, caste, and rank; social mobility in contemporary society. (Identical with ANTH 450).

457. Bio-Social Determinants of Socialization (3) I II (Identical with PSY 457, which is home).

458. Violence and Youth (3) I I (Identical with PSYC 458, which is home).

459. Sociology of Gender (3) I I Social construction, variation and consequences of gender categories across time and space. Topical (decision-making, deviance) and institutional (family, religion, politics) approaches. (Identical with W S 459).

467. Race and Ethnic Relations (3) I I Social processes involved in minority groups in terms of race, caste, class, ethnicity, politics, and religion. (Identical with ANTH 467, MAS 467).

487. Interpretations of Women's Health (3) I I (Identical with W S 487, which is home).

493. Internship I, Legislative Internship (1-12) [Rpt./] II

494. Practicum (3)

498. Senior Capstone (3) [Rpt./] I I Course is 3 units per semester and must be taken in 2 consecutive semesters for a total of six units.

498H. Honors Thesis (3) [Rpt./] 2

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (3) [Rpt./]


505. World-System Theory (3) I II Theory and research on the modern world-system.

508. Sociology of Culture (3) I II Theory and research on the nature of cultural systems, cultural production and consumption, and strategies of interpretive analysis. P consult department before enrolling.

509. Objects and Methods of Cultural Analysis (3) I I From content analysis to statistical analysis, means of gathering and analyzing data on cultural objects.

510. Political Sociology (3) I I Basic approaches in political sociology, with emphasis on the relationship of economic and political processes.

511. Rational Choice Sociology (3) I I Survey of the rapidly growing literature that applies the basic principles of rational choice theory to classic sociological problems such as the emergence of effective norms, the causes of marriage and divorce, the attainment of group solidarity, the causes of collective action, and the effects of institutions on social order.

514. The State and Social Policy (3) I II Examination of the historical development of the state, processes of policy formation, and the political economy of modern welfare and regulatory regimes.

515. Social Movements and Collective Action (3) I I A sociological examination of the emergence and development of social movements/collective action at both the societal and individual levels. Major theoretical perspectives on social movements/collective action will be reviewed as will recent and classical empirical works in the area. P admission to graduate program or consult department before enrolling.

516. Health, Ethics and Public Policy (3) I I (Identical with PA 516, which is home). May be convened with SOC 416. For a description of course topics see SOC 416.

520. Communication and the Legal Process (3) I I (Identical with COMM 520, which is home). May be convened with SOC 520. For a description of course topics see SOC 520.

521. Social Policy (3) I I (Identical with PA 521, which is home).

524. Organization Ecology (3) I I Survey of theory and research in organizational ecology, focusing on the organizational population as the level of analysis. Topics include population boundaries, selection vs. adaptation, evolution.
530. Theories and Research in Social Psychology (3) I, II A comprehensive introduction to the major theoretical perspectives, methodologies, research areas, and issues in contemporary social psychology.

532. Structured Approaches to Role and Identity (3) I, II An examination of the concepts of role, self, and identity in relation to social structures. Alternative approaches are presented, but the structured symbolic interactionist perspective is highlighted. P, SOC 530 or consult department before enrolling.

533. Social Relations, Groups, and Networks (3) I An analysis of social interaction in relations, groups, and networks, emphasizing the reciprocal influences of social structure and social process. Theories of exchange, power, status, and justice are considered. P, SOC 530 or consult department before enrolling.

535. Advanced Topics in Social Psychology (3) [Rpt./2] I, II An in-depth study of one area of theory and research in social psychology. Topics vary.

540. Correctional Policy and Theory (3) II (Identical with PA 540, which is home).

541. Deviance and Social Control (3) I, II Theory and research on the origins of various forms of deviant behavior, and on the consequences of efforts to control them. P, SOC 341 or SOC 342; SOC 201. (Identical with PA 541).

542. Criminology (3) I, II A comprehensive review of classic and contemporary approaches to crime, its nature, causes and consequences.

543. White Collar and Organizational Crime (3) I (Identical with PA 543, which is home).

545. Law and Society (3) [Rpt./1] I Comprehensive survey of major theoretical perspectives, methodologies, and empirical works on the origins, operations, development, and social consequences of legal and quasi-legal institutions.

546. Crime and Public Policy (3) [Rpt./1] II (Identical with PA 546, which is home). May be convened with SOC 446.

551. Stratification and Class (3) I, II Basic examination of concepts and research in the area of stratification, with emphasis on the classic statements and contemporary research.

552. Advanced Topics in Stratification (3) [Rpt./1] I, II In-depth study of one contemporary area of research in stratification. Topics will vary.

553. Sociology of Education (3) I Survey of sociological theory and research on education. Focuses on courses and consequences of variation in school practices affecting individual student achievement, behavior, and labor market outcomes.

556. Gender Issues in Organizational Behavior (3) I, II (Identical with MAP 556, which is home).

557. Gender and Labor (3) I Sources and consequences of gender differentiation and inequality, with attention to occupations, earnings, labor markets, household work, and the family. P, 3 grad credits in women’s studies, sociology, or economics or undergrad major in one of these fields.

558. Gender Identities and Interactions (3) I, II Examination of the interface of gender, race, class, and ethnicity in the context of social structures and institutions. Focuses upon identities and social interaction as keys to understanding how gender inequality is created, perpetuated, or altered in families, schools, peer groups, work settings, and cultural symbols. P, 3 grad credits in women’s studies, sociology, or economics. (Identical with W S 558).

559. Sociology of Gender and the State (3) I, II Gender and construction of state institutions, sovereignty, policy development, ideas and practices of citizenship, states, families, and markets, naturalist and paternalist origins of welfare states, race and gender in contemporary social policy, gender and political interests. (Identical with W S 559).

560. Race and Ethnicity (3) I, II Analysis of recent research on the relations among racial and ethnic minorities in society, with special attention to current empirical and theoretical issues.

569. Basic Quantitative Methods (3) I An introduction to basic quantitative methods for professional sociologists, including computer, mathematical, and statistical concepts.

570A. Social Statistics (3) I Probability, distributions, estimation and hypothesis testing.

570B. Social Statistics (3) II Ordinary least squares regression, generalized least squares regression, structural equation models (path analysis and non-restrictive systems).


576. Field and Observational Methods (3) I, II Comprehensive and critical examination of the collection, coding, analysis, and presentation of ethnographic/qualitative field data. Original field research required. P, admission to graduate program or 3 grad credits in women’s studies, sociology, or economics. (Identical with COMM 576).

577. Experimental Methods (3) I. The logic, design and analysis of experiments in social science research. Topics include the relation of experimentation to theory, experimental design, and practical issues. P, SOC 575 or consult department before enrolling.

580. Population Studies (3) I Theory and research in the fields of fertility, mortality, and migration, with emphasis on their relationships to social structure. An original research project is required.

585. Constructing Social Theories (3) I, II The nature and fundamental types of social theories. Formulating theories to guide research across a range of substantive areas. Criteria for choosing among alternative theories.

595. Colloquium
a. Colloquium (1-3) I
b. Seminar (1-3) [Rpt./6 units] I

596. Seminar
a. Seminar (1-3) II
b. Graduate Teaching (3) II
c. Practicum (1) I

e. Social Organization (3) [Rpt./1] I, P, completion of 1st year graduate program curriculum in sociology. (Note: This is a two-semester course beginning in the fall that receives a “K” grade at the end of the first semester)

f. Research and Publication (3) [Rpt./1] I II

g. Technology and Social Theory (3) II (Identical with MSE 596, which is home).

599. Independent Study (1-4) [Rpt./1]

693. Internship (1-4) [Rpt./1]

696. Seminar
a. Seminar (1-3) II (Identical with ENGR 696A, which is home).

699. Independent Study (1-4) [Rpt./1]

900. Research (2-8) [Rpt./1]

910. Thesis (4) [Rpt./1]

920. Dissertation (1-9) [Rpt./1]
To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

**Soil, Water, and Environmental Sciences (SWES)**

105. Introduction to Environmental Science: Land, Water, and Air (3) I Introduction to contemporary environmental issues and their relationship to physical, chemical, and biological principles. Discussion and evaluation of risks and trade-offs in addressing solutions to environmental pollution. Optional field trip. P, high school chemistry recommended; CR, SWES 106 recommended; Field Trips.

106. Environmental Science Laboratory: Land, Water, and Air (1) I Laboratory exercises and field trip experiences to study environmental problems related to land, water, and air resources. Basic physical, chemical and biological principles that relate to understanding environmental problems will be stressed. P, high school algebra and chemistry recommended; Field Trips.

197. Workshop

- a. Workshop (1) S P, offered through Horizons Unlimited Summer Program; Field Trips.

200. Soils (3) I II GRD Fundamental principles of soil science-origin, nature, and constitution of soils; their chemical, physical, and biological properties in relation to plant growth and the nonplant uses of soils. P, CHEM 101A; CHEM 102A, CHEM 103A.

201. Soils Laboratory (1) I II CDT Laboratory exercises for 200. P, SWES 200 or SWES 200.

250. Water and Its Uses (3) I GRD (Identical with ABE 250, which is home).

299. Independent Study (1-3) [Rpt./]

299H. Honors Independent Study (1-3) [Rpt./]

302. Introduction to Environmental Toxicology (3) I (Identical with PCOL 302, which is home)


316. Soil Fertility and Plant Nutrition (3) I II Chemical and biological properties of soil as they affect soil nutrient availability and crop production. Principles of plant nutrition and nutrient acquisition also discussed. Additional topics: fertilizers and fertilization, irrigation water quality, soil salinity, environmental impacts of fertilizers, and principles of soil and plant tissue testing. P, SWES 200.

317. Soil Fertility and Plant Nutrition laboratory (1) II Practical discussion and application of the principles of soil fertility and plant nutrition. Laboratory and greenhouse exercises involve soil and plant tissue testing and fertilizer response experiments. Field trips demonstrate crop production field experimentation, and use of soil as a medium for waste disposal. P, SWES 316 or SWES 316; Field Trips.

325. Soil Microbiology (3) I II Introduction to the biology and soil microorganisms, their interactions in soil ecosystems and relations with higher plants; laboratory exercises emphasize methods for identifying populations of bacteria, fungi, protozoa, nematodes and algae and their activities in soils. P, CHEM 103B, MCB 181.

330. Introduction to Remote Sensing (3) I (Identical with GEOG 330, which is home).

393. Internship (1-3) [Rpt./] I II

397. Workshop

- a. Teaching Workshop (2-3) P, sophomore or higher status with a grade of “A” in SWES 105-106, or majors in environmental science.

399. Independent Study (1-4) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./]

401. Management of Arid Lands and Salt-Affected Soils (3) I II Principles and practices of soil, water and crop management under arid and semiarid conditions; the use of diagnostic procedures for evaluating soils and waters, reclamation, and economics of irrigation project development. P, SWES 200; Field Trips.

404. Irrigation Principles and Management (3) I II GRD 2R, 3L (Identical with ABE 404, which is home). May be convened with SWES 504.

405. Environmental, Soil and Water Chemistry Laboratory (3) I Principles and methods of the chemical analysis of soils, water and biological materials with emphasis on illustrating important soil and environmental concepts and processes. P, CHEM 322, CHEM 323, PHYS 102. May be convened with SWES 505.

417. Geographic Information Systems for Natural Resources (3) I II (Identical with RNR 417, which is home). May be convened with SWES 517.

420. Environmental Physics (3) I Physical principles used in assessment, prevention or reduction of environmental problems. Main topics include energy sources; energy and mass transport; and pollution within soil, water and air. P, MATH 125B, PHYS 103. May be convened with SWES 520.

421A. Microbiological Techniques (3) I (Identical with MIC 421A, which is home).

421B. Microbiological Techniques (3) II (Identical with MIC 421B, which is home).


426. Environmental Microbiology Laboratory (2) I Basic techniques for isolation and characterization of environmental soil and water microflora including methods for enumeration and measurement of physiological activity. P, SWES 425. (Identical with MIC 426). May be convened with SWES 526.

428. Microbial Genetics (3) I II (Identical with PL P 428, which is home).

430. Environmental Monitoring (2) I Application and development of environmental measurements to the sampling and monitoring of groundwater, soil, surface water, and near-surface atmospheric systems. P, HWR 450 or SWES 411 or equivalent. May be convened with SWES 530.

431. Soil Morphology, Classification and Interpretation (3) I Theory and practice of describing characteristics of soils; principles of soil classification and interpretation; making soil interpretations for selected land uses. P, SWES 200, SWES 201; Field Trips. May be convened with SWES 531.

438. Environmental, Soil and Water Chemistry (3) II Basic soil and water chemical properties and interactions, chemical behavior, and processes in the environment. Natural and anthropogenic examples. P, SWES 200, CHEM 103B, CHEM 104B.

440. Biodegradation of Pollutants in Soil and Groundwater (3) I Description of modern pollution problems and potential biological remediation techniques focusing on the chemistry, biochemistry and molecular biology of biodegradation of hazardous and toxic compounds. P, SWES 425. (Identical with MIC 440). May be convened with SWES 540.

444. Applied Environmental Law (3) I A guided course through real world environmental law. U.S. legal system, major environmental laws-criminal and civil; common marketplace problems and solutions; high profile cases; essential professional skills. May be convened with SWES 544.

450. Anticipating the Future: Focus on Environment (3) I II Techniques and approaches to understand broad issues about the future with focus on environmental topics. Uses computer conferencing with Internet and significant student discussion and opportunities for team approaches and reporting. P, upper division status; CR, Writing-Emphasis Course. May be convened with SWES 550.

453. Remote Sensing of the Environment (3) I II Remote sensing techniques and applications for improved natural resource utilization of soils, water, grasslands, and forest. Fundamental energy-matter interactions that influence the spectral characteristics of vegetation, soil, and water. P, SWES 330 or PHYS 102B; Field Trips. May be convened with SWES 553.

461. Soil and Water Conservation (3) S Consideration of major soil and water conservation problems and solutions; principles of soil and water degradation by erosion, ground water overdraft; chemical transport in surface and ground water and their effects on world food production and environmental problems. P, SWES 200; Field Trips. May be convened with SWES 561.

466. Soil and Groundwater Restoration (3) I Methods for remediation of contaminated soil and groundwater; factors influencing efficacy of remediation systems. Emphasis on scientific basis of restoration. (Identical with HWR 466). May be convened with SWES 566.

470. Soil Physics (3) I II CDT Soil structure and...
physical constitution of soils; the physical properties of soil-water systems, movement and exchange of gases in the soil, and physical laws governing the movement and availability of soil water. P, SWES 200, PHYS 103; CR, MATH 125A. May be convened with SWES 570.

474. Aquatic Plants and the Environment (4) I II The role of riparian areas, estuaries, and constructed wetlands in the environment. Emphasis on plants as wildlife habitat for nutrient cycling and bioremediation. Field Trips. (Identical with ECOL 474, WFSC 474). May be convened with SWES 574.

475. Freshwater and Marine Algae (4) II (Identical with ECOL 475, which is home).

483. Geographic Applications of Remote Sensing (3) II (Identical with ECOL 483, which is home). May be convened with SWES 583.

490. Remote Sensing for the Study of Planet Earth (3) II (Identical with REM 490, which is home). May be convened with SWES 590.

493. Internship (1-3) [Rpt./]

494. Practicum 

498. Honors Thesis (3) [Rpt./ 2] I II

499. Independent Study (1-4) [Rpt./]

501. Management of Arid Land and Salty Soils (3) II Graduate-level requirements include an in-depth research paper on a single aspect of a current topic.

504. Irrigation Principles and Management (3) II (Identical with ABE 504, which is home). May be convened with SWES 504.

505. Environmental, Soil and Water Chemistry Laboratory (3) II For a description of course topics see SWES 405. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. May be convened with SWES 405.

511. Soil Chemistry (3) I CDT Composition and crystal chemistry of soil minerals; nature of soil organic matter; application of colloidal chemistry to the soil system; chemistry of the soil solution and acid- and salt-affected soils.

517. Geographic Information Systems for Natural Resources (3) II (Identical with RNR 515, which is home). May be convened with SWES 417.

520. Environmental Physics (3) I For a description of course topics see SWES 420. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. May be convened with SWES 420.

525. Environmental Microbiology (3) I For a description of course topics see SWES 425. Current concepts in water quality, aerobiology and microbial biogeochemistry. (Identical with MBIM 525). May be convened with SWES 425.

526. Environmental Microbiology Laboratory (2) I For a description of course topics see SWES 426. Graduate-level requirements include additional assignments. (Identical with MBIM 526). May be convened with SWES 426.

530. Environmental Monitoring (2) I For a description of course topics see SWES 430. Graduate-level requirements include preparation of a term project. May be convened with SWES 430.

531. Soil Morphology, Classification and Interpretation (3) I For a description of course topics see SWES 431. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. May be convened with SWES 431.

540. Biodegradation of Pollutants in Soil and Groundwater (3) II For a description of course topics see SWES 440. Graduate-level requirements include a short oral presentation about a recent journal article and a paper pertaining to recent advances in biodegradation studies. (Identical with MBIM 540). May be convened with SWES 440.

541. Soil Genesis (3) II Physical and chemical processes and mineralogy of weathering and soil formation; quantitative pedology; the soil as part of the ecosystem. P, GEOS 101, CHEM 103B; Field Trips. (Identical with GEOS 541).

544. Applied Environmental Law (3) I For a description of course topics see SWES 444. Graduate-level requirements include extra term papers and case studies. May be convened with SWES 444.


550. Anticipating the Future: Focus on Environment (3) II For a description of course topics see SWES 450. Graduate-level requirements include a report in an area of special interest. May be convened with SWES 450.

553. Remote Sensing of the Environment (3) II For a description of course topics see SWES 453. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. May be convened with SWES 453.

561. Soil and Water Conservation (3) S For a description of course topics see SWES 461. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. May be convened with SWES 461.

