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**ACADEMIC CALENDAR 1997-98**

**First Semester**

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<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>Applications for bachelor’s degree candidacy must be filed for degrees to be awarded at close of the following summer session</td>
<td>Aug. 1 Friday</td>
</tr>
<tr>
<td>Degrees awarded as of this date for students completing requirements at close of summer session</td>
<td>Aug. 14 Thursday</td>
</tr>
<tr>
<td>Residence halls open</td>
<td>Aug. 21 Thursday</td>
</tr>
<tr>
<td>New-student orientation program (Last session)</td>
<td>Aug. 21-22 Thursday-Friday</td>
</tr>
<tr>
<td>New Student Convocation</td>
<td>Aug. 22 Friday</td>
</tr>
<tr>
<td>Classes begin</td>
<td>Aug. 25 Monday</td>
</tr>
<tr>
<td>Labor Day—no classes</td>
<td>Sept. 1 Monday</td>
</tr>
<tr>
<td>Last day of registration for credit</td>
<td>Sept. 2 Tuesday</td>
</tr>
<tr>
<td>Last day for dropping courses with deletion of course enrollment from record</td>
<td>Sept. 19 Friday</td>
</tr>
<tr>
<td>Honors Convocations—no classes 3:00-5:00p.m. (Family Weekend)</td>
<td>Oct. 17 Friday (tentative)</td>
</tr>
<tr>
<td>Last day for dropping courses</td>
<td>Oct. 17 Friday</td>
</tr>
<tr>
<td>Veterans’ Day—no classes</td>
<td>Nov. 11 Tuesday</td>
</tr>
<tr>
<td>Thanksgiving recess</td>
<td>Nov. 27-30 Thursday-Sunday</td>
</tr>
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</table>

**Second Semester**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications for bachelor’s degree candidacy must be filed for degrees to be awarded at close of the following fall session</td>
<td>Dec. 1 Monday</td>
</tr>
<tr>
<td>Classes and laboratory sessions end</td>
<td>Dec. 10 Wednesday</td>
</tr>
<tr>
<td>Semester examinations begin</td>
<td>Dec. 12 Friday</td>
</tr>
<tr>
<td>Semester examinations end</td>
<td>Dec. 19 Friday</td>
</tr>
<tr>
<td>Residence halls close</td>
<td>Dec. 20 Saturday</td>
</tr>
<tr>
<td>Winter Commencement</td>
<td>Dec. 20 Saturday</td>
</tr>
<tr>
<td>Class and laboratory sessions end for Presession</td>
<td>May 1 Friday</td>
</tr>
<tr>
<td>Memorial Day Holiday—no classes</td>
<td>May 6 Wednesday</td>
</tr>
<tr>
<td>First Summer Session</td>
<td>May 8 Friday</td>
</tr>
<tr>
<td>Independence Day Holiday—no classes</td>
<td>May 15 Friday</td>
</tr>
<tr>
<td>First session classes and examinations end</td>
<td>May 16 Saturday</td>
</tr>
<tr>
<td>Second Summer Session</td>
<td>May 16 Saturday</td>
</tr>
<tr>
<td>Class and examinations end for first session</td>
<td>Jun. 8 Monday</td>
</tr>
<tr>
<td>Independence Day Holiday—no classes</td>
<td>Jun. 10 Wednesday</td>
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<tr>
<td>First session classes and examinations end</td>
<td>Jul. 3 Friday</td>
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<tr>
<td>Summer Session</td>
<td>Jul. 9 Thursday</td>
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<tr>
<td>Class and examinations end for second session</td>
<td>Jul. 13 Monday</td>
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<tr>
<td>Independence Day Holiday—no classes</td>
<td>Jul. 15 Wednesday</td>
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<tr>
<td>Second session classes and examinations end</td>
<td>Aug. 12 Wednesday</td>
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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 arrange to 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. For this reason it is important for each student to be acquainted with and remain currently informed about all policies, and to be responsible for completing requirements.

The electronic catalog, found at http://catalog.arizona.edu is the University's official, comprehensive source of departmental, college and university-wide information related to academic programs. 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.

The General Academic Manual provides information excerpted from the electronic catalog. This 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 electronic catalog, from On Course! Academic Program Requirements Reports (APRRs) at http://www.arizona.edu/academic/oncourse/aprr.html, 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 section 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.