564. Environmental Chemistry (3) I Physical and chemical processes influencing the behavior of contaminants in the subsurface environment. Includes equilibrium and kinetic theory of solubilization-dissolution, volatilization, sorption, hydrolysis, photolysis, surface catalysis and radioactive decay. P, CHEM 103B, CHEM 480A.

565. Contaminant Transport in Porous Media (3) II The transport of contaminants in the subsurface environment. Effects of dispersion, interphase mass transfer, transformation reactions, and porous-media heterogeneity on transport; covers aqueous (dissolved) and multiphase (immiscible liquid, gas) systems. P, SWES 570 or HWR 518 or HWR 531.

566. Soil and Groundwater Restoration (3) I For a description of course topics see SWES 466. Graduate-level requirements include a research paper. (Identical with HWR 566). May be convened with SWES 466.

570. Soil Physics (3) II CDT For a description of course topics see SWES 470. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. May be convened with SWES 470.

573. Monitoring Biosphere Process (3) I Global-scale interactions of soils with their plant cover and climate. The spatial distributions and dynamics of soil-plant-water processes with emphasis on measurements from space. P, SWES 330 or SWES 453; SWES 200.

574. Aquatic Plants and the Environment (4) I II For a description of course topics see SWES 474. Graduate-level requirements include an additional research project and class presentation. (Identical with ECOL 574, WFSC 574). May be convened with SWES 474.

583. Geographic Applications of Remote Sensing (3) II (Identical with GEOG 583, which is home). May be convened with SWES 483.

590. Remote Sensing for the Study of Planet Earth (3) II (Identical with REM 590, which is home). May be convened with SWES 490.

593. Internship (1-3) [Rpt./]

599. Independent Study (1-4) [Rpt./]

602. Soil Plant Relationships (3) I Principles of soil solution and colloid chemistry, soil-water relationships, soil microbiology, and plant physiology and metabolites will be discussed. These principles will be applied to processes of soil nutrient cycling, nutrient availability, and plant growth. P, SWES 200.

605. Soil-Water Dynamics (3) II Water flow in soils; closely related problems of solute, pollutant, and heat transfer; emphasis on current concepts and research. P, MATH 254. (Identical with ABE 605, HWR 605).

693. Internship (1-3) [Rpt./] I II

696. Seminar 

a. Topics in Soils, Water and Environmental Science (1) [Rpt./] I II

699. Independent Study (1-6) [Rpt./]

900. Research (1-6) [Rpt./]

909. Master's Report (1-9) [Rpt./]

910. Thesis (1-8) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]
Fax: (520) 621-6104  
URL: http://www.coh.arizona.edu/spanish/spanish.html

Baccalaureate Degree
Bachelor of Arts (B.A.)

Graduate Degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Portuguese (B.A.)
Spanish (B.A., M.A., Ph.D.)

M.A. emphases:
literature
language and linguistics

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/Minor requirements are available on line at http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Portuguese (PORT)

101. 1st Semester Portuguese (4) I II GRD Communicative approach, emphasis on all language skills. Recommended for students with no previous experience with the language.

102. 2nd Semester Portuguese (4) I II GRD Communicative approach, emphasis on all language skills. P, PORT 101 or equivalent.

177. Eroticism and Love in the Middle Ages (3) I II (Identical with GER 177, which is home).

195. Colloquium
 a. TCPS: Portugal Culture, Literature, and Language (1) I

199. Independent Study (1-4) [Rpt.] I II

205. Intensive Portuguese (4) I II Equivalent of 101 and 102 combined. Communicative approach, emphasis on all language skills. Recommended for highly motivated students and/or those with experience in another Romance Language or the equivalent. P, recommended for highly motivated students or those with experience in another Romance language or the equivalent.

206. Intensive Portuguese (4) I II Communicative approach, emphasis on all language skills. Recommended for highly motivated students or those with experience in another Romance language or the equivalent. P, recommended for highly motivated students or those with experience in another Romance language or the equivalent.

299. Independent Study (1-4) [Rpt.] I II

325. Intermediate Grammar and Writing (3) I II For intermediate students to enhance their writing, speaking and reading abilities and to prepare for the transition from language learning to studies in literature as well as in culture and civilization of the Portuguese-speaking world. P, PORT 206 or equivalent. (Identical with LA S 325).

350. Intro Genres and Literary Analysis (3) I Introductory course in literary reading and analysis based on texts from the Portuguese-speaking countries. P, PORT 206 or equivalent.

397. Workshop
 r. Portuguese Language Skills and Culture (6) P, PORT 206 or equivalent.

399. Independent Study (1-4) [Rpt.] I II

401. Luso-Brazilian Literature-1900 (3) I II Overview of literary periods and introduction to the major literary figures of Portugal, Brazil and the Luso-African countries (Angola, Mozambique, Cape Verde, Guinea-Bissau, Mozambique and Porto Principe) from the beginning of their literature to 1900. P, PORT 325 or equivalent. May be convened with PORT 501. 405. Advanced Composition and Conversation (3) I II


414. Teaching of Modern Languages (3) I II (Identical with TTE 414, which is home).

425. Advanced Grammar, Composition, and Writing Skills (3) I II For more advanced students to increase comprehension of written Portuguese, to improve oral skills, to practice written skills, and to prepare for transition from language learning to the study of literature. P, PORT 325 or equivalent.

430. Brazilian Civilization (3) I II Broad survey of Brazilian culture. Thematic examination of some of the major cultural developments. Topics include: Brazilian music, Afro-Brazilian culture, the role of women in Brazilian society, Brazilian popular culture. P, PORT 325 or equivalent. (Identical with LA S 430). May be convened with PORT 530.

431. Civilization in the Portuguese-Speaking World (3) I II For a description of course topics see PORT 431. Graduate-level requirements include a twenty-page paper and an oral presentation on the paper. (Identical with LA S 531). May be convened with PORT 431.

459. Brazilian Literature in Film (3) I II For a description of course topics see PORT 459. Graduate-level requirements include an in-depth research paper. (Identical with LA S 549). May be convened with PORT 459.

563. Topics in Luso-Brazilian Literature (3) I II For a description of course topics see PORT 563. Graduate-level requirements include additional research and reports. (Identical with LA S 563). May be convened with PORT 463.

597. Workshop
 r. Advanced Intensive Portuguese and Brazilian Culture (6) P, one year of Portuguese and consent of instructor. May be convened with 497r.

599. Independent Study (1-4) [Rpt.] I II

699. Independent Study (1-4) [Rpt.] I II

Spanish (SPAN)

101. First Semester Spanish (4) GRD Oral approach. For the student with no previous experience in Spanish.


177. Eroticism and Love in the Middle Ages (3) I II (Identical with GER 177, which is home).

195. Colloquium
 a. Colloquium (1) I

199. Independent Study (1-4) [Rpt.] I II

201. Second Year Spanish (4) CDT P, SPAN 102 or placement examination. Credit allowed for SPAN 103 or SPAN 203, but not for both.

202. Second Year Spanish (4) GRD P, SPAN
201 or placement examination. Credit allowed for one of these courses: SPAN 202, SPAN 333.

203. Writing and Oral Skills for the Native Speaker of Spanish (4) I II Designed for students who learned most of their Spanish in a home environment. Introduces students to written Spanish. This course fulfills the University’s foreign language requirement. Students receiving credit for 203 will not receive credit for 202, but can receive credit for 201.

204A-204B-204C. Intensive Spanish (8) S Offered in Guadalajara only. Recommended for highly motivated students or those familiar with another Romance language.

205. Intensive Spanish (4) I S 205 is the equivalent of 101 and 102. Recommended for highly motivated students and/or those with experience in another Romance language.

206. Intensive Spanish (4) II S 206 is the equivalent of 201 and 202. Recommended for highly motivated students and/or those with experience in another Romance language. P, SPAN 205.

212. Latin America on Film (3) I II Study of Latin American cinema and how it portrays the historical, cultural, and socio-political reality of Latin America. Also considers the portrayal of Latin American literature on film.

214. Rewriting the Good Fight: the Spanish Civil War and its Legacy (3) I II Study of the Spanish Civil War and its Spanish, European, and worldwide contexts. Particular attention devoted to the artistic legacy of the Spanish Civil War in the visual arts, film, and literature.

251. Intermediate Spanish (3) I II CDT Combines all forms of language skills (speaking, reading, writing, and comprehension) with intermediate grammar. P, SPAN 202. Credit allowed for one of these courses: SPAN 251, SPAN 253.

253. Intermediate Spanish for the Native Speaker (3) I For native speakers of Spanish who wish to continue to improve their writing, spelling, grammar and vocabulary within a dynamic cultural context. (Native speakers should take 253 instead of 251; credit is not allowed for both.)

285. Introduction to Humanities Computing (3) S (Identical with GER 285, which is home).

299. Independent Study (1-4) [Rpt.]

299H. Honors Independent Study (1-3) [Rpt.]

301B. Intermediate Spanish (3) I II

305. Intensive Spanish, Fifth and Sixth Semesters (6) S GRD Offered in Guadalajara only. For those who have completed four semesters of college Spanish or equivalent. Will cover the 5th and 6th semester Spanish. A complete immersion in the study of intermediate Spanish, teaching all four skills. P, SPAN 204. Credit allowed for one of these courses: SPAN 305, SPAN 325.

323. Intermediate Grammar and Writing for the Native Speaker (3) I II For the native speaker of Spanish who has had some formal instruction of the language and who wishes to improve grammar and writing. (Native speakers should take 323 instead of 325; credit is not allowed for both). P, SPAN 251 or SPAN 253.

325. Intermediate Grammar and Writing (3) I II Essential points of grammar, with emphasis on syntax and P, SPAN 251.


333. Intermediate Composition and Conversation for the Native Speaker (3) I II For native speaker of Spanish. Students write compositions and do oral presentations on various cultural topics. (Native speakers should take 333 instead of 330; credit is not allowed for both.)

340. Phonetics (3) I II Intensive study of phonetics and phonology with emphasis on practical applications for non-native speakers of Spanish. P, SPAN 330 or SPAN 333.

343. Phonetics for the Native Speaker (3) I II For native speakers of Spanish. Basics of phonetics and overview of phonetic variants in the major varieties of New World and Peninsular Spanish. (Native speakers should take 343 instead of 340; credit is not allowed for both). P, SPAN 203.

350. Readings in the Literary Genres (3) I II P, SPAN 330 or SPAN 333. (Identical with LA S 350).


399. Independent Study (1-4) [Rpt.]

399H. Honors Independent Study (1-3) [Rpt.]

400. Survey of Spanish Literature (3) I II Introduction to Spanish literature from the Middle Ages to the contemporary period. P, SPAN 350.


403. Mexican and Mexican-American Literature (3) II Studies of major works by Mexican and Mexican-American writers. Taught in Spanish although a small portion of the readings may be in English. P, SPAN 350. (Identical with LA S 403, MAS 403).

414. Teaching of Modern Languages (3) II P, SPAN 350. (Identical with TTE 414, which is home).


425. Advanced Grammar and Composition (3) II Advanced themes of grammar with emphasis on the syntax of verbs and the acquisition of terminology and skills to facilitate analysis. P, SPAN 325. (Identical with LA S 425).

430. Spanish Civilization (3) I Spanish milieu; geographical, political, and cultural aspects of Spanish civilization. P, SPAN 330 or SPAN 333.


433. Mexican and Mexican-American Civilization through Literature (3) I Study of the culture, history, literature and oral tradition (corridos, legends) of the Mexican and Mexican American. P, SPAN 330 or SPAN 333. (Identical with LA S 433, MAS 433).

433A. Mexican-American Civilization Through Literature (3) I

435. Cervantes' Don Quixote (3) I II SPAN 350.

436. Readings in Spanish Prose from the Middle Ages through the Twentieth Century (3) I II Readings in Spanish prose from the Middle Ages through the twentieth century. P, SPAN 350.

437. Spanish Theater (3) I II Spanish theater selections from the middle ages through the twentieth century. P, SPAN 400.

438. Spanish Poetry (3) I II Readings in Spanish poetry from the Middle Ages through the twentieth century. P, SPAN 350.


449. Topics in Spanish, Spanish-American, Mexican, and Mexican American Literature
521. Topics in Eighteenth, Nineteenth, and Twentieth-Century Spanish Literature (3) [Rpt./ 3] I II Representative topics include Spanish romanticism; nineteenth-century realist and naturalist Spanish prose; the generation of '98; modern Spanish prose fiction; modern Spanish poetry; the contemporary novel of the post-Franco era; contemporary Spanish poetry; modern and contemporary Spanish theater.

530. Development of Spanish-American Literature from the Pre-Columbian Period to Independence (3) I Spanish-American literature from the Pre-Columbian period to independence (prose, poetry and drama). (Identical with LA S 530).

531. Topics in Spanish-American Literature from the Pre-Columbian Period to Independence (3) [Rpt./ 3] I II Representative topics include pre-Columbian Aztec, Mayan, and Maya-Quiche literature; the chronicle; Renaissance and baroque poetry.


580. Introduction to Hispanic Linguistics (3) [Rpt./ 3] I II May be taken up to four times and will rotate between the following four topics. Introduction to Hispanic Sociolinguistics: Current sociolinguistic perspective on the Spanish Language; Introduction to Spanish in the Americas: Diachronic and synchronic perspectives on the evolution and development of the Spanish-American Dialectology; Introduction to Spanish Phonology: Theoretical perspectives on major issues of Spanish phonology; Introduction to Spanish Morpho-Syntax: Current theoretical perspective on major issues of Spanish Morpho-Syntax.

581. Topics in Second Language Theories and Applications (3) [Rpt./ 3] I II May be taken up to four times and will rotate between the following four topics. Theories of Second Language Acquisition: Analysis of the current theories of second language acquisition including theories from linguistics, psychology and education; Curriculum and Materials Development: Development of curricula and materials that reflect the impact of current research in the field of second language acquisition; Theories and Techniques of Teaching Spanish: Study and analysis of theories of language instruction and learning with an emphasis on proficiency-oriented approaches that stress strategic development of skills and accuracy; Applied Linguistics: Application of current linguistic theories to language analysis for the purpose of teaching forms and functions teaching based on patterns of use as well as similarities and contrasts with English.

582. Topics in Hispanic Linguistic Theories and Applications (3) [Rpt./ 3] I II May be taken up to four times and will rotate between the following four topics. Morphological Theory: Theoretical perspectives on the major morphosyntactic and morphophonological issues of Spanish Morphology; Linguistic Perspectives on Mexican American Spanish and Analyses of (socio)linguistic phenomena encountered in the Spanish of the Southwest; History of the Spanish Language: Diachronic and synchronic perspectives on the evolution and development of peninsular Spanish; Theoretical Issues in Spanish Phonology: Further nonlinear theoretical analyses of selected problems in Spanish Phonology.

596J. Second Language Acquisition (3) [Rpt./ 4] SPAN 506. (Identical to ENGL 596J, which is home).

I Spanish eighteenth, nineteenth, and twentieth-century literature (short fiction, poetry, novel and drama).

521. Topics in Eighteenth, Nineteenth, and Twentieth-Century Spanish Literature (3) [Rpt./ 3] I II Representative topics include Spanish romanticism; nineteenth-century realist and naturalist Spanish prose; the generation of '98; modern Spanish prose fiction; modern Spanish poetry; the contemporary novel of the post-Franco era; contemporary Spanish poetry; modern and contemporary Spanish theater.
SPECIAL EDUCATION AND REHABILITATION (SER)

Education Bldg., Rm. 412
The University of Arizona
PO Box 210069
Tucson AZ 85721-0069
Phone: (520) 621-7822
FAX: (520) 621-3821
E-mail: rgamal@mail.ed.arizona.edu
URL: http://www.ed.arizona.edu/departs/SER/serinfo.htm

Baccalaureate Degree
Bachelor of Science in Education (B.S.E.)
Graduate Degrees
Master of Arts (M.A.)
Educational Specialist (Ed.S.)
Doctor of Education (Ed.D.)
Doctor of Philosophy (Ph.D.)

Major and Degrees
Special Education and Rehabilitation (B.S.E., M.A., Ed.S., Ed.D., Ph.D.)
B.S.E. Options:
   deaf studies
   general

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/ oncourse/data/interface/. Minor requirements are available online at http://www.arizona.edu/ academic/oncourse/data/interface/minors/.

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Special Education and Rehabilitation (SER)

301A-301B Mainstreaming (2) I II GRD
Introduction to the integration of special students into the regular elementary. P, TTE 322, TTE 323, TTE 324, TTE 326, TTE 327, open only to elementary education majors currently enrolled in student teaching.

370A. American Sign Language (4) I Designed for students with no previous knowledge of ASL and/or deaf culture. To develop basic skills in ASL vocabulary, grammar and use. 370a-370b must be taken in sequence.

370B. American Sign Language (4) II Designed for students with no previous knowledge of ASL and/or deaf culture. To develop basic skills in ASL vocabulary, grammar and use. 370a-370b must be taken in sequence. P, SER 370A is prerequisite to SER 370B.

394. Practicum (1-3) [Rpt./]
399. Independent Study (1-3) [Rpt./]
399H. Honors Independent Study (1-3) [Rpt./]
400. Survey of Special Education and Rehabilitation (3) I II Introduction to historical, legal, pedagogical, and social issues underlying services in special education and rehabilitation. Provides an overview of the characteristics of persons with exceptionalities and disabilities as well as the services available.

401A. Assessment and Instruction or Students with Early Reading and Spelling Difficult (3) I II Procedures, methods, strategies for informal diagnosis and instruction of students with learning problems in the areas of reading and spelling. Strategies appropriate for use in the elementary or the special classroom. May be convened with SER 501A.

401B. Assessment and Instruction for Preschool Children with Learning Problems (3) II Procedures, methods, strategies for assessment and instruction of children with learning problems in the preschool years. Strategies and adaptations for use with delays in physical development, cognitive development, communication, socioemotional development, and the development of adaptive behavior will be emphasized. P, SER 400, SER 460, SER 575, open to students in dual certification program in TTE.

402. Behavior Principles and Disability (3) I II Use of behavior principles to positively support individuals with disabilities, especially those with moderate and severe disabilities. P, SER 400. May be convened with SER 502.

403. The Special Services (3) Information to aid teachers in dealing with responsibilities and concerns in school settings with regard to P.L. 94-142. Education for All Handicapped Children Act Section 504 of the Rehabilitation Act, Family Education Rights and Privacy Act, and other legal issues. May be convened with SER 503.

404. Cultural and Linguistic Diversity in Exceptional Learners (3) I Provides a theoretical base and practical approach to the study of special needs of students with language and cultural differences; basic premises of bilingual special education and the interface of the two fields. May be convened with SER 504.

405. Introduction to Learning Disabilities (3) I II Theories and history of programs for individuals with learning disabilities-definition, characteristics, etiology. P, degree candidates must complete SER 400 prior to taking SER 405. May be convened with SER 505.

410. Introduction to Mental Retardation and Severe Disabilities (3) I History and philosophy of educational programs for persons with mental retardation and other developmental disabilities; etiology, classification, and characteristics, with consideration of educational, social, and psychological problems. P, SER 400 or SER 405. May be convened with SER 510.

411. Service Delivery Trends in Rehabilitation and Special Education (3) I II Critical examination of current trends, issues and initiatives affecting service systems for persons with disabilities.

415. Physical and Multiple Disabilities (3) I Physical and multiple impairments, etiology, intervention practices, adaptations, transferring and handling skills, and integration into typical environments. Field Trips. May be convened with SER 515.

421. Introduction to Visual Impairments and Deaf-Blindness (3) I An overview of educational services for the student with visual impairments and multiple sensory impairments. An emphasis is placed on the psychosocial effects of visual impairments on the individual and means of compensating for those effects. May be convened with SER 521.

423A. Braille I (3) I I Fundamentals of Braille reading and writing, methods of teaching Braille and preparation of materials. May be convened with SER 523A.

423B. Braille II (3) I II Fundamentals of Braille reading and writing, methods of teaching Braille and preparation of materials. May be convened with SER 523B.

425. Strategies of Vocational Development and Supported Employment (3) I II Systematic study of the strategies used to place and retain individuals with disabilities in paid, community employment. Topics to include job development, consumer assessment, job placement, job-site training, and follow-up. P, SER 400. May be convened with SER 525.

430. Education and Rehabilitation of Deaf and Hard of Hearing Individuals (3) I Current and historical perspectives; educational and rehabilitative services; etiology; impact on families, psychosocial, cognitive and intellectual development and functioning of deaf and hard of hearing individuals. May be convened with SER 530.

431A. American Sign Language (4) I Designed to develop intermediate ASL conversational skills in a variety of settings, topics, and functions. P, SER 370B or consent of department. May be convened with SER 531A.

431B. American Sign Language (4) II Designed to develop intermediate ASL conversational skills in a variety of settings, topics, and functions. P, consent of department, SER 370B, SER 413A is prerequisite to 413B. May be convened with SER 531B.

433A. Introduction to the Structure of ASL (3) I I Introduction to the structure of ASL. Classes will be offered on a rotating basis in 433a-433b-
433B. Languages and Cultures of the Deaf Communities (3) I II Languages and cultures of deaf communities. Classes will be offered on a rotating basis in 433a-433b, 433c-433d sequence; however, courses need not be taken in sequence. P, SER 431B or consent of department. May be convened with SER 533B.

433C. History of the Deaf Community (3) I II History of Deaf Communities. Classes will be offered on a rotating basis in 433a-433b, 433c-433d sequence; however, courses need not be taken in sequence. P, SER 431B or consent of department. May be convened with SER 533C.

433D. ASL Literature and Film (3) I II ASL literature and film. Classes will be offered on a rotating basis in 433a-433b, 433c-433d sequence; however, courses need not be taken in sequence. May be convened with SER 533D.

439A. Special Topics in Sign Language Studies (3) I II ASL Acquisition and Bilingualism. Classes will be offered on a rotating basis in the following sequence: 439a, 439b, and 439c. Courses need not be taken in sequence. P, SER 431B or consent of department. May be convened with SER 539A.

439B. Special Topics in Sign Language Studies (3) I II Signed Language Policy, Planning, and Intervention. Classes will be offered on a rotating basis in the following sequence: 439a, 439b, and 439c. Courses need not be taken in sequence. P, SER 431B or consent of department. May be convened with SER 539B.

439C. Special Topics in Sign Language Studies (3) I II Methods and materials of ASL/ESL instruction. Classes will be offered on a rotating basis in the following sequence: 439a, 439b, and 439c. Courses need not be taken in sequence. P, SER 431B or consent of department. May be convened with SER 539C.

440. Education of Gifted Children (3) I Issues in education of the gifted; discussion of definitions, characteristics, development, screening, identification, curriculum, teaching strategies, and program development. P, SER 400. May be convened with SER 540.

444A. Intensive ASL (3-6) S Intensive ASL. 444a-444b-444c need not be taken in sequence. P, SER 431B or consent of department. May be convened with SER 544A.

444B. Introduction to Interpreting (3-6) S 444a-444b-444c need not be taken in sequence. P, SER 431B or consent of department. May be convened with SER 544B.

444C. Classroom Instruction in ASL (3-6) S Classroom instruction in ASL. 444a-444b-444c need not be taken in sequence. P, SER 431B or consent of department. May be convened with SER 544C.

450. Introduction to Emotional or Behavioral Disorders (3) I Issues in education of the emotionally or behaviorally disordered; discussion of history, current issues, definitions, characteristics, and theoretical perspectives. P, SER 400. May be convened with SER 550.

455. Rehabilitation and Aging (3) I II Emphasis on aging from the viewpoint of the aging person and those working with the aged. May be convened with SER 555.

460. Introduction to Early Childhood Special Education (3) I Focuses on the disabling conditions impacting on infants, toddlers and their families, preschool children, programs available to serve them and their families, and critical issues in this rapidly evolving field. P, SER 400. May be convened with SER 560.

468. Transition Methods (3) I Provides an understanding of effective strategies for promoting the smooth transition of students with disabilities from school to work and adult living. May be convened with SER 568.

475. Observation and Participation in Special Education Programs (1-3) [Rpt./ 6 units] I II Practical experiences with individuals having special needs with focus on psychological, educational, and service-related implications and practices. Field trips, class observations and seminars. P, SER 400 or SER 500; Field Trips. May be convened with SER 575.

478. Prevention of Addictions (3) I Analysis of addictive behaviors (e.g., drug addictions, eating disorders, compulsive gambling) from a psychosocial and biological perspective and the implications of this analysis for primary, secondary, and tertiary prevention of addictions. May be convened with SER 578.

481. Interviewing and Client Services (3) I II The development of essential interviewing skills for case management of rehabilitation clients. P, SER 425 or SER 525; SER 400, SER 411.

483. Supervised Casework in Rehabilitation (3) I II Application of fundamental professional rehabilitation theories and skills in field settings. P, SER 400 or SER 411; SER 400 or SER 411 or SER 481.

484. Problems of Drug Abuse (3) [Rpt./ 1] I II Survey course for teachers, counselors, and agency workers concerned with drug abuse; examination of community, cultural, and educational approaches to drug use and abuse. May be convened with SER 584.

485. Rehabilitating the Public Offender (3) I II Components in service delivery to the public offender, how the offender enters the criminal justice system, and treatment and rehabilitation services available.

493. Internship (1-4) [Rpt./] I II

494. Practicum (3) [Rpt./]

495. Teaching Exceptional Children (1-10) [Rpt./] I II For a description of course topics see SER 495. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with SER 402.

496. The Special Services (3) For a description of course topics see SER 403. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with SER 402.

498. Honors Thesis (3) [Rpt./ 2]

499. Independent Study (1-4) [Rpt./]

499H. Honors Independent Study (3) [Rpt./] I II

501A. Assessment and Instruction or Students with Early Reading and Spelling Difficult (3) I II For a description of course topics see SER 401A. Graduate-level requirements include in-depth projects. May be convened with SER 401A.

502. Behavior Principles and Disability (3) I II For a description of course topics see SER 402. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with SER 402.

503. The Special Services (3) For a description of course topics see SER 403. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with SER 403.

504. Cultural and Linguistic Diversity in Exceptional Learners (3) I For a description of course topics see SER 404. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with SER 404.

505. Introduction to Learning Disabilities (3) I II For a description of course topics see SER 405. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with SER 405.

507A-507B Methods for Diagnosing Specific Learning Disabilities (3-3) I II Educational and psychological assessment of academic areas and learning processes involving perception, integration, and expression, with emphasis on informal and formal assessment and diagnostic teaching. P, SER 405 or SER 405 CR, SER 593.

508. Teaching Elementary Students with Learning Disabilities (3) I II Remediaion of academic areas and cognitive processes involving perception, integration, and expression, with emphasis on strategies for planning and implementing instructional programs at the elementary level. P, SER 405 or SER 405 CR, SER 593.

510. Introduction to Mental Retardation and Severe Disabilities (3) I For a description of course topics see SER 410. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with SER 410.

512. Teach Learning Disabled Adolescents (3) I Intervention alternatives for teaching the learning disabled adolescent at the secondary level. Emphasis on current intervention methods and practices.

513. Educating Students with Mental Retardation and Severe Disabilities (3) I Methods of developing age-appropriate, functional and
inclusive programming, community-based instruction, and integrative source delivery for students who have moderate to profound retardation and other physical, sensory and behavior disorders.

515. Physical and Multiple Disabilities (3) [Rpt./ 1] I For a description of course topics see SER 415. Graduate-level requirements include additional assignments. Field trips. May be convened with SER 415.

517. Behavior Modification and Theory in Schools (3) II Application of behavior principles and techniques to promote learning and social development of school-related behavior. P, ED P 510 or consent of instructor.

518. Nonoral Communication (3) [Rpt./ 3] II Nonsymbolic communication skills development and techniques to promote learning and social development for all ages; social interaction skills; augmentative communication aids.

520. Low Vision and Visual Functioning (3) I Anatomy and physiology of the eye; implications of visual disorders including visual field losses; introduction to optics; use of optical and nonoptical aids in classroom settings; clinical and functional low vision assessments, including assessing children with multiple impairments; and report writing. P, SER 521.

521. Introduction to Visual Impairments and Deaf-Blindness (3) I For a description of course topics see SER 421. Graduate-level requirements include writing a grant proposal to obtain monies to enhance service delivery. May be convened with SER 421.

522A. Orientation and Mobility for Teachers of Individuals with Visual Impairments (3) II Methods of teaching orientation and mobility skills to visually impaired and blind students. Emphasis on the school-aged child, with particular attention to concept development, orientation skills, pre-cane skills, personal safety, and independent ambulation, including an introduction to long-cane techniques.

523A. Braille I (3) I II For a description of course topics see SER 423A. Graduate-level requirements include in-depth paper(s) on aspects of current issues and class presentations. May be convened with SER 423A.

523B. Braille II (3) I II For a description of course topics see SER 423B. Graduate-level requirements include in-depth paper(s) on aspects of current issues and class presentations. May be convened with SER 423B.

524. Methods of Teaching the Visually Handicapped (3) II Curriculum development and adaptation in various educational programs; adaptation of classroom materials and procedures for use with blind and partially sighted children and youth; emphasis on methods of teaching academic and nonacademic skills and on educating students with nonhandicapped peers. P, SER 521; CR, SER 593.

525. Strategies of Vocational Development and Supported Employment (3) II For a description of course topics see SER 425. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with SER 425.

526. Principles and Assessments of O & M (3) I In-depth study of the principles supporting orientation and mobility instruction; assessment principles and strategies specific to O & M. P, SER 520 or equivalent, SER 522A.

527. Advanced O & M Practice and Procedures (4) I Preparations for orientation and mobility (O & M) specialists in methods, techniques and approaches using the long cane and other mobility devices essential in the development of travel skills of persons with visual impairments. P, SER 520 or equivalent, SER 522A.

529. Education and Rehabilitation of Deaf and Hard of Hearing Individuals (3) I For a description of course topics see SER 429. Graduate-level requirements include an in-depth paper and a class presentation. May be convened with SER 429.

531A. American Sign Language (4) I For a description of course topics see SER 431A. Graduate-level requirements include a research paper and an oral presentation on an approved aspect of the linguistics of American Sign Language. May be convened with SER 431A.

531B. American Sign Language (4) II For a description of course topics see SER 431B. Graduate-level requirements include a research paper and an oral presentation on an approved aspect of the linguistics of American Sign Language. May be convened with SER 431B.

532. Oral/Aural Development and Assessment: Deaf and Hard of Hearing (3) II Development of speech and speech reception skills; assessment of speech intelligibility, articulation, speech reading and auditory functioning of deaf and hard of hearing children. P, SER 430; SP H 583 or SER 430.

533A. Introduction to the structure of ASL (3) I II For a description of course topics see SER 433A. For a Graduate-level requirements include an in-depth research paper on a course-related topic and a class presentation. May be convened with SER 433A.

533B. Languages and Cultures of the Deaf Communities (3) I II For a description of course topics see SER 433B. For a Graduate-level requirements include an in-depth research paper on a course-related topic and a class presentation. May be convened with SER 433B.

533C. History of the Deaf Community (3) I II For a description of course topics see SER 433C. For a Graduate-level requirements include an in-depth research paper on a course-related topic and a class presentation. May be convened with SER 433C.

533D. ASL Literature and Film (3) I II For a description of course topics see SER 433D. For a Graduate-level requirements include an in-depth research paper on a course-related topic and a class presentation. May be convened with SER 433D.

534. Language Development for the Exceptional Child (3) I Pragmatic, semantic and syntactic aspects of pre-linguistic and linguistic development in exceptional children and youth; cognitive and social bases of language development.

535. Assessment of Bilingual Exceptional Learners (2) II Educational and psychological assessment of bilingual students with emphasis on informal and formal evaluation methods and procedures for purposes of identification and educational planning. P, SER 507.

536. Teaching Bilingual Exceptional Learners (2) II Instructional interventions and program development for exceptional students from culturally and linguistically diverse backgrounds. Emphasis on current intervention methods and practices. P, SER 508.

537. Language and Literacy for Deaf and Hard of Hearing Children (3) I II Assessment of language and literacy strategies for facilitating language and literacy in deaf and hard of hearing children and youth. P, SER 534; CR, SER 594A.


539A. -539B. Special Topics in Sign Language Studies (3) I II For a description of course topics see SER 439A, SER 439B, SER 439C. Graduate-level requirements include an in-depth research paper on a course-related topic and a class presentation. May be convened with SER 439A, 439B, 439C.

540. Education of Gifted Children (3) I For a description of course topics see SER 440. Graduate-level requirements include an in-depth paper(s) on a single aspect of current issues in the field. May be convened with SER 440.

541. Teaching the Gifted: Questioning Strategies (3) II Mastery of skills involved in developing abstract thinking abilities in gifted children by using the Hilda Taba Teaching Strategies. Emphasis on using these sequential questioning methods in all content areas and at all grade levels. P, SER 440 or SER 540.

542. Teaching the Gifted: Productive Thinking Models (3) I Mastery of skills involved in developing productive thinking abilities in gifted children by using teaching-learning models developed by Parnes, Williams, Taylor, Guilford, Renzulli and Treffinger at all grade levels and in all content areas. P, SER 440 or SER 540.

543. Teaching the Gifted: Hierarchical Models (3) I Introduction to general principles involved in providing a curriculum for the gifted. Overview of ten teaching-learning models commonly used with the gifted. Mastery of skills involved in using the hierarchical models with gifted students. P, SER 440 or SER 540.

544A. Intensive ASL (3-4) S For a description of course topics see SER 444A. Graduate-level requirements include an in-depth paper on aspects of current issues in the field. May be convened with SER 444A.
544B. Introduction to Interpreting (3-6) S For a description of course topics see SER 444B. Graduate-level requirements include an in-depth paper on aspects of current issues in the field. May be convened with SER 444B.

544C. Classroom Instruction in ASL (3-6) S For a description of course topics see SER 444C. Graduate-level requirements include an in-depth paper on aspects of current issues in the field. May be convened with SER 444C.

549. School Psychology (3) I Roles of the school psychologist; implementing programs in the public schools; legal and ethical issues in school psychology. P, consent of instructor.

550. Introduction to Emotional or Behavioral Disorders (3) I For a description of course topics see SER 450. Graduate-level requirements include an in-depth research paper and a class presentation on a topic related to course content. May be convened with SER 450.

551. Teaching Children with Emotional or Behavioral Disorders (3) II Assessment techniques, academic and behavioral intervention strategies, and classroom management with emotionally or behaviorally disordered children and youth.

555. Rehabilitation and Aging (3) II For a description of course topics see SER 455. Graduate-level requirements include an in-depth research paper and a class presentation on a topic related to course content. May be convened with SER 455.

559. Testing of Minorities (3) II Current theoretical, social, and practical issues in the use of norm-referenced tests with individuals from minority colleges.

560. Introduction to Early Childhood Special Education (3) I II For a description of course topics see SER 460. Graduate-level requirements include an in-depth research paper and a class presentation on a topic related to course content. May be convened with SER 460.

561. Methods of Teaching Preschool Children with Disabilities (3) II Deals with competencies required to teach all categories of disabilities found in preschool children except deaf/blind. P, SER 460 or SER 560; SER 562, SER 575; CR, SER 593; Field Trips.

562. Methods of Assessment for Preschool Children with Disabilities (3) I Norm-referenced and criterion-referenced instruments for screening, diagnosis and assessment of infants, toddlers, and preschool children will be reviewed. Emphasis will be placed on teacher involvement in the assessment process. P, SER 400 or SER 500; SER 575.

563. Client Assessment in Rehabilitation (3) II Exploration of the world of work; critical review of vocational choice theories; experiences in the use and interpretation of individual assessment techniques. P, SER 565 or SER 565 CR, ED P 458. Open to majors only.