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

Admissions & Registration Information
This section provides information regarding admission and registration policies that apply to continuing students. For other information about admissions and registration, contact the Office of Admissions & New Student Enrollment or the Registrar's Office.

Academic Policies & 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/

Colleges, Departments & Courses of Instruction
This section lists the degrees and majors administered by each college and department, and provides essential information for course selection.

Permanent courses which were approved at the time of printing of this manual 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, and a description of 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 through offering temporary courses. These courses are listed as part of the department offerings in the Schedule of Classes each term. You must consult the offering department if you wish a description of these courses. (Temporary courses are entirely comparable to permanent courses in meeting any requirements for which they are appropriate).

Familiarity with this section can be of enormous assistance in helping you select courses as well as assisting you to become aware of the vast scope of course work available to enrich your study at The University of Arizona.

For the most current listing of approved courses, consult the electronic catalog at http://catalog.arizona.edu/.
GENERAL INFORMATION

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 The University of Arizona. Students are advised to 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 UA 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. Non-credit 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.

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.

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 with and who 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. The University 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.

Office of Affirmative Action
The University of Arizona
888 N. Euclid, Rm. 217
Tucson, AZ 85721
(520) 621-3081

Policy on the Accommodation of Religious Observance and Practice
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. Administrators and faculty members are expected to reasonably accommodate individual religious practices. Refusal to accommodate is justified only when undue hardship would result from any available alternative of reasonable accommodation.

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.

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 insure 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).

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 the center, The University of Arizona, PO Box 210021, Tucson, AZ 85721-0021.

On Course!
On Course! is a computerized degree audit system which evaluates a student’s progress toward graduation. It produces two 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, and for UA students who first registered in summer 1993 or later.

APRRs are available electronically at http://www.arizona.edu/academic/oncourse/aprr.html, or from your college advisor. A student may request a copy of his or her SAPR through Student Link at http://www.arizona.edu:1080/sis.

Student Link
Student Link, at: http://arizona.edu:1080/sis is a group of services that gives students access to their own computerized records. Students access their information by using their student identification and personal identification numbers. These services include addresses, class schedules, course availability, grades, and financial aid award status. Future plans are to provide additional services.

Currently, student information is available for inquiry only 8:00 a.m. - 6:00 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. It is also available on-line at: http://www.arizona.edu/cgi-bin/schedule/schedule-entry.pl

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

The University of Arizona electronic catalog and the Schedule of Classes are available through UAInfo. 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. For information on accessing UAInfo, call the Center for Computing & Information Technology (CCIT) Help Desk at 621-HELP.

The Catalog is Going On line
The University of Arizona is putting its general catalog on line during the spring 1997 semester. You can reach it through the World Wide Web at http://catalog.arizona.edu

What's so special about the new on-line catalog?
- It's organized to best meet the needs of different audiences. There are two views into the catalog. One is for students already enrolled at The University of Arizona. The information they see is specific to them and is based on their catalog year, degree and major. This "personal" view of the catalog's academic requirements helps a student find information relevant to their academic career. The second view of the catalog is for everyone else, from students considering the University to advisors.
- New information can be added regularly, like future course offerings and changes in University policy. This will help students plan because they will know what classes are going to be available in the future and what courses are changing.
- The catalog can be searched, which will help students and advisors easily find all the information they need.
DEFINITIONS

The following statements are brief definitions of selected terms which are frequently used in this manual. 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.

APRR: Academic Program Requirements Reports (APRRs) display the requirements and approved courses for each undergraduate program at the University. APRRs are available through the electronic catalog or directly at http://www.arizona.edu/academic/oncourse/aprr.html.

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 objectives of general education programs are shared across all colleges although individual colleges designate the courses and number of units required in each general education area.

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 requiring fewer units than the major.

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

Residence Credit: The University does not distinguish its credit offerings according to residence and non-residence 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 request a SAPR through Student Link, at http://www.arizona.edu:1080/sis.