565. Principles of Rehabilitation (3) [Rpt./ 1] I Principles underlying rehabilitation programs and interdisciplinary relationships of agencies engaged in rehabilitation services. Open to majors only.

568. Transition Methods (3) II For a description of course topics see SER 468. Graduate-level requirements include additional assignments including a term paper. May be convened with SER 468.

570. Administration of Special Education Programs (3) I Review of current federal and state Special Education Laws and Regulations and related federal mandates, special education funding, compliance and legal issues, precedent setting court cases, and current issues in special education administration and program delivery. P, consult department before enrolling.

571. Supervision of Special Education (3) II Theory and practice concerning various aspects of supervising special education programs and services, service delivery models, staff and program development, philosophy, communication, systemic and personal change, and evaluation. P, SER 570.

572. Policy and Program Evaluation Analysis in Special Education (3) I Practical aspects of policy analysis and program development/evaluation in schools and other social agencies that serve with disabilities and/or giftedness.

575. Observation and Participation in Special Education Programs (1-3) [Rpt./ 6 units] I II For a description of course topics see SER 475. Graduate-level requirements include an in-depth research paper or other project. May be convened with SER 475.

578. Prevention of Addictions (3) I For a description of course topics see SER 478. Graduate-level requirements include an in-depth research paper or other project. May be convened with SER 478.

580. Medical Aspects of Disability (3) [Rpt./ 1] I Etiology, therapy, and prognosis of the major disabilities, including drug and alcohol; assessment of physical capacities and limitations; typical restorative techniques. Open to majors only.

581. Psychosocial and Cultural Aspects of Disability (3) [Rpt./ 1] I Exploration of the psychosocial, sociological and cultural aspects of disability; analysis of somatopsychology, psychosomatics, and social psychology.

582. Principles and Practices of Vocational Evaluation (3) I Understanding work skills and labor market conditions; process of vocational evaluation of rehabilitation clientelle; collecting and synthesizing evaluation data and writing meaningful reports.

583. Counseling Theories and Practices in Rehabilitation Settings (3) [Rpt./ 1] I II Professional rehabilitation counseling practices with varied ethnic, age disability, and dependency populations. Open to majors only.

584. Problems of Drug Abuse (3) I II For a description of course topics see SER 484. Graduate-level requirements include an in-depth research paper and a class presentation on a topic related to course content. May be convened with SER 484.

585. Vocational Planning and Placement (3) II Problems of physical, mental, social, and emotional disability, as they relate to the formulation of a rehabilitation plan; exploration of the various sources of occupational and career choice information, case management and job placement and development. P, SER 580; SER 563, SER 565 or SER 580.

586. Psychosocial Assessment of the Deaf Person (3) II Selection, administration, and interpretation of various psychosocial evaluation instruments used with deaf persons. P, SER 674A, ED P 673.

588. Professional Problems and Ethical Concerns in Rehabilitation Psychology (3) I Introduction to the field of rehabilitation psychology including an examination of ethical and legal considerations in the practice of rehabilitative psychology, foundational material in professional psychology, and an overview of the rules and functions of rehabilitation psychology. Open to majors only.


590. Applied Research with Exceptional Learners (3) I Review of principles and practices underlying applied research with exceptional learners; practice in preparation of research proposals; conduct of research emphasized.

591. Preceptorship (1-3) [Rpt./]

593. Internship (1-12) [Rpt./] I II

594. Practicum (1-3) [Rpt./]

a. Communication Development for Deaf and Hard of Hearing Children (1-6) [Rpt./] I II

c. Teaching the Gifted (1-6) [Rpt./ 9 units] I II CR, SER 440, SER 541, SER 542, SER 543.

595. Colloquium

b. Language Learning and Reading Disabilities (3) II (Identical with LRC 595B).

c. Mental Retardation and Severe Disabilities (3) II P, SER 400.

d. Recent Advances in Special Education and Rehabilitation (3-6) I II

e. Bilingual Special Education (2) I

f. Emotional or Behavioral Disorders (3) I Open to majors only.

g. Orientation and Mobility (3) II S P, SER 520, SER 522A, SER 522B, SER 526.

k. Group Processes (3) I II

596. Seminar

a. Issues in Special Education and Rehabilitation (1-3) [Rpt./ 6 units]

597. Workshop

a. Creativity and Giftedness (1-3) [Rpt./ 9 units] I

d. Woodcock-Johnson - Revised (1) S GRD Open to majors only.

e. Consultation and Collaboration for Special Needs Students (2) II

g. Best Practices for Educating Students with Severe Disabilities (2) S
674B. Intellectual Assessment Techniques (3) II Credit allowed for one of these courses: SER 673; majors or minors only or SER 673. Intellectual assessment devices: Wechsler Adult Intelligence Scale. P, interpretation of various intellectual assessment ability and their implications for intellectual behavior.

673. Theoretical Foundations of Intelligence (3) II Various theories and models of human ability and their implications for intellectual assessment.

674A. Field Experience in Intellectual Assessment in Education (3) I Supervised field experience in the administration, scoring and interpretation of various intellectual assessment devices: Wechsler Adult Intelligence Scale. P, SER 673; majors or minors only or SER 673. Credit allowed for one of these courses: SER 674A, SER 674B.

674B. Intellectual Assessment Techniques (3) II Supervised field experience in the administration, scoring and interpretation of various intellectual assessment devices: Intellectual assessment techniques.

677. Individual Assessment Techniques in the Schools (3) II Techniques for assessing personality and social behavior; practice in implementing programs derived from assessment techniques. P, consent of instructor, SER 674B; Open to majors only.

679. Educational and Psychological Assessment of Children (3) I Psychoeducational assessment techniques, practice in prescribing remedial programs. P, SER 673, SER 647B; Open to majors only.

685. Child Behavior Disorders and Adjustment (3) I II The diagnostic and assessment practices, theories, and research related to child behavior disorders. P, SER 530 or instructor consent.


691. Preceptorship (1-6) [Rpt./] I

693. Internship (1-3) [Rpt./]

694. Practicum (1-3) [Rpt./]

695. Colloquium

1. Issues, Trends and Futures in Special Education (3) II

b. Emotional or Behavioral Disorders (3) II

c. Rehabilitation Psychology (3) [Rpt./] II I II

d. Learning Disabilities (3) I

e. Sensory Impaired (3) II

g. Issues and Research in Educating the Gifted (3) [Rpt./] II

h. Rehabilitation Administration (3) I I

1. Diagnosis in Rehabilitation Psychology (3) II

696. Seminar

a. Issues in Special Education and Rehabilitation (1-6) [Rpt./6 units]

b. Neuropsychological Bases of Learning and Behavior (3) I II

c. Professional Standards, Ethics and Issues in School Psychology (3) [Rpt./] I I P, SER 530 or instructor consent.

699. Independent Study (1-3) [Rpt./]

700. Research (1-3) [Rpt./]

701. Preceptorship (1-6) [Rpt./]

702. Internship (1-12) [Rpt./]

704. Practicum (3-9) [Rpt./]

705. Independent Study (1-3) [Rpt./] I

900. Research (1-3) [Rpt./]

910. Thesis (3-6) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-6) [Rpt./]

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**SPEECH AND HEARING SCIENCES (SP H)**

Speech and Hearing Sciences Bldg., Rm. 214
The University of Arizona
PO Box 210071
Tucson AZ 85721-0071
Phone: (520) 621-1644
FAX: (520) 621-9901
E-mail: peaches@ccit.arizona.edu
URL: http://www.shs.arizona.edu/

Baccalaureate Degree
Bachelor of Science in Speech & Hearing Sciences (B.S.S.)

Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Major and Degrees
Speech and Hearing Sciences (B.S.S., M.S., Ph.D.)

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface. Minor requirements are also available on line at: http://www.arizona.edu/academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Speech and Hearing (SP H)

199. Independent Study (1-3) [Rpt./] I II

207. Survey of Human Communication and Its Disorders (3) I II The role of hearing, language and speech processes in human communication and its disorders is covered through readings, lectures, and observations in laboratories and clinics.

260. Speech Science (4) I Anatomy, neuroanatomy, physiology of the speech mechanism; acoustical characteristics of voice and speech sounds; frequency, intensity, time and wave composition.

3R, 3L. (Identical with LING 260).

280. Hearing Science (4) II Anatomy, neuroanatomy, physiology of the auditory mechanism; acoustics and psychoacoustics; decibel scale, normal auditory function. 3R, 3L.

282. Biology of Sensation (3) I (Identical with NRSC 282, which is home).

350. Language Science (3) I Core features of language are identified and integrated into a model of language that is applicable to first and second language acquisition and language disorders. Topics may include: phonology, morphology, syntax, semantics, and pragmatics.

367. Phonetics (3) I S Scientific study of speech sounds; articulatory phonetics, transcription, normal and disordered speech.

370. Adult Communication Disorders (3) I The study of adult disordered communicative processes. Consideration is given to signs and symptoms, etiology, clinical course, and vocational-social impact of these disorders. Principles of assessment and intervention are highlighted. Open to majors only. P, SP H 260, SP H 280.

371. Pediatric Communication Disorders (3) II The study of child disordered communicative processes. Consideration is given to signs and symptoms, etiology, clinical course, and developmental-academic-social impact. Principles of assessment and intervention are highlighted. P, SP H 260, SP H 280 Open to majors only.

399. Independent Study (1-3) [Rpt./] I II

399H. Honors Independent Study (1-3) [Rpt./] I II

403. Measurement for Diagnosticians (3) II GRD Basic statistical competencies with their diagnostic applications. Students become familiar with calculation of simple statistics, able to evaluate the statistical properties of standardized tests, and the extent to which statistical evidence can support basic diagnostic interpretations. May be convened with SP H 503.

441. Language Acquisitions (3) II Principles and processes of first language acquisition described in relation to children's social and cognitive development; first language acquisition processes compared and contrasted to child and adult second language acquisition and language disorders. P, SP H 350. (Identical with LING 441, PSYC 441). May be convened with SP H 541.

458. Clinical Studies: Speech-Language Pathology (1-3) [Rpt./ 9 units] Under supervision, students carry out prescribed intervention programs and conduct evaluation of children and adults. Students participate in weekly
498. Senior Capstone (1-3) [Rpt.] I II

499. Independent Study (1-5) [Rpt./]

499H. Honors Independent Study (3) [Rpt./] I II

500. Introduction to Quantitative Methods and Research in Speech and Hearing Sciences (2) I Study of measurement and research design and their application in research and professional practice.

501. Professional Issues in Speech-Language Pathology and Audiology (1) I Professional practice issues including certification, licensure, supervision, quality control, ethics, federal and state legislation.

502. Principles of Neuroanatomy (4) II (Identical with CBA 502, which is home).

503. Measurement for Diagnosticians (3) II GRD [Rpt.] For a description of course topics see SP H 403. Graduate-level requirements include a written review of three test manuals. May be convened with SP H 403.

510. Counseling Techniques in Communication Disorders (3) II Introduction to counseling the communication handicapped and their families.

541. Language Acquisitions (3) II For a description of course topics see SP H 441. Graduate-level requirements include a scholarly paper/project on a selected topic relevant to the course. (Identical with LING 541, PSYC 541). May be convened with SP H 441.

549. Survival Skills for Students (2) I II For graduate students and postdoctoral fellows, this course provides information and experiences that will aid in successful “survival” during the graduate-student years and those following graduation. Topics include effective speaking and writing, grants-personship, mentoring, teaching, career options, among others. Discussion of ethical issues and resources is integrated across topics. (Identical with BIOC 549, MCB 549, PS 549, PSIO 549).

552. Language Disorders in School Age Children (2) The nature and treatment of language disorders in children from grades K-12; relationships between language and learning disabilities; social skills, cognitive function; assessment and treatment strategies. P, SP H 441 or SP H 551.

553. Developmental Language Impairments (3) I Topics include: language and nonlanguage characteristics, and clinical management of children with developmental language impairment, acquired aphasia, bilingualism, and auditory disorders.

555. Developmental Language Disorders (2) I Preschool-level. Competency-based approach (treatment, assessment, and evaluation) to autism, specific language impairment, and mental retardation with attention to children learning English as a second language. Case study focus. P, SP H 441 or SP H 551.


558. Clinical Studies: Speech-Language Pathology (1-3) [Rpt./9 units] For a description of course topics see SP H 458. Graduate-level requirements include independent planning of treatment programs, completion of clinical progress reports, and formulation of evaluation reports as needed. Clinical research designs are also considered. Open to majors only, P, 451 or 571. May be convened with SP H 458.

559. Clinical Studies: Audiology (1-3) [Rpt./9 units] For a description of course topics see SP H 459. Graduate-level requirements include clinical progress or evaluation reports. Open to majors only, P, 589 or CR. May be convened with SP H 459.

560. Speech and Hearing Science Instrumentation Laboratory (1) I For a description of course topics see SP H 460L. May be convened with SP H 460L.

560R. Speech and Hearing Science Instrumentation Laboratory (2) For a description of course topics see SP H 460RL. Graduate-level requirements include a project on a selected topic. May be convened with SP H 460R.

562. Psychophysical Acoustics (3) II Experimental procedures and instrumentation; study of psychoacoustics; stimulus integration, pitch and loudness limen and scales, masking, and auditory fatigue; binaural hearing; theory of signal detection. P, SP H 280, SP H 460.

563. Microcomputer Applications (2) II Basic understanding of microcomputer operations and its multiple functions; emphasis on computer literacy, administrative/clinical applications, and hands-on instruction.

567. Experimental Phonetics: Physiology (3) I Systematic examination of current experimentation and research in speech as motor behavior, with emphasis on physiological investigations of normal respiration, phonation, resonance, and articulation; critical evaluation of research design. P, SP H 260. (Identical with PSYC 567).

568. Speech Perception (3) II For a description of course topics see SP H 468. Graduate-level requirements include more extensive reading. (Identical with LING 568, PSYC 568). May be convened with SP H 468.

570L. Laboratory in Evaluation Process (1) I II Open to majors only. P, 570R or CR.

570R. Evaluation Process (2) I Study of principles, methods and selected procedures involved in the assessment of individuals with communication disorders; attention to skills in interviewing and preparation of reports. P, 370, 371, 483; CR or subsequent registration in 590L (for majors).

571L. Laboratory in Articulation Disorders (1) I S For a description of course topics see SP H 471L. Graduate-level requirements include a scholarly paper and/or project on a selected topic. Open to majors only. P, 571R or CR. May be convened with SP H 471L.

571R. Articulation Disorders and Therapies (2) I S For a description of course topics see SP H 471R. Graduate-level requirements include a scholarly paper and/or project on a selected topic. May be convened with SP H 471R.


459. Clinical Studies: Audiology (1-3) [Rpt./9 units] Under supervision, students assess hearing impairments, formulate objectives, and carry out remedial programs with emphasis on the application of research data and current technology to clinical treatment. P, CR, SP H 483. Open to majors only. May be convened with SP H 559.

460. Speech and Hearing Science Instrumentation Laboratory (1) I II P, CR, SP H 460R. May be convened with SP H 560L.

460R. Speech and Hearing Science Instrumentation (2) I Consideration of some common and specific instruments and methods employed in speech and hearing laboratories and clinics. P, CR, SP H 260, SP H 280. May be convened with SP H 560R.

468. Speech Perception (3) II General overview of the field of speech perception. Topics include: role of contextual factors in the processing of speech, developmental issues in speech perception, perception of foreign language speech sounds, the recognition of speech by computers and animals, implications for hearing-impaired populations and models of speech perception. P, SP H 260. (Identical with LING 468, PSYC 468). May be convened with SP H 568.

471L. Laboratory in Articulation Disorders (1) I S Open to senior majors only. P, SP H 471L, open to senior majors only; CR, SP H 471R. May be convened with SP H 571L.

471R. Articulation Disorders and Therapies (2) I S Etiology, diagnosis, prognosis, and therapy for the articulatory aspects of communication problems. P, SP H 350, SP H 371, SP H 367, senior status advised. May be convened with SP H 571R.

483. Principles of Audiology (3) I Basic principles and techniques of audiological testing, etiologies of hearing impairment, and intervention strategies. P, SP H 280 or graduate status. May be convened with SP H 583.

484. Introduction to Hearing Aids and Audiological Rehabilitation (3) II Characteristics of hearing aids and evaluation of their performance; identification and treatment of communication disorders associated with hearing loss. P, SP H 280. May be convened with SP H 584.

486. Child Audiology (3) II Study of the development and disorders of the auditory system; audiometric evaluation and differential diagnosis in infants and children; psychological, auditory, and educational aspects of the habilitation of aurally handicapped children. P, SP H 280, SP H 483. May be convened with SP H 586.

496. Seminar

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./2] I II

573. Nature and Treatment of Childhood Stuttering (2) II Examines the problem of stuttering, its evaluation and management in children.

574. Cleft Palate, Other Craniofacial Disorders, and Communication (2) II Communication disorders associated with cleft palate and other craniofacial defects. Speech assessment, evaluation and treatment; survey of dental and surgical services. P, SP H 471L or SP H 471R.


580. Community and Industrial Audiology (2) II Hearing conservation in industry, schools, and the community; auditory and non-auditory effects of noise, noise assessment, control, and protective procedures.


583. Principles of Audiology (3) I For a description of course topics see SP H 483. Graduate-level requirements include a scholarly paper and/or project on a selected topic relevant to the course. P, 280 or graduate standing. May be convened with SP H 483.

584. Introduction to Hearing Aids and Audiologic Rehabilitation (3) II For a description of course topics see SP H 484. Graduate-level requirements include a scholarly paper and/or project on a selected topic. P, SP H 280, SP H 483. May be convened with SP H 484.

585. Audiologic Habilitation: Children (3) I Amplification, room acoustics, auditory and visual processing, evaluation and remedial programming for children with mild to moderate hearing impairment. P, SP H 483 or SP H 589.

586. Child Audiology (3) II For a description of course topics see SP H 486. Graduate-level requirements include a scholarly paper and/or project on a selected topic. P, 280, 483. May be convened with SP H 486.


595. Colloquium a. Current Problems in Speech and Hearing Sciences (1) I II

596. Seminar a. Experimental Phonetics (1-3) I II b. Clinical Audiology (1-3) I II c. Hearing Physiology and Psychophysics (1-3) I II d. Language and Language Disorders (1-3) I II e. Speech Pathology (1-3) I II

599. Independent Study (1-3) I II

600. Research Methods in Communication Sciences and Disorders (3) II Design and execution of descriptive and experimental research in communication sciences and disorders.


663. Digital Processing of Speech Signals (3) II Basic knowledge of digital signal processing for students in biological sciences. Topics include spectral analysis, fast Fourier transform, linear prediction coding, and digital filtering. P, SP H 260.


665R. Aerodynamic Evaluation and Management of the Speech Mechanism (2) I II Principles and clinical methods of aerodynamic evaluation and management of the disordered speech mechanism, with practical experience provided through case studies and class experiments. P, SP H 260, SP H 460R, SP H 460L, SP H 567.

691. Preceptorship (1-3) I II

695. Colloquium a. Motor Control (2) I II (Identical with PSIO 695A, which is home).


697. Communicative Aspects of Aging (1) I Hearing, voice, and language changes in the elderly caused by aging and disease. Emphasis on management of these problems. (Identical with GERO 576).

698. Communicative Aspects of Aging (2) I II Hearing, voice, and language changes in the elderly caused by aging and disease. Emphasis on management of these problems. (Identical with GERO 576).

700. Research (1-3) I II

701. Thesis (1-6) I II

720. Dissertation (1-12) I II

930. Supplementary Registration (1-9) I II

SURGERY (SURG)

For more information about surgery courses, see the entry for the College of Medicine in this manual.

SYSTEMS AND INDUSTRIAL ENGINEERING (SIE)

Bachelor of Science in Systems Engineering (B.S.Sy.E.)
Bachelor of Science in Industrial Engineering (B.S.In.E.)

Graduate Degrees
Master of Science in Systems Engineering (M.S.)
Master of Science in Industrial Engineering (M.S.)
Master of Science in Reliability & Quality Engineering (M.S.)
Doctor of Philosophy in Systems & Industrial Engineering (Ph.D.)

Majors and Degrees
Industrial Engineering (B.S.In.E., M.S.)
Reliability and Quality Engineering (M.S.)
Systems Engineering (B.S.Sy.E., M.S.)
Systems and Industrial Engineering (Ph.D.)

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/ oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/ academic/ oncourse/data/interface/minors/.
300R. Engineering Experiment Design (3) I II Design and analysis of observational and factorial experiments employing numerical and graphical methods. Topics include control charts, probability plots, multiple regression analysis, confidence and prediction intervals and significance tests. 1.5ES, 1.5ED. P, SIE 305; CR, SIE 330L.

340. Deterministic Operations Research (3) I Linear programming models, solution techniques, sensitivity analysis and duality. 3ES. P, SIE 265 or ECON 210; SIE 270.

350. Deterministic Systems (3) I II Modeling and analysis and design of linear deterministic systems in both the time and frequency domains. Input/output differential equations, Laplace transforms and state space methods. Attention will be given to modeling physical and engineering systems and computer simulations. 3ES. P, ECE 207, MATH 254, SIE 350.

370. Design of Computer Systems (4) I II Boolean algebra, combinational and sequential logic circuits, finite state machines, simple computer architecture, assembly language programming, and real-time computer control. The computer is used as an example of systems engineering design; it is analyzed as a system, not as a collection of components. 3R, 3L, 1ES, 2ED. P, ENGR 102, ECE 207.

377. Software for Engineers (3) I Programing in C. Modular program design and verification, pointers and structures, data structures and algorithms including: lists, trees, graphs, searching and sorting. 1.5ES, 1.5ED. P, SIE 170. Credit allowed for one of these courses: SIE 377, CSC 342.

383. Integrated Manufacturing Systems (3) I Introduction to the integrated manufacturing enterprise and automation. Topics include computer-aided design, process planning, computer numerical control machining, machine vision, application of robots and automation. 2R, 2L. 1ES, 1ED. P, SIE 260, MSE 331.

396. Proseminar
a. Elite Seminar I (1) I II

399. Independent Study (1-5) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./]

406. Quality Engineering (3) I Quality, improvement and control methods with applications in design, development, manufacturing, delivery and service. Topics include modern quality management philosophies, engineering/statistical methods (including process control, control charts, process capability studies, loss functions, experimentation for improvement) and TQM topics (customer driven quality, teaming, Malcolm Baldrige and ISO 9000). P or CR, SIE 305; SIE 430. May be convened with SIE 506.


410. Human Factors and Ergonomics in Design I (4) I Consideration of human characteristics in the requirements for design of systems, organizations, facilities and products - to enable human-centered design which considers human abilities, limitations and acceptance.

411. Human Factors and Ergonomics in Design II (4) II Advanced human-centered design with emphasis on human-system interfaces. Applications to computer and information systems, consumer products, manufacturing processes, etc., according to student interest. A project will be required. 1ES, 2ED. P, SIE 410 or consent of instructor. May be convened with SIE 511.

422. Engineering Decision Making Under Uncertainty (3) I Application of principles of probability and statistics to the design and control of engineering systems in a random or uncertain environment. Emphasis is placed on Bayesian decision analysis. 1ES, 2ED. P, SIE 330R, SIE 330L or equivalent. May be convened with SIE 522.


431. Simulation Modeling and Analysis (3) I II Discrete event simulation, model development, statistical design and analysis of simulation experiments, variance reduction, random variate generation, Monte Carlo simulation. 1.5ES, 1.5ED. CR, SIE 321; P, SIE 330R, SIE 330L. May be convened with SIE 531.


442. System Design Projects (3) I II Practical application of engineering knowledge by student teams to actual system design problems in industry or business. Development of report writing and oral presentation skills. Writing-Emphasis Course. 3ED. P, SIE 431.

453. Deterministic Control Systems (3) I The analysis and synthesis of deterministic linear control systems, with emphasis on design using both frequency-domain and state-variable approaches. 1.5ES, 1.5ED. P, SIE 350.

462. Production Systems Analysis (3) I Production systems, quantitative methods for forecasting, aggregate planning, inventory control, materials requirement planning, production scheduling, manpower planning and facility design. 3ES. P, SIE 340.

463. Facilities and Production Systems Design (3) I Case studies emphasizing aspects of production systems design such as facility location, facility layout, group technology.
product and process design, material handling, and automated assembly. The student will be required to work in groups. Solutions will be presented using both written and oral reports.

464. Facilities Layout and Design (3) II
Definition and modeling solutions of continuous and discrete, single and multifacility location problems for various objectives. Relative location and layout of facilities/departments for minimizing material handling and interaction costs. Emphasis on quantitative methods. 2ES, 1ED, P, SIE 321, SIE 340. May be convened with SIE 564.

473. Concepts in Information and Communication Systems (3) II Modeling and analysis of information and communication, systems/ networks for application in telecommunication, systems and computer communication networks. Topics selected from the following: signal representation, sampling, coding and error detection, modulation, OSI network architecture, network protocols, delay models of performance, routing and flow control. 3ES, P, SIE 321, SIE 340. May be convened with SIE 573.

474. Decision Support Systems (3) I Building, testing and evaluating expert systems, computer systems that emulate the human and draw conclusions based on incomplete or inaccurate data. Each student will build a decision support system using commercially available expert system shells. Students will use many tools to test and validate their systems. 1ES, 2ED, P, familiarity with computers. May be convened with SIE 574.

475. Computational Methods for Games, Decisions, and Artificial Intelligence (3) II An introduction to automata, computer representation and optimal solution of games and decision problems. Principles of heuristic programming and machine learning. A programming project is to be selected from areas such as game strategies, graphics, recreational mathematics, and manufacturing simulation. Microcomputer experience is emphasized. 1ES, 1ED. May be convened with SIE 575.


485. Robotics and Automation (3) I Methods of design and operation of general purpose and industrial manipulation systems. Kinematic and dynamic models of mechanical manipulators, trajectory planning, manipulator control, robotic vision and other sensing techniques. 2ES, 1ED, P, SIE 350 or equivalent. May be convened with SIE 585.

486. Modeling Manufacturing Systems (3) II An intermediate-level introduction to topics in hierarchical design, planning, and control of manufacturing systems. Topics include modeling automated transfer lines, cellular manufacturing, and flexible manufacturing systems. Emphasis on material flow and analysis of throughput rate. 2ES, 1ED, P, SIE 321, SIE 340. May be convened with SIE 586.

495. Colloquium s. Senior Colloquium (1) I P, senior status, open to majors only.

498. Senior Capstone (1-3) I II
498H, Honors Thesis (3) [Rpt./] II
499. Independent Study (1-3) [Rpt./] II
499H, Honors Independent Study (3) [Rpt./] II

506. Quality Engineering (3) I For a description of course topics see SIE 406. Graduate-level requirements include additional readings and assignments/projects. May be convened with SIE 406.

508. Systems Reliability Engineering (3) I For a description of course topics see SIE 408. Graduate-level requirements include additional readings and assignments/projects. May be convened with SIE 408.

509. Integration of Reliability Testing in Systems Design (3) II Developmental tests, reliability growth tests, truncated life tests, sequential life tests, burn-in, environmental stress screens and field tests. Application of concurrent engineering and Bayesian methods to integrate reliability tests into the overall product development cycle, thereby reducing overall test time and life cycle costs. P, SIE 508, SIE 530.

510. Behavioral Judgement and Decision Making (3) II Models and theories of human judgment and decision from an engineering perspective. Subjective probability, value and utility. Methods for aiding and supporting decision making. P, SIE 330L or SIE 530; SIE 330R.

511. Human Factors and Ergonomics in Design II (4) II For a description of course topics see SIE 411. For a description of course topics see 411. Graduate-level requirements include separate examinations and a major project. May be convened with SIE 411.

513. Environmental Risk Analysis (3) I (Identical with HWR 513, which is home).


522. Engineering Decision Making Under Uncertainty (3) I For a description of course topics see SIE 422. Graduate-level requirements include a semester research project. May be convened with SIE 422.

525. Queuing Theory (3) II Application of the theory of stochastic processes to queuing phenomena; introduction to semi-Markov processes; steady-state analysis of birth-death, Markovian, and general single- and multiple-channel queuing systems. P, SIE 520.

528. Maintainability Engineering (3) II Complex systems reliability; maintainability engineering; reliability and availability of maintained systems; operational readiness; system effectiveness; maintainability demonstration. P, SIE 408, SIE 530. Credit allowed for one of these courses: SIE 528, A ME 577.


530. Engineering Statistics (3) I II For a description of course topics see SIE 430. Graduate-level requirements include more difficult homework assignments. May be convened with SIE 430.

531. Simulation Modeling and Analysis (3) I II For a description of course topics see SIE 431. Graduate-level requirements include a library research report. May be convened with SIE 431.

532. Statistical Models in Engineering (3) I II Statistical distributions applicable in engineering, with emphasis on quality and reliability problems. Topics include model selection, parameter estimation, and approximations for large-scale systems. P, SIE 530.

536. Experiment Design and Regression (3) II Planning and designing experiments with emphasis on factorial layout. Includes analysis of experimental and observational data using multiple linear regression and analysis of variance. P, SIE 530.

540. Survey of Optimization Methods (3) II For a description of course topics see SIE 440. Graduate-level requirements include additional assigned readings and a project paper. May be convened with SIE 440.

541. Dynamic Programming (3) II Modeling of stochastic dynamic systems and the application of dynamic programming techniques to optimal decision and control problems. Topics include inventory control, admission and flow control in queuing systems, stochastic scheduling, dynamic portfolio analysis and computational methods. P, SIE 321, SIE 340.


545. Nonlinear Programming (3) II Unconstrained and constrained optimization problems from a numerical standpoint. Topics include variable metric methods, optimality conditions, quadratic programming, penalty and barrier function methods, interior point methods, successive quadratic programming methods. P, SIE 340.

546. Algorithms, Graphs, and Networks (3) II Model formulation and solution of problems on graphs and networks. Topics include heuristics and optimization algorithms on shortest paths, min-cost flow, matching and traveling salesman problems. P, SIE 340. Credit allowed for one of these courses: SIE 546, MIS 546.

550. Theory of Linear Systems (3) II An intensive study of continuous and discrete linear systems from the state-space viewpoint, including criteria for observability, controllabilit-
575. Computational Methods for Games, Decisions, and Artificial Intelligence (3) II For a description of course topics see SIE 475. Graduate-level requirements include a comprehensive and intensive programming project. May be convened with SIE 475.

576. Numerical Analysis (3) I For a description of course topics see SIE 476. Graduate-level requirements include extra reading assignments and more sophisticated programming assignments. May be convened with SIE 476.

580. Advanced Queuing Theory (3) I Selected topics covering current and recent research on queuing models and their applications. Emphasis on algorithmic methods for the study of complex queuing models of engineering interest. P, SIE 520, SIE 530.

590. Colloquium (1-3) [Rpt./1] I II Consult department before enrolling.

595. Seminar (2-5) [Rpt./1]

631. Digital Systems Simulation (3) II Emphasis on current research problems including random variate generation, modeling, language development and statistical analysis of output. P, SIE 431 or MIS 521a or MIS 521b.

636. Advanced Experiment Design (3) I Robust product and process design through planned experiments, emphasizing the integration of loss functions, parameter design and tolerance design.
Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Teaching and Teacher Education (TTE)

199. Independent Study (1-3) [Rpt.]

211. Image Processing for Scientific Discovery (3) II (Identical with PTYS 211, which is home).

293. Internship (1-3) [Rpt.]

294. Practicum (1-4) [Rpt.]

299H. Honors Independent Study (3) [Rpt.]

300. Classroom Processes and Instruction (4) I II Classroom observation, management, instruction, and planning processes; includes field work and laboratory experiences. P, admission to the College of Education.

302. Educational Applications in Museum Anthropology (3) I II (Identical with ANTH 302, which is home).

322. Teaching Language Arts and Communication in Elementary (3) The teaching of language and communicative arts in the elementary school, with special emphasis on current approaches and organization of methods and materials. P, ED P 301, TTE 300, admission to the College of Education. Methods courses in block format only: TTE 322, TTE 323, TTE 324, TTE 326, TTE 327 and TTE 394A.

323. Teaching Reading and Decoding in Elementary School (3) The teaching of reading and decoding in the elementary school, with special emphasis on current approaches and organization of methods and materials. P, ED P 301, LRC 480, TTE 300, admission to the College of Education. Methods courses in block format only: TTE 322, TTE 323, TTE 324, TTE 326, TTE 327 and TTE 394A.

324. Teaching Science and Health in Elementary School (3) Basic course in methods of elementary school science and health instruction, with special emphasis on the skills and structure of science in relation to the processes of inquiry. P, ED P 301, TTE 300, 8 units of science, admission to the College of Education. Methods courses in block format only: TTE 322, TTE 323, TTE 324, TTE 326, TTE 327 and TTE 394A.

326. Teaching Elementary School Mathematics in a Technological Age (3) Concepts, methods, and use of materials, calculators and computers in the teaching of elementary school mathematics. P, ED P 301, MATH 301, TTE 300, admission to the College of Education. Methods courses in block format only: TTE 322, TTE 323, TTE 324, TTE 326, TTE 327 and TTE 394A.

327. Teaching Elementary School Social Studies in a Multicultural Society (3) Methods and materials for teaching elementary school social studies with a multicultural emphasis. P, ED P 301, TTE 300, admission to the College of Education. Methods courses in block format only: TTE 322, TTE 323, TTE 324, TTE 326, TTE 327 and TTE 394A.

338. The Teaching of Secondary School Subjects

- Teaching Family and Consumer Sciences Education (4) I Writing-Emphasis Course. (Identical with FS 338G, which is home).
- Science (3) I II, P, TTE 300, ED P 310; CR, TTE 394B.
- Art (3) I II, P, TTE 300, ED P 310; CR, ARE 431/531 and ARE 400/500 (Identical with ARE 338L).
- Music (3) I II (Identical with MUS 338M, which is home).
- Theatre Arts (3) I II (Identical with T AR 338T, which is home).
- Social Studies (3) I I, P, TTE 300; CR, TTE 394B.

342. Middle School Curriculum and Teaching (3) I Functions of the middle school as they pertain to curriculum organization, instructional strategies, student activities, guidance and evaluation. P, admission to teacher preparation program.

377. Early Childhood Education (3) I II Curriculum practices in the primary grades. P, TTE 300 or ED P 301.

384. Records/Information Management (3) I II Systems of information management; creation, distribution, storage, transfer and disposition of office records; management aspects of establishing information systems and evaluating their efficiency.

393. Internship (1-6) [Rpt.]

394. Practicum

- a. Elementary School Reading (1) [Rpt. I I II P or CR, TTE 322, TTE 323; admission to the College of Education.
- b. Secondary Methods (1) [Rpt. I I II P, TTE 300, ED P 310, EDUC 350, admission to the College of Education. CR, TTE 338H or TTE 338U or TTE 338Y or TTE 414, or one only of TTE 410, TTE 411, TTE 412. Open to majors only.

396. Proseminar

- a. Honors Proseminar (3) I II

399. Independent Study (1-3) [Rpt.]

399H. Honors Independent Study (1-3) [Rpt.]

405. Mathematics in the Secondary School (3) I II Study and analysis of curriculum changes in school mathematics, with emphasis on the design and content of experimental programs. P or CR, MATH 315, MATH 330, MATH 362. (Identical with MATH 405).

407. Principles of Vocational Education (2) I (Identical with ED 407, which is home). May be construed with TTE 507.

408. English as a Second Language in Bilingual...
Education (3) I II (Identical with ENGL 408, which is home).

410. Teaching of English Composition (3) I II (Identical with ENGL 410, which is home).

411. Teaching of Literature (3) I II (Identical with ENGL 411, which is home).

412. Teaching of the English Language (3) I II (Identical with ENGL 412, which is home).

414. Teaching of Modern Languages (3) I II
Specific methods, objectives, organization of subject matter and evaluation in modern languages. (Identical with FREN 414, ITAL 414, PORT 414, SPAN 414).