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. 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

At the time this manual was being edited, a proposal for a university-wide general education structure was under faculty review. If adopted, the new program will replace current undergraduate general education requirements. In anticipation of this change, several courses have been approved as pilot courses for the proposed university-wide program. These courses may also be used to satisfy current general education requirements. For information regarding the term of offering, the requirements which these courses satisfy, and other registration information, see the Schedule of Classes. A list of current pilot courses arranged according to study area follows.

Tier One Pilot Courses

Traditions & Cultures

AFAS (African American Studies) 122. Introduction to African Diaspora: Religion and Culture
ARH (Art History) 110. Art in Society
CHN (Chinese) 174. Chinese Civilization
CLAS (Classics) 150. In the Beginnings
CLAS (Classics) 221. The Classical Traditions
EAS (East Asian Studies) 150. The Worlds of Buddhism
ENGL (English) 150a. Books in Dialog: Classical and Medieval
ENGL (English) 150b. Books in Dialog: Early Modern and American
ENGR (Engineering) 109. Technology & Society: An Historical Perspective
PHIL (Philosophy) 122. Mind, Matter and God
PHIL (Philosophy) 123. Western Civilization: Science and Inquiry
RELI (Religious Studies) 120. Comparative Religion
SPAN (Spanish) 111. The Arts and Politics in Latin America
T & C (Traditions and Cultures) 101. Traditions and Cultures: Non-Western
T & C (Traditions and Cultures) 102a. Traditions and Cultures: Ancient Times to the Renaissance
T & C (Traditions and Cultures) 102b. Traditions and Cultures: The Renaissance to the Present
T & C (Traditions and Cultures) 103. Traditions and Cultures: Topics in Culture

Individuals & Societies

I&S (Individuals & Societies) 101. Individuals & Societies: Individuals
I&S (Individuals & Societies) 102. Individuals & Societies: Societies
RNR (Renewable Natural Resources) 105. American Design on the Land

Natural Sciences

ASTR (Astronomy) 103. Life in the Universe
GEOS/HWR (Geosciences/Hydrology and Water Resources) 107a. Introduction to Global Change
MNE (Mining Engineering) 120. Mineral Resources, Geotechnology and the Environment
NSC (Natural Sciences) 101. Natural Sciences: Physical Sciences
NSC (Natural Sciences) 102. Natural Sciences: Biological Sciences
NSC (Natural Sciences) 105. Natural Sciences: Planetary and Geological Sciences
PTYS 105a. The Universe and Humanity

Tier Two Pilot Courses

Individuals & Societies

AGTM 380. Global Agriculture & International Relations
GER 274. The Dialogue of the Sexes: Women & Men in German Society

Arts

JPN 245. Popular Culture in Japan

Humanities

FREN 280. Introduction to French Language, Linguistics and Culture
ITAL 250a/b/c/d. Italian Literature in Translation
ITAL 330b. Italian Americana, Fiction and Film: Crossing Oceans
JPN 220. Japanese Religion
ORGANIZATION OF ACADEMIC UNITS

Fifteen colleges comprise the academic units 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 for determination of requirements for majors. The academic programs and courses offered by the University through its various units are listed 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.

College of Agriculture
  School of Family and 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 and Policy

College of Education

College of Engineering and Mines
  College of Fine Arts
    School of Music and 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
  School of Health Related Professions

University College

Graduate College
  Graduate Interdisciplinary Programs
  General Divisions

Military Aerospace Studies, Military Science, and Naval Science
ADMISSIONS AND REGISTRATION INFORMATION

ADMISSIONS

For information about admissions policies and procedures, contact the Office of Admissions and New Student Enrollment, The University of Arizona, PO Box 210040, Tucson, AZ 85721, (520) 621-3237, FAX: 621-9799, e-mail: APPINFO@arizona.edu, URL: http://w3.admissions.arizona.edu/admissions.

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.

High School Deficiencies

The deficiencies must be made up within one calendar year of the date of first enrollment, either by additional high school courses or by college courses. Students who fail to remove deficiencies within one calendar year of the date of their first enrollment will not be permitted to register for future terms. Academic competency requirements may also be met by obtaining a specified score on the Scholastic Aptitude Test (SAT), the ATP Achievement Tests, or the American College Test (ACT).

Credits from Community Colleges

While there is no limit to the total number of units of course work that may be transferred from an accredited community college to The University of Arizona, no more than 72 of those units may be applied toward the requirements for a bachelor's degree. The choice of the 72 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.