438. The Teaching of Secondary School Agricultural Science (4) I (Identical with A ED 438, which is home). May be convened with TTE 538.

438T. Secondary School Theatre Methods (3) I (Identical with T AR 438T, which is home). May be convened with TTE 538T.

493. Internship
Successful completion of professional education courses, content area course, and the basic skills exam are required prior to student teaching. Music education students must consult with a music education advisor to waive this requirement.

Application must be made one semester prior to enrollment in student teaching. Pass/fail grades are the only grades available for TTE 493A and TTE 493B. Enrollment in these courses will not affect the amount for which a student can otherwise enroll under the pass-fail option.

a. Student Teaching in Elementary School (3-12) [Rpt./] II I II P, TTE 300, TTE 322, TTE 324, TTE 326, TTE 327, ED P 301, EDUC 350; CR, TTE 496C, SER 301A; Admission to the College of Education Special Fee.

b. Student Teaching in Secondary School (6-12) I II P, TTE 300, ED P 310, EDUC 350, LRC 435, appropriate methods course, Admission to the College of Education; CR, TTE 496C, SER 301B; Special Fee.

1. Legislative Internship (1-12) [Rpt./] II

494. Practicum (1-4) [Rpt./]

496. Seminar
c. Issues in Teaching (1) II CR, TTE 493A or TTE 493B

498. Senior Capstone (1-3) I II

498H. Honors Thesis (3) [Rpt./ 2]

499. Independent Study (1-3) [Rpt./]

499H. Honors Independent Study (3) [Rpt./] II

503. Teacher Leadership and School Change (3) II Teacher leadership and involvement as it applies to change process, school improvement, collaborative decision-making, school assessment, strategic planning, and school restructuring.

504. Trends/Issues in Elementary Schools (3) Investigation of the rationale, implementation and consequences of recent trends/issues in elementary school organization, curriculum and methodology.

505. Trends/Issues in Secondary Education (3) I II Examination of purposes and functions of middle level and high schools, investigation of trends, issues, and organization of curriculum and programs.

507. Principles of Vocational Education (2) II (Identical with A ED 507, which is home). May be convened with TTE 407.

515. Observation and Supervision of Student and Inservice Teachers (3) Research-based strategies to supervise and critique teaching events, and to determine positive ways of thinking and acting in classrooms.

520. The School Curriculum: Science (3) Elementary and secondary science curricula in terms of their aims, content/processes, instructional methods and assessment. These science curricula are placed within a historical perspective and examined from a theoretical and research base. P, TTE 324 or TTE 338H.

521. Elementary and Middle School Mathematics Curriculum (3) Elementary and middle school mathematics curricula in terms of their aims, content/processes, instructional methods and assessment. These mathematics curricula are placed within a historical perspective and examined from a theoretical and research base. P, TTE 326 or TTE 338Y.

522. The School Curriculum: Social Studies (3) Elementary and secondary social studies curricula in terms of their aims content/processes, instructional methods and assessment. These social studies curricula are placed within an historical perspective and examined from a theoretical and research base. P, TTE 327 or TTE 338U.


526. Investigations in Early Childhood Education (3) Critical study and evaluation of research findings and learning theories with emphasis upon pedagogical implications related to early childhood education.

528. Developing Programs for Young Children (3) Contemporary early educational programs with emphasis upon the child's changing needs and the home, school and society. Criteria unique to particular ECE programs are analyzed to establish guidelines for program development.

529. Classroom Organization and Management (3) An analysis of concepts, research findings, and effective practices for organizing and managing classrooms. Experiences in solving management problems provided. P or CR, TTE 539; P, EDUC 500.

530. Environmental Education Topics (3) S Issues related to environmental education in schools. Emphasis on diverse perspectives of environmental education and strategies for changing curricular P, TTE 324 or TTE 338H.


534. Alternatives in the Secondary Classroom (3) Theoretical bases, methods and strategies for selecting instruction in secondary classrooms, and their application to classroom instruction. May be convened with TTE 438.

538. The Teaching of Secondary School Agricultural Science (4) I (Identical with A ED 538, which is home). May be convened with TTE 438.

538T. Secondary School Theatre Methods (3) I (Identical with T AR 538T, which is home). May be convened with TTE 438T.

539. Recent Research on Teaching and Schooling (3) An overview of the concepts, methodologies and findings of recent research on teaching and schooling practices. P, TTE 500, EDUC 500.

542. The Middle School/Junior High (3) History, purposes, curriculum, instructional organization, and classroom processes for middle schools/junior high schools.

545. Curriculum Theory and Policy (3) A survey of theoretical frameworks in curriculum; the processes of content representation and enactment; planning evaluation, and change; analysis of curriculum policy.

593. Internship (1-6) [Rpt./] II

593. Internship
1. Legislative Internship (1-9) [Rpt./] I II
1. Legislative Internship (1-9) [Rpt./] I II

594. Practicum (1-4) [Rpt./]

595. Colloquium
c. Colloquium (1-3)

596. Seminar
c. Topics in Teacher Education (3) [Rpt./12 units]

597. Workshop
e. Learning Through Play (3)
e. Learning Through Play (3)
e. Learning Through Play (3)

600. Middle-Level School Development (3) S

p. Parents as Partners in Education (3)
p. Parents as Partners in Education (3)
p. Parents as Partners in Education (3)

r. Action Research Workshop (3) S

w. Elementary Science Demonstrations (3) II S P, TTE 324 or TTE 338H.
Theatre Arts (T AR)

Drama Bldg., Rm. 239
The University of Arizona
PO Box 210003
Tucson AZ 85721-0003
Phone: (520) 621-7008
FAX: (520) 621-2412

E-mail: theatre@ccit.arizona.edu
URL: http://arts.music.arizona.edu/

Baccalaureate Degrees
Bachelor of Arts (B.A.)
Bachelor of Fine Arts (B.F.A.)
Graduate Degrees
Master of Arts (M.A.)
Master of Fine Arts (M.F.A.)

Launch the program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available on line at: http://www.arizona.edu/academic/ oncourse/data/interface/. Minor requirements are available on line at http://www.arizona.edu/ academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Theatre Arts (T AR)

100. Acting for General College Students (3)
The craft of acting with emphasis on body, voice and mind. Theoretical background and experience, including in-class performances of selected scenes. Open to non-majors only.

103. Theatre Appreciation (3) I II An introduction to the art used in producing the play: directing, acting, technical production. Open to non-majors only.

111. Stagecraft (3) [Rpt./ 3 units] I II Basic principles of the scenic process: construction and use of materials, shop techniques and practices. 2R, 1L. Special Fee.

113. Stagecraft Crew (1) [Rpt./ 2] I II Performance support crew for scenery and properties areas in department productions. P or CR, T AR 111 for department majors.

115. Makeup (1) I II History and essentials of makeup; straight, character, and special types; effects of light on makeup; opportunity for experience in production. 2S.

116. Introduction to Stage Costume Construction (3) I II Basic principles of construction process and techniques. Use of materials for stage costumes. 2R, 3L. Special Fee.

Performance support crew for wardrobe and costuming areas for department productions. P or CR, T AR 116 for department majors.

121. Introduction to Design: Stage Costume and Scenery (3) II Basic concepts and practice of theatrical design, and presentation skills of costume and scenic design.

140A-140B. History of the Theatre and Drama in Western Civilization (3) I Origins and development of the arts of theatre from primitive ritual to modern times; integrated study of plays, theatre architecture, dramatic styles, and theories of significant periods. P, T AR 104A is not prerequisite to T AR 104B, open to non-majors.

145. Principles of Dramatic Structure (3) I Interpretation of structural elements of major dramatic forms and styles in relation to stage presentation and film; reading and analysis of representative plays. Open to majors only.

149. Acting I (3) I Fundamental techniques of acting, with emphasis on the actor's approach to characterization and the performer's relationship to all parts of the play's production. 2R, 2S. CR, T AR 111 and T AR 113, or T AR 116A and T AR 116B, and T AR 118. Open to majors only.

151. Acting II (3) II Intensive study of text analysis and the actor's approach to characterization as it pertains to modern realism. 2R, 3S. P, T AR 149; CR, T AR 145, T AR 111 and T AR 113; or T AR 116A-T AR 116B, and T AR 118.

193. Internship (1-5) [Rpt./]

194. Practicum

a. Performance (1-2) [Rpt./ 4 units]

199. Independent Study (1-5) [Rpt./]

203. Voice and Movement for the Actor I (2) [Rpt./ 1] I Beginning voice and movement skills for the actor including the Linklater approach, phonetics, physical isolation and awareness exercises. 4S. P, T AR 151, audition. Open to acting majors only.

204. Voice and Movement for the Actor II (2) [Rpt./ 1] II Continued voice and movement skills for the actor. 4S. P, T AR 203, T AR 250, audition. Open to majors only.

205. Musical Theatre (2) [Rpt./ 1] I S American musical theatre: its origins, development and influences. Practical applications. 1R, 2S. Open to majors only.

220. Stage Lighting (3) I II Studies in stage lighting equipment, procedures, design techniques, and shop practices. 2R, 1L. P, T AR 120.

221. Stage Lighting Crew (1) [Rpt./ 2] Crew work on theatrical stage lighting productions. P or CR, T AR 220 for majors.


225. Scene Design I (3) I II Basic principles of research, analysis and visualization for stage design. Strong emphasis on model building. 2R, 1L. P or CR, T AR 297A for department majors.

229. Costume Design I (3) I Basic principles of
238. Modern Drama Through Performance (3) II Interpretation of modern plays from Ibsen to the present; presentation of speakers in drama, with emphasis on the physical and vocal qualities that project these characters; deals with the modern masters, such as Shaw, Miller, and Williams.

239. Speaking in the Arts (3) I II A studio course for presenters in the fine arts who wish to develop skills in appearing on the electronic media, stressing background, current trends, and performance techniques. (Identical with M AR 239).

250. Acting III (3) I Intensive work in expanding the versatility of the actor's instrument. Improvement of acting, class exercises and scene work. 2R, 2S. P T AR 111, T AR 113, T AR 116, T AR 118, T AR 151, audition.

251. Acting IV (3) II Nonrealistic styles, including expressionism, absurdism and the contemporary avant-garde; work with select exercises in both representational and presentation modes. Analytical skills, scene performance and critique. 2R, 2S. P T AR 203, T AR 250, audition; CR, T AR 204.

293. Internship (1-5) [Rpt./]

294. Practicum (1-3) [Rpt./]

297. Workshop

a. Theatrical Production (1-2) [Rpt./ 4 units] P, T AR 113, T AR 118.

299. Independent Study (1-5) [Rpt./]

299H. Honors Independent Study (1-2) [Rpt./] II

300. Plays for K-12 Setting (1) I Directed readings of one-acts, full-length plays, musicals and other dramatic material suitable for elementary, middle, and high school study and production.

305. Voice and Movement for the Actor III (2) [Rpt./ 1] I Intermediate voice and movement skills for the actor including standard stage speech and period manners and movement; emphasis on Shakespearean style. 4S. 4R, P T AR 204, T AR 251, audition. Open to majors only.

306. Voice and Movement for the Actor IV (2) II Continued intermediate voice and movement skills for the actor including individualized attention to special voice problems and period manners and movement. Emphasis on Commedia dell'arte, Moliere and English Restoration styles. 4S. P T AR 305. Open to majors only.

319. Sound for the Theatre (3) I Basic technical and aesthetic principles of theatrical sound production. 2R, 2S. Special Fee.

336. Introduction to Shakespeare through Performance (3) I Understanding Shakespeare's plays through performance. Performance-oriented analysis compels a thorough comprehension of the ideas, emotions, attitudes, and intent of the plays being studied.

338T. Theatre Arts (3) II Carries credit in Education Only. (Identical with TTE 338T, which is home).

340A-340B. History of the Theatre (3-3) I II Origins and development of the arts of theatre from primitive ritual to modern times; integrated study of plays, theatre architecture, dramatic styles, and theories of significant periods. Writing-Emphasis Courses. P, T AR 145. Open to majors only.

347. English Phonetics (3) I Scientific study of the sounds of speech; emphasis on laws and principles determining articulatory features, dialect variation, sound change, and sound as communication context.

391. Preceptorship (2) [Rpt./]

393. Internship (1-3) [Rpt./]

394. Practicum (1-3) [Rpt./]

396. Proseminar h. Honors Proseminar (3) II

397. Workshop

a. Writing and the Arts (3) I II P, ENGL 101, ENGL 102.

399. Independent Study (1-3) [Rpt./] II

399H. Honors Independent Study (1-3) [Rpt./]

401. Advanced Construction Techniques (3) [Rpt./2] I Advanced study and practice in fabrication techniques for theatrical designers and technicians. Emphasis on a wide range of materials and skills found in theatrical construction. Includes OSHA compliance, respirator training, and safety. P, T AR 111, T AR 116; Special Fee. May be convened with T AR 501.

402. Combat for the Stage (1) [Rpt./ 1] II Basic study in the execution of staged combat, training in the use of theatrical weapons and hand-to-hand combat required in playscripts. Extensive physical training as well as work in relaxation and focus. Open to majors only. May be convened with T AR 502.

403. Musical Theatre II (3) I Intensive text and score analysis in relation to the process of characterization for the actor, singer, dancer in musical theatre. Individual and group performance. Audition materials and techniques for a professional career in theatre. 2L, 2S. P, T AR 205, audition. Open to majors only. May be convened with T AR 503.

404. Musical Theatre III (3) I Intensive scene study and exploration of the major historical styles and genres of the American musical theatre. 2R, 2S. P, T AR 403, audition. Open to majors only. May be convened with T AR 504.

405. Theatrical Engineering and Management (3) II Advanced studies in technical theatre, engineering, structures and motion-control systems for the stage. P, T AR 111. May be convened with T AR 505.

410. Methods of Teaching Creative Drama (3) I Principles and procedures of improvisation, role-playing, creative playwriting techniques, and program development in creative dramatics applicable to the elementary and secondary school levels. P, 12 units of theatre arts and education. May be convened with T AR 510.

414. Advanced Makeup (2) [Rpt./ 2] II History and practical application of theatrical make-up. Design and construct such items as masks, prosthetic pieces, wigs and beards. P, T AR 115. May be convened with T AR 514.


419. Sound Design (3) [Rpt./2] II Advanced study in theatrical sound, production and design. P, T AR 319. May be convened with T AR 519.

420. Advanced Lighting Design (3) II Special problems, practice and trends in design light for theatrical productions. P, T AR 220; Special Fee. May be convened with T AR 520.

423. Scene Painting I (3) I Techniques and methods of scenic painting. Special Fee. May be convened with T AR 523.

425. Costume and Scenic Design II (3) [Rpt./2] II Advanced instruction and practice in theatrical costume and scenic design with an emphasis on rendering. P, T AR 225, T AR 229. May be convened with T AR 525.

427. Advanced Stage Costume Construction I (3) [Rpt./1] I II Advanced techniques in costume construction, fabric technology and pattern drafting. P, T AR 116, T AR 224; Special Fee. May be convened with T AR 527.

428. Advanced Stage Costume Construction II (3) [Rpt./1] I I Advanced techniques in construction of stage costumes for historic periods. P, T AR 116; Special Fee. May be convened with T AR 528.

430. Stage Management (3) I Principles and techniques of stage management, practical applications, problems and analysis of stage managing. P, T AR 111, T AR 151. May be convened with T AR 530.

431. Audience Development (3) I Publicity, press releases, sales, advertising, display techniques, subscription procedures. P, 12 units of theatre arts or related arts field. May be convened with T AR 531.

432. Theatre Management (3) II Amateur, educational, and professional theatre organization and management; theatrical contracts, professional unions and representative organizations. P, 12 units of theatre arts or related arts field. May be convened with T AR 532.


440. History of the Modern Theatre (3) I Major movements, plays, and theories in theatrical art from 1915 to the present. P, T AR 145. Open to majors only.
442. Advanced Stage Lighting II (3) An advanced study of lighting design; theoretical (light plots) and practical (light lab) projects. P, T AR 420 or T AR 520. May be convened with T AR 542.

445. Dramaturgy (3) The varied roles of the production dramaturg: script analysis, rehearsal process, research, criticism, outreach, interpretation. Major project and short papers. P, for majors I course in theatre history or criticism, for others-instructor consent. May be convened with T AR 545.

448A-448B. Period Styles (3-3) II Chronological survey of the history of architecture, costume, decorative arts and furniture as it applies to theatre production. May be convened with T AR 548A-548B.


452. Acting VII (3) Rpt/1 I Audition material, techniques and research into problems of a professional career in the theatre, television, motion pictures and related fields. 2R, 2S. P, T AR 305, T AR 449, audition. May be convened with T AR 552.

453. Acting VIII (3) Advanced stage combat. Intensive study of the techniques of stage combat. Study and review of major acting theories with emphasis on integrating stage combat techniques. Students may have an opportunity to test for national recognition by the Society of American Fight Directors as an actor/combattant. 2R, 2S. P, T AR 402, audition. May be convened with T AR 553.

455. Directing I (3) Basic techniques of stage directing including play analysis, director-actor communication and technical problems of movement, composition, picturization and blocking. 2R, 2S. P, consent of instructor, open to majors only. May be convened with T AR 555.

456. Directing II (3) Techniques of stage direction with the study of factors leading to a completed production; special attention given to director-designer communication and the production process. Direction of one-act plays. 2R, 2S. P, T AR 455. May be convened with T AR 556.

460A-460B. Writing for Stage and Screen (3-3) II Preparation and analysis of short scripts for stage and motion pictures. Writing-Emphasis Course for cinema option (General Fine Arts Studies Major). P, recommended senior status only, May be convened with T AR 560A-560B.