The Transfer General Education Core Curriculum (TGECC)

The Arizona public community colleges and The University of Arizona have agreed upon a common structure for a general education core curriculum. This common agreement is called the Transfer General Education Core Curriculum (TGECC). The TGECC is composed of a minimum of 41 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 TGECC. Completing the TGECC 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. In order to complete a degree program efficiently, students should select courses to meet the TGECC requirements that will also fulfill program requirements in the college and major they intend to pursue upon transfer. The requirements for the TGECC are available through the Arizona community college advising center.

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. Students should refer to the community college catalogs for descriptions of the courses listed in the Transfer Guides.

Transferability 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 which 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.

Applying for Readmission

- Students absent from the University for a regular semester or longer must reapply.
- Students who have attended other institutions and all international students (non-immigrants), should contact the Office of Admissions and New Student Enrollment to reapply.
- Students who have attended other institutions since last attendance at the University must submit official transcripts of all courses completed prior to review of the readmission application. Transcripts should be sent to the Office of Admissions and New Student Enrollment.
- Students planning to enroll in a new college must obtain written approval from the college dean prior to readmission.
- 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 through the Office of Admissions and New Student Enrollment.

**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**
- 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.
- 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.
- 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**
Beginning fall semester 1996-97, 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.

**Registration Deadline**
Students must be registered by the end of the fifth week of classes. No late registrations will be accepted after this date. Registration is not complete until registration fees, and tuition if appropriate, are paid. Failure to pay by the 21st day will result in the student being allowed to enroll, even if the student has been attending classes.

Late registration after this date will not be accepted unless the student submits a written appeal to the Registrar and can document extenuating circumstances such as medical problems (physically incapacitated and not able to be present), legal problems, or some other academic commitment which precluded enrolling prior to the 21st day (study abroad, coop in absentia registration). See the calendar for the academic year in the front of this manual.

**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 non-refundable late payment fee. Students who fail to register prior to the first day of class will be assessed an additional late registration fee.

**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 course instructors approve.

**Release of Information**
The University complies with all provisions of the Family Educational Rights and Privacy Act of 1974 dealing with the release of educational records. A copy of the University'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 withdrawals filed by the end of the fifth week of classes result in cancellation of registration in the course. Course withdrawals filed from the end of the fourth week of classes until the end of the eighth week of classes are subject to rules set forth in the section “Withdrawal Grade” under Academic Policies and Graduation Requirements in this manual.
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 Graduate Council (in the case of graduate students) or by the Dean of Students (in the case of students withdrawing completely from the University). 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. The change of college will be effective for the current term if filed within the first four weeks of classes during a regular semester. If filed after that date, the change of college will be effective the following semester.
ACADEMIC POLICIES AND GRADUATION REQUIREMENTS

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 extension of incomplete grade, choice of catalog, and 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.

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. Attempts 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 ten 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 are considered to be making normal progress toward a degree if their cumulative grade-point average for all work attempted at The University of Arizona 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</th>
<th>Minimum GPA based upon University Credit at the UA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fewer than 14 units</td>
<td>1.750</td>
</tr>
<tr>
<td>From 14 to 26 units</td>
<td>1.840</td>
</tr>
<tr>
<td>27 or more units</td>
<td>2.000</td>
</tr>
<tr>
<td>Graduate students</td>
<td>3.000</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 in the table above listed under “Minimum G.P.A.”
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 disqualified from the University may not take University of Arizona 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
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 student 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 require 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 requires 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. During the summer session, however, 6 units of credit might be given over 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. Considerable deviation in excess of these requirements may occur, particularly at the graduate level.

PROFICIENCY AND EXEMPTION EXAMINATIONS, CREDIT BY EXAMINATION
Students may establish credit or proficiency in various disciplines under any of several modes. They are:
- The Advanced Placement Program administered by the College Board;
- The Higher Level Examinations of the International Baccalaureate;
- The College-Level Examination Program (CLEP), also administered by the College Board;
- Departmental exemption or proficiency examinations;
- 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 Examinations  
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 the various proficiency examinations.

At the discretion of the department, the proficiency examination may include laboratory projects or other evidence of satisfactory skills in addition to or instead of the written examination. A fee is normally charged for these examinations