461. Artist Collaboration (2) Rpt/2 I The development and communication of a visual idea for performance art; exploring all mediums of visual and aural communication. May be convened with T AR 561.

462. Collaborative Play Development (3) Rpt/1 II Explores collaborative approaches to the development of theatrical performance through group improvisation, writing exercises, and the shaping of a performance project to be shown publicly. P, enrollment by audition only. (Identical with DNC 462). May be convened with T AR 562.

468. Dialects in Performance (3) II Application of suitable phonetic theory toward a systems approach to acquiring dialects for performance in stage, television and radio presentations. 1R, 4S. P, ability to do close transcription of I.P.A. Phonetic Alphabet. May be convened with T AR 568.

475. Screen Acting Techniques (3) Principles and techniques of various performance methods involved in acting for television and motion pictures; basic problems faced by the professional actor seeking employment in these media; on-camera experience with directed exercises and dramatic scenes. 2R, 3L. P, T AR 151, audition. May be convened with T AR 575.

492. Internship (1-3) Rpt/1 II

494. Practicum (1-3) Rpt/1 II

495. Colloquium

a. Teaching Methods for Dance (3) I (Identical with DNC 495A, which is home). May be convened with T AR 595A.

497. Workshop

a. Technical Production (1-3) Rpt/20 units P, consent of instructor. May be convened with T AR 597A.

b. Costume Production (1-3) Rpt/20 units P, consent of instructor. May be convened with T AR 597B.

c. Lighting Production (1-3) Rpt/20 units P, consent of instructor. May be convened with T AR 597C.

d. Sound Production (1-3) Rpt/20 units P, consent of instructor. May be convened with T AR 597D.

e. Scenic Production (1-3) Rpt/20 units P, consent of instructor. May be convened with T AR 597E.

f. Performance (1-3) Rpt/20 units

g. Management Workshop (1-3) Rpt/20 units I II, consent of instructor. May be convened with T AR 597M.

498. Senior Capstone (1-3) I II

499H. Honors Thesis (3) Rpt/2 I II

499. Independent Study (1-5) Rpt/1 I II

499H. Honors Independent Study (3) Rpt/1 I II

501. Advanced Construction Techniques (3) Rpt/2 I For a description of course topics see T AR 401. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 401.

502. Combat for the Stage (1) Rpt/1 I II

for a description of course topics see T AR 402. Graduate-level requirements include an additional performance and/or research project. May be convened with T AR 402.

503. Musical Theatre II (3) I For a description of course topics see T AR 403. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 403.

504. Musical Theatre III (3) II For a description of course topics see T AR 404. Graduate-level requirements include an additional performance and/or research project. May be convened with T AR 404.

505. Theatrical Engineering and Management (3) II For a description of course topics see T AR 405. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 405.

510. Methods of Teaching Creative Drama (3) I For a description of course topics see T AR 410. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 410.

514. Advanced Makeup (2) Rpt/2 I II For a description of course topics see T AR 414. Graduate-level requirements include an additional creative and/or research paper. May be convened with T AR 414.

515. Advanced Scenic Drafting (3) Rpt/2 I For a description of course topics see T AR 415. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 415.

516. Advanced Rendering (3) Rpt/3 I For a description of course topics see T AR 416. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 416.

518. Digital Imaging for the Theatre (3) I For a description of course topics see T AR 418. Graduate-level requirements include more complex designs of multiple views and lighting situations. May be convened with T AR 418.

519. Sound Design (3) Rpt/2 II For a description of course topics see T AR 419. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 419.

520. Advanced Lighting Design (3) II For a description of course topics see T AR 420. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 420.

523. Scene Painting I (3) I For a description of course topics see T AR 423. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 423.

525. Costume and Scenic Design II (3) Rpt/2 II For a description of course topics see T AR 425. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 425.

527. Advanced Stage Costume Construction I (3) Rpt/1 II For a description of course topics see T AR 427. Graduate-level requirements include an additional creative and/or
research project. May be convened with T AR 427.

528. Advanced Stage Costume Construction II (3) [Rpt./ 1] I For a description of course topics see T AR 428. Graduate-level requirements include additional projects. May be convened with T AR 428.

530. Stage Management (3) I For a description of course topics see T AR 430. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 430.

531. Audience Development (3) I For a description of course topics see T AR 431. Graduate-level requirements include an in-depth research paper or project. May be convened with T AR 431.

532. Theatre Management (3) II For a description of course topics see T AR 432. Graduate-level requirements include an in-depth research paper or project. May be convened with T AR 432.

538T. Secondary School Theatre Methods (3) I For a description of course topics see T AR 438T. Graduate-level requirements include additional text and/or book reviews. (Identical with TTE 538T). May be convened with T AR 438T.

541. Scenography (3) I The integration of scenery, costume, make-up, light and sound into a total production design.

542. Advanced Stage Lighting II (3) I For a description of course topics see T AR 442. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 442.

545. Dramaturgy (3) I II For a description of course topics see T AR 445. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 445.

546. Careers in Dance (3) II (Identical with DNC 546, which is home).

548A-548B. Period Styles (3) I For a description of course topics see T AR 448A-448B. Graduate-level requirements include additional research papers and an oral presentation. May be convened with T AR 448A-448B.

549. Acting V (3) I For a description of course topics see T AR 449. Graduate-level requirements include an additional performance and/or research project. May be convened with T AR 449.

550. Literary Resources for Choreography (3) [Rpt./ 1] II (Identical with DNC 550, which is home).

551. Acting VI (3) II For a description of course topics see T AR 451. Graduate-level requirements include an additional performance and/or research project. May be convened with T AR 451.

552. Acting VII (3) [Rpt./ 1] I For a description of course topics see T AR 452. Graduate-level requirements include an additional performance and/or research project. May be convened with T AR 452.

553. Acting VIII (3) (Identical with T AR 453. Graduate-level requirements include an additional performance and/or research project. May be convened with T AR 453.

554. Directing I (3) I For a description of course topics see T AR 454. Graduate-level requirements include an additional performance and/or research project. May be convened with T AR 454.

555. Directing II (3) II For a description of course topics see T AR 455. Graduate-level requirements include an additional performance and/or research project. May be convened with T AR 455.

560A-560B. Writing for Stage and Screen (3) I For a description of course topics see T AR 460A-460B. Graduate-level requirements include the preparation of full-length scripts for stage and motion pictures. May be convened with T AR 460A-460B.

561. Artist Collaboration (2) [Rpt./ 2] II For a description of course topics see T AR 461. Graduate-level requirements include an additional creative and/or research project. May be convened with T AR 461.

562. Collaborative Play Development (3) II For a description of course topics see T AR 462. Graduate-level requirements include serving as a performer or facilitator (depending on the audition results) and will also be assigned to documenting rehearsal and performance. (Identical with DNC 562). May be convened with T AR 462.

568. Dialects in Performance (3) II For a description of course topics see T AR 468. Graduate-level requirements include a close transcription of a selected dialect or dialects from oral presentation and a suitable analysis of the articulatory features. May be convened with T AR 468.

573. Screen Acting Techniques (3) II For a description of course topics see T AR 473. Graduate-level requirements include an additional performance and/or research project. May be convened with T AR 473.

580. Graduation Production Study I (1-3) [Rpt./ 9 units] I Advanced seminar and studio to examine the production process for designers, directors, dramaturgs and technicians. May be convened with T AR 470.

583. Post-Performance OR Technical Production (1-3) [Rpt./ 20 units] For a description of course topics see T AR 473A. May be convened with T AR 473A.

589. Workshop (1-3) [Rpt./ 20 units] For a description of course topics see T AR 473B. May be convened with T AR 473B.

590. Independent Study (1-5) [Rpt./ ]

600. Introduction to Graduate Study of Drama (3) I Methods and materials for research in theatre and drama; introduction to the bibliography of these fields; organization and form of thesis.

605. Advanced Voice and Movement for the Actor I (3) [Rpt./ 1] I Advanced study and exercise in voice and movement for the actor: relaxation, breathing, physical and vocal freedom, resonance, articulation and improvisation including the Linklater Approach. P.A., and Neutral Mask. 6S. P. audition.

606. Advanced Voice and Movement for the Actor II (3) [Rpt./ 1] II Continued advanced study and exercise in voice and movement for the actor: standard stage speech, stage dialects, period costumes, manners and movement. 6S. P. audition.

636. Shakespearean Production (3) I Advanced readings and discussion in theory and criticism, analysis of filmed and video Shakespeare, and directorial approaches to Shakespeare production in performance history.

642. Advanced Studies in Theatre History (3) [Rpt./ 1] I II Concentrated study in theatre history, with major emphasis on the physical theatre, standard scholarly works, and source materials.

644. American Theatre and Drama (3) I II Studies in the American theatre and drama. Directed and individual projects will be assigned.

646. Theories of the Theatre (3) I II Concentrated study of select topics in dramatic and performance theory, with special emphasis on modern and contemporary eras.


655. Advanced Directing I (3) I Techniques of stage directing, including play analysis, director-actor communication, director-designer communication, blocking, movement, composition; use of directorial style and the adaptation of directorial philosophies. 2R, 2S.

656. Advanced Directing II (3) I Techniques of analyzing and staging classical texts for a contemporary audience; use of directorial style...
TRADITIONS & CULTURES (TRAD)

For a listing of Traditions and Cultures courses, see the section labeled "General Education Courses" in this manual, or view the on-line catalog listing at http://catalog.arizona.edu/courses/984/GENED.html

UNIVERSITY COLLEGE

Modern Languages Building, Room 347
The University of Arizona

and the adaptation of directorial philosophies with an emphasis on staging the plays of Shakespeare. 2R, 2S. P, T AR 449, T AR 655.

693. Internship (1-6) [Rpt./]

694. Practicum (1-3) [Rpt./]

696. Seminar

a. Contemporary Trends (1-3) [Rpt./ 6 units] I II Students may earn a maximum of 9 units in T AR 696 with a maximum of 6 units in any area.

b. Special Topics in Acting (1-3) [Rpt./ 6 units] I II Students may earn a maximum of 9 units in T AR 696 with a maximum of 6 units in any area.

c. Special Topics in Directing (1-3) [Rpt./ 6 units] I II Students may earn a maximum of 9 units in T AR 696 with a maximum of 6 units in any area.

d. Musical Theater Production (1-3) [Rpt./ 6 units] I II Students may earn a maximum of 9 units in T AR 696 with a maximum of 6 units in any area.

e. Special Topics Playwrighting (3) [Rpt./ 1 unit] Students may earn a maximum of 9 units in T AR 696 with a maximum of 6 units in any area.

f. TPC Stage Costume Construction (1-3) [Rpt./ 6 units] I II Students may earn a maximum of 9 units in T AR 696 with a maximum of 6 units in any area.

g. Period Design Styles (1-3) [Rpt./ 6 units] II Students may earn a maximum of 9 units in T AR 696 with a maximum of 6 units in any area.

h. Special Topics in Costume Design (2-3) [Rpt./ 6 units] I II Students may earn a maximum of 9 units in T AR 696 with a maximum of 6 units in any area.

i. Special Topics in Theatre Education (1-3) [Rpt./ 6 units] Students may earn a maximum of 9 units in T AR 696 with a maximum of 6 units in any area.

699. Independent Study (1-5) [Rpt./]

900. Research (1-5) [Rpt./]

909. Master’s Report (1-3) [Rpt./]

910. Thesis (2-4) [Rpt./]

920. Dissertation (1-9) [Rpt./]

930. Supplementary Registration (1-9) [Rpt./]

VETERINARY SCIENCE AND MICROBIOLOGY (V SC/MIC)

Veterinary Science/Microbiology Bldg.
Rm. 202
The University of Arizona
PO Box 210090
Tucson AZ 85721-0090
Phone: (520) 621-2355
FAX: (520) 621-6366
E-mail: hilgert@ag.arizona.edu
URL: http://ag.arizona.edu/VSC/vscho home.html

Baccalaureate Degrees
Bachelor of Arts (B.A.)
Bachelor of Science in Agriculture (B.S.A.)
Graduate Degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors and Degrees
Veterinary Science (B.S.A.)
Microbiology (B.S., B.S.A.)
Pathobiology (M.S., Ph.D.)

Program requirements
For undergraduate academic program requirements consult the On Course! Academic Program Requirements Reports (APRRs). APRRs are available on line at: http://www.arizona.edu/academic/oncourse/data/interface/minors/. For graduate program requirements consult Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Microbiology (MIC)

181L. Introductory Biology Laboratory I (1) I
(Identical with MCB 181L, which is home).

181R. Introductory Biology I (3) L S (Identical with MCB 181R, which is home).

182. Introductory Biology II (4) II (Identical with ECOL, 182, which is home).

195. Colloquium

a. Great Experiments in Microbiology (1) I II
(Identical with BIOC 195A, MCB 195A).

b. Biotechnology (1) I II (Identical with BIOC 195B, which is home).
c. Society and Science (1) I II (Identical with BIOC 195C, which is home).

199H. Honors Independent Study (1-6) [Rpt./] I II

205L. Biology of Microorganisms Laboratory (1) I II Laboratory techniques in introductory microbiology. CR, MIC 205R. 

205R. Biology of Microorganisms (4) I II Introduction to the diverse lifestyles of bacteria, viruses, fungi, and protozoan parasites, their importance in the biosphere, and their roles in human and animal diseases. P, MCB 181L, MCB 181R; ECOL 182; CHEM 104A, CHEM 104B or consent of instructor.

299. Independent Study (1-3) [Rpt./]

305. Introductory Plant Pathology (3) I (Identical with PL P 305, which is home).

328. Microbial Physiology (3) I II (Identical with V SC 328, which is home). 

393. Internship (1-3) [Rpt./] I II 

399. Independent Study (1-4) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II

403L. Parasitology Laboratory (1) I (Identical with V SC 403L, which is home). May be convened with MBIM 503L.

410. Cell Biology (3) II (Identical with MCB 410, which is home).

411. Molecular Biology (3) II (Identical with MCB 411, which is home).

419. Immunology (3) I II (Identical with V SC 419, which is home).

420. Pathogenic Bacteriology (3) II (Identical with V SC 420, which is home).

421A-421B. Microbiological Techniques (3-3) I II Experiments to facilitate the development of laboratory skills in basic and applied microbiology and biotechnology with emphasis on molecular genetics and physiology. 1R, 6L. P, MIC 205R, MIC 205L. MIC421A is not a prerequisite to MIC421B. (Identical with MIC 241B, PL P 421A-421B SWES 421A-421B, V SC 421A-421B).

423. Mechanisms of Disease (4) II (Identical with V SC 423, which is home).

425. Environmental Microbiology (3) I (Identical with SWES 425, which is home).

426. Environmental Microbiology Laboratory (2) I (Identical with SWES 426, which is home).

427L. General Mycology Laboratory (2) I (Identical with PL P 427L, which is home).

427R. General Mycology (3) I (Identical with PL P 427R, which is home).

428. Microbial Genetics (3) I II (Identical with PL P 428, which is home).

429. General Virology (3) I II Essential features of the viruses, including structure, gene expression and life style. Introduction to pathogenesis with respect to humans, other animals, and plants. P, MIC 181 or MIC 205.

430. Introduction to Biophysics (2) I CDT (Identical with PHYS 430, which is home).

432. Pathogenic Virology (3) [Rpt./] I I (Identical with V SC 432, which is home).

438. Ecology of Infectious Disease (3) II (Identical with V SC 438, which is home).

440. Biodegradation of Pollutants in Soil and Groundwater (3) II (Identical with SWES 440, which is home).

443. Research Animal Methods (3) I (Identical with V SC 443, which is home).

451. Biology and Characterization of Plant Pathogenic Agents (4) II (Identical with PL P 451, which is home).

454. Host-Microbial Interactions (3) II (Identical with V SC 454, which is home).

470. Food Microbiology and Sanitation (3) II (Identical with N SC 470, which is home).

471. Food Microbiology and Sanitation Laboratory (2) I (Identical with V SC 471, which is home).

473. Recombinant DNA Methods and Applications (4) II (Identical with MCB 473, which is home).

475. Parasite Immunology (3) II (Identical with V SC 475, which is home). May be convened with MIC 575.

493. Internship (1-3) [Rpt./] I II 

494. Practicum

495. Research (3) [Rpt./] I II P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

498. Senior Capstone (1-3) I II 

498H. Honors Thesis (3) [Rpt./] I II

499. Independent Study (1-4) [Rpt./]

499H. Honors Independent Study (1-3) [Rpt./] I II

575. Parasite Immunology (3) II (Identical with V SC 575, which is home). May be convened with MIC 475.

Vernacular Science (V SC)


193. Internship (1-8) [Rpt./] I II

195. Colloquium
d. This Wormy World (1) I (Identical with MCB 195D).

235. Practicum

239. General Virology (2) II (Identical with AN S 315R, 315L, which is home).

315L. Physiology of Reproduction Laboratory (1) I (Identical with AN S 315L, which is home).

315R. Physiology of Reproduction (3) I (Identical with AN S 315R, which is home).


393. Internship (1-8) [Rpt./] I II

399. Independent Study (1-3) [Rpt./]

399H. Honors Independent Study (1-3) [Rpt./] I II

400A. Animal Anatomy and Physiology (3) I Physiology, gross and comparative anatomy; nervous, muscular, skeletal, immune, hemolympathic, circulatory, and renal systems. 400A is not a prerequisite for 400B. P, ECOL 181, V SC 182, CHEM 243A, MATH 117R/S. May be convened with V SC 500A.

400B. Animal Anatomy and Physiology (3) II Physiology, gross and comparative anatomy; respiratory, digestive, endocrine and reproductive systems. 400A is not a prerequisite for 400B. P, ECOL 181, V SC 182, CHEM 243A, MATH 117R/S. May be convened with V SC 500B.

403L. Parasitology Laboratory (1) I Parasite morphology and diagnostic laboratory techniques. P, 12 units of biology and microbiology; CR, 403R. (Identical with ECOL 403L, ENTO 403L, MIC 403L).

403R. Biology of Animal Parasites (3) I Biology of host-parasite relationships with emphasis on parasites of veterinary and human importance. Parasite morphology and physiology, life cycles, epidemiology, pathogenesis and zoonotic potential. P, 12 units of biology and microbiology. (Identical with ECOL 403R, ENTO 403R, MIC 403R). May be convened with V SC 503R.

405. Animal Diseases (3) I Survey of selected diseases of domestic animals Includes disease mechanisms, immunology and infectious agents; husbandry, management, and nutrition. May be convened with V SC 505.

419. Immunology (3) I II Basic concepts of the immune system. Presentation of the roles of antigen, immunoglobulins, complement, lymphokines and roles immune cells play in humoral and cell-mediated immunity. P, 325, CHEM 241b, 243b. (Identical with MIC 419). Honors section available for (4) honors credits. Writing-Emphasis Course.


421A-421B. Microbiological Techniques (3-3) I II (Identical with MIC 421A-MIC 421B, which is home).

423. Mechanisms of Disease (4) II Comparative pathology of animal and selected human diseases with emphasis on pathogenesis, pathophysiology, and morphologic changes at the macro-
456. Physiology Laboratory (3) II (Identical with ECOL 468, which is home). May be convened with V SC 566.

468. Comparative Physiology (3) II (Identical with ECOL 468, which is home). May be convened with V SC 566.

475. Parasite Immunology (3) II An updated understanding and review of host-parasite interactions with emphasis on host immunological mechanisms operative in the control of parasitic infection. P, V SC 403, MIC 419 or equivalent courses with consent of instructor. (Identical with MBIM 475, MCB 475, MIC 475). May be convened with V SC 575.

493. Internship (1-6) [Rpt./]

494. Practicum

499. Independent Study (1-5) [Rpt./]

500A-500B. Animal Anatomy and Physiology (3-3) For a description of course topics see V SC 400A-V SC 400B. Graduate-level requirements include two in-depth research papers on related pertinent topics in animal anatomy and/or physiology, written exams, and a final oral comprehensive exam. 500A is not prerequisite to 500B. P, ECOL 181, ECOL 182; CHEM 243a; MATH 117R/S. May be convened with V SC 500A -V SC 500B. Graduate-level requirements include an in-depth research paper on one of the lecture topics presented in the course plus research proposal preparation. (Identical with AN S 543, BIOC 543, MBIM 543). May be convened with V SC 443.

503L. Parasite Laboratory (1) I Graduate-level requirements include an in-depth research paper dealing with the differential diagnostic techniques used to identify a single parasite species. (Identical with ECOL 503L, ENTO 503L, INSC 503L, MBIM 503L).

503R. Biology of Animal Parasites (3) I For a description of course topics see V SC 403R. Graduate-level requirements include an in-depth research paper on the molecular biology/immune response of a single parasite. (Identical with ECOL 503R, ENTO 503R, INSC 503R, MBIM 503R). May be convened with V SC 403R.

505. Animal Diseases (3) I For a description of course topics see V SC 405. Graduate-level requirements include a term paper. May be convened with V SC 405.

512. Biological Electron Microscopy (4) I II (Identical with MCB 512, which is home).


520. Pathogenic Bacteriology (3) II For a description of course topics see V SC 420. For a description of course topics see 420, P, MIC 325, CHEM 241b, CHEM 243b. (Identical with MBIM 520). May be convened with V SC 420.

523. Mechanisms of Disease (5) II For a description of course topics see V SC 423. Graduate level requirements include preparation of a research proposal on a selected relevant topic and critical analysis of selected publications from the current literature. (Identical with MBIM 523, MCB 523). May be convened with V SC 423.

527. Insect Chemical Ecology (4) I (Identical with ECOL 427, which is home). May be convened with V SC 427.

529. General Virology (3) II (Identical with MBIM 529, which is home).

532. Pathogenic Virology (3) [Rpt./1] I For a description of course topics see V SC 432. Graduate-level requirements include a research term paper and class presentation. (Identical with MBIM 532). May be convened with V SC 432.

538. Ecology of Infectious Disease (3) II For a description of course topics see V SC 438. Term paper required for graduate credit. (Identical with MBIM 538). May be convened with V SC 438.

543. Research Animal Methods (3) I For a description of course topics see V SC 443. Graduate-level requirements include an in-depth research paper on one of the lecture topics presented in the course plus research project preparation. (Identical with AN S 543, BIOC 543, MBIM 543). May be convened with V SC 443.

549. Diseases of Wildlife (3) II For a description of course topics see V SC 449. Graduate-level requirements include a class presentation. (Identical with WFSC 549). May be convened with V SC 449.

550L. Medical Mycology Laboratory (2) II (Identical with MBIM 550L, which is home).

550R. Medical Mycology (2) II (Identical with MBIM 550R, which is home).

552. Medical-Veterinary Entomology (4) [Rpt./3] II (Identical with ENTO 452, which is home). May be convened with V SC 552.

554. Host-Microbial Interactions (3) II For a description of course topics see V SC 452. Graduate-level requirements include a five-page proposal. (Identical with MBIM 554). May be convened with V SC 454.

556. Aquaculture (3) II (Identical with WFSC 456, which is home). May be convened with V SC 556.

559. Comparative Vertebrate Histology (4) II For a description of course topics see V SC 459. Graduate-level requirements include a written report on a selected topic. (Identical with ECOL 559). May be convened with V SC 459.

565. Shrimp Pathology (3) [Rpt./1] S Comprehensive lectures and practical laboratory training on the current methods used to diagnose, prevent and treat the principal diseases of cultured penaeid shrimp. P, B.S., M.S. and/or D.V.M. in biological and/or medically oriented fields.
For undergraduate academic program requirements, students may consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available in college or departmental offices. APRRs are also available online at: http://www.arizona.edu/academic/ oncourse/data/interface/. Minor requirements are available online at http://www.arizona.edu/ academic/oncourse/data/interface/minors/.

For graduate program requirements consult the Graduate Catalog and the departmental office listed above.

To learn more about majors, minors, and other departmental information consult the on-line catalog or contact the department at one of the addresses above.

Women's Studies (WS)

100. Introduction to Women's Studies (3) I II
Introduction to the new information and research on women in literature, history, sociology, philosophy, anthropology, psychology, and political science; investigations of each discipline's approach to women's roles and status.

150. Sociology of Women (3) I II (Identical with SOC 150, which is home).

195. Colloquium
a. First Year Colloquium in Women's Studies (1) (Identical with ENGS 195C, which is home).

200. Women and Western Culture (3) I II
Examines the various ways in which women have been depicted in western philosophy, literature, and the arts from the classical Greek period to the present. Explores women's cultural expressions and representations of themselves.

205. Introduction to Feminist Literary Theory (3) I Introduction to the principles of feminist literary analysis through texts authored by women writers and through diverse historical writings on race, language, sexuality, creativity, class and subordination which forms the basis of feminist criticism. Within the theoretical context we will explore writing by Anglo women, women of color, and women from diverse cultural traditions. (Identical with CCLS 205).

216. Psychology of Gender (3) I II (Identical with PSYC 216, which is home).

220. Introduction to African American Studies (3) I I (Identical with AFAS 220, which is home).

225. Introduction to Women and Religion (3) I (Identical with RELI 225, which is home).

253A.-253B. History of Women in the United States (3-3) I II (Identical with HIST 253A, HIST253B which is home).

299. Independent Study (1-6) [Rpt./]

303. Gender and Language (3) I (Identical with ANTH 303, which is home).

305. Feminist Theories (3) I Explores feminist theories from various disciplines, analytical frameworks, and subject areas. Examines the construction, differentiation, and representation of the genders in different cultural settings and explores the interactions between gender systems and women's roles, statuses and experiences.

365. African-American Autobiographies: Women and Their Histories (3) I II (Identical with AFAS 365, which is home).

370, Feminist Ethics (3) I II Exploration of diverse feminist ethical languages and value systems and the enactment of these languages and values through the activisms surrounding contemporary social issues. Assignments and class discussions directed toward students' understanding various moral positions and articulation of their own positions.

311. Women and Sexuality (3) I II Examines the regulation and expressions of women's sexuality historically from the late 19th century to the present. Introduces students to some of the main theories and issues in the field of history of sexuality.

321. Women in Judaism (3) I I (Identical with JUS 321, which is home).

324. Women and Religion in the U.S. (3) I II (Identical with RELI 324, which is home).

325. Gender and Science (3) I II The history and philosophy of science; women as subjects of scientific research; women as scientists; future public policy. Students will be required to write a research paper and co-lead a class discussion.

328. Women in Russian Literature and Culture (3) I I (Identical with CLAS 330, which is home).

335. Gender and Politics (3) I II (Identical with POL 335, which is home).

342. Writers, Women and the Gods: The Caribbean Novel (3) [Rpt./ 2 I I (Identical with AFAS 342, which is home).

351A.-351B Intro to Lesbian and Gay Literature (3-3) I I (Identical with ENGL 351A-351B which is home).

373. Women's Fictions in Twentieth-Century Germany (3) I II (Identical with GER 373, which is home).

380. Nature, the Great Mother and Woman (3) I II (Identical with HUMS 380, which is home).

393. Internship (1-6) I II

396. Proseminar
h. Honors Proseminar (3) [Rpt./ 2 II Course is primarily for honors students. Repeatable if topic is different.

399. Independent Study (1-6) [Rpt./]

399H. Honors Independent Study (1-6) [Rpt./]

400. Special Topics in Women's Studies (3) [Rpt./ 1 I II Topics will vary. May be convened with W S 500.

402. Gender and Language in Japan (3) I II (Identical with JPN 402, which is home). May be convened with W S 502.

406. Gender and Social Identity (3) I (Identical with ENGL 406, which is home).

418. Women and Literature (3) [Rpt./ 1 I II (Identical with ENGL 418, which is home).
423. Representation of Gender in the Media (3) I (Identical with MAR 423, which is home).
425. Theoretical Issues in the Study of Women and Religion (3) II (Identical with RELI 425, which is home). May be convened with W S 525.
430. Lesbian/Bisexual Women's Theories/Lives/Activisms (3) I Exploration of the relationships between lesbian and bisexual women's lives and activism, and the theoretical understandings which concurrently/both arise out of and construct those lives and activism. May be convened with W S 530.
433. Feminist Political Theory (3) I (Identical with POL 433, which is home). May be convened with W S 533.
430. Lesbian/Bisexual Women's Theories/Lives/Activisms (3) I Exploration of the relationships between lesbian and bisexual women's lives and activism, and the theoretical understandings which concurrently/both arise out of and construct those lives and activism. May be convened with W S 530.
433. Feminist Political Theory (3) I (Identical with POL 433, which is home). May be convened with W S 533.
440. Engendering the Past (3) I II (Identical with ANTH 440, which is home).
444. Women and the Body (3) II Exploration of the ways that women have defined their bodies; how the representation of woman as body permeates the culture and affects women's sense of self and self-esteem. Examination of feminist theoretical analyses of women's power and the control of women's bodies. May be convened with W S 544.
445. Women in Islamic History (3) I (Identical with HIST 445, which is home). May be convened with W S 545.
446. Health and the Global Economy (3) II (Identical with GEOG 446, which is home). May be convened with W S 546.
450. American Indian Women (3) II (Identical with AIS 450, which is home).
453. History of Women and Work (3) I (Identical with HIST 453, which is home).
455. History of Women in Europe (3) I II (Identical with HIST 455, which is home). May be convened with W S 555.
458. Topics in Comparative Women's History (3) II (Identical with HIST 458, which is home).
459. Sociology of Gender (3) II (Identical with SOC 459, which is home).
461. Feminist and IR Theories (3) II (Identical with POL 461, which is home). May be convened with W S 561.
464. Women in American Architecture (3) I (Identical with ARCH 464, which is home). May be convened with W S 564.
465. Women in International Development (3) II (Identical with ANTH 465, which is home).
468. Women in China (3) I (Identical with CHN 468, which is home).
476. Women and the Law (3) I (Identical with MAP 476, which is home).
480. Men, Women and Work (3) I II (Identical with MAP 480, which is home).
481. Work, Motherhood, and Female Identity in America: 1945 to the Present (3) I History of women in the U.S. since 1945. Will explore a variety of topics including employment, sexuality, mother-hood, abortion, reproductive technologies and feminism, and explore how changes in these areas have affected diverse groups of women. Prior course work in women's studies or history helpful. (Identical with HIST 481). May be convened with W S 581.
483. Gender and African History (3) (Identical with HIST 483, which is home). May be convened with W S 583.
485. Mexicana/Chicana Women's History (3) I CDT (Identical with MAS 485, which is home). May be convened with W S 585.
487. Interpretations of Women's Health (3) I This course examines a broad array of women's health issues, with a focus on women in the U.S. The main emphasis is on the social, cultural and institutional contexts shaping health and disease patterns among different populations. The issues explored include breast and cervix cancers, AIDS, eating disorders, violence and health care. (Identical with SOC 492 and ANTH 492).
489. Women in East Asia (3) I (Identical with HIST 489, which is home).
490. Women in Middle Eastern Society (3) I (Identical with ANTH 490, which is home). May be convened with W S 590.
493. Internship (1-6) [Rpt./] I II I II
495. Honors Seminar (1-12) [Rpt./] I II
499. Contemporary Feminist Theories (3) II Introduction to contemporary feminist theories, posing and analyzing the questions that propel theorizing about women's relationships to processes of gender differentiation. By examining the assumptions about gender relations that ground theoretical positions from various disciplines, analytic traditions, and subject areas, students will be enabled to read, synthesize and critique across the spectrum of feminist theorizing. (Identical with ENGL 554).
500. Special Topics in Women's Studies (3) [Rpt./] I II For a description of course topics see W S 400. Graduate-level requirements include additional readings, a book review, and a paper. May be convened with W S 400.
502. Gender and Language in Japan (3) II (Identical with JPN 502, which is home). May be convened with W S 402.
525. Theoretical Issues in the Study of Women and Religion (3) II (Identical with RELI 525, which is home). May be convened with W S 425.
530. Lesbian/Bisexual Women's Theories/Lives/Activisms (3) I For a description of course topics see W S 430. Graduate students will be asked to do an in-class presentation of selected materials and will have the choice of writing a single, long-term paper. May be convened with W S 430.
533. Feminist Political Theory (3) I (Identical with POL 533, which is home). May be convened with W S 433.
539. History of Feminist Theory (3) I Historical grounding in woman-centered theory characteristic of Western discourse. Each reading will be placed in context with other contemporaneous relevant thinking of the human condition, including attention to race, class and difference.
540. Engendering The Past (3) I II (Identical with ANTH 540, which is home).
544. Women and the Body (3) II For a description of course topics see W S 444. Graduate-level requirements include a more comprehensive research paper and preparation of a lecture/summary on several books in the topic. May be convened with W S 444.
545. Women in Islamic History (3) I (Identical with HIST 545, which is home). May be convened with W S 445.
546. Health and the Global Economy (3) II (Identical with GEOG 546, which is home). May be convened with W S 446.
550. Modern Theories of Cultural Studies (3) I II (Identical with CCLS 550, which is home).
554. Contemporary Feminist Theories (3) II Introduction to contemporary feminist theories, posing and analyzing the questions that propel theorizing about women's relationships to processes of gender differentiation. By examining the assumptions about gender relations that ground theoretical positions from various disciplines, analytic traditions, and subject areas, students will be enabled to read, synthesize and critique across the spectrum of feminist theorizing. (Identical with ENGL 554).
555. History of Women in Europe (3) I II (Identical with HIST 555, which is home). May be convened with W S 455.
558. Gender Identities and Interactions (3) I II (Identical with SOC 558, which is home).
559. Sociology of gender and the State (3) II (Identical with SOC 559, which is home).
561. Feminist and IR Theories (3) II (Identical with POL 561, which is home). May be convened with W S 461.
564. Women in American Architecture (3) I (Identical with ARCH 564, which is home). May be convened with W S 464.
571. Counseling Woman (3) II (Identical with FS 571, which is home).
581. Work, Motherhood, and Female Identity in America: 1945 to the Present (3) I II For a description of course topics see W S 481. Graduate-level requirements include a longer more comprehensive research paper. (Identical with HIST 581). May be convened with W S 481.
583. Gender and African History (3) (Identical with HIST 583, which is home). May be convened with W S 483.
584. Feminist Research Methodologies (3) II Considers some epistemological assumptions underlying research and theoretical projects of traditional disciplines; explores feminist adaptations and critiques of these assumptions.
585. Mexicana/Chicana Women's History (3) I (Identical with MAS 585, which is home). May be convened with W S 485.
586. Gender, Difference, and Power (3) I Focuses on gender as it has intersected in varied ways with other cultural distinctions of difference based on class, race, sexual identity, and religion.
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590. Women in Middle Eastern Society (3) I
(Identical with ANTH 590, which is home). May be convened with W S 490.

591. Preceptorship (1)

593. Internship (1-6) I II

596. Seminar
  a. Women's Studies (3) [Rpt./ 2] I II May be convened with 496a.
  c. Women and the Literature of Identity in Modern Middle East and North Africa (3) II
     (Identical with HIST 596C, which is home). May be convened with W S 496C.
  r. Research in Women's Studies (3) [Rpt./ 1] I II
  w. Women's Studies (3) [Rpt./ 2] I II (Identical with ENGL 596W, which is home).

599. Independent Study (1-6) [Rpt./] I II

606. Women's Health in the United States (3)
II (Identical with ANTH 606, which is home).

695. Colloquium
  b. The Jurisprudence of Gender and Race (2)
     I (Identical with LAW 695B, which is home).
  e. Advanced Studies in the History of Women (3) [Rpt./ 10] I II GRD (Identical with HIST 695E, which is home).

696. Seminar
  n. Comparative Women's History (3) [Rpt./ 4]
     II (Identical with HIST 696N, which is home).

699. Independent Study (1-6)

799. Independent Study (1-6)

910. Thesis (1-3)

930. Supplementary Registration (1-9)
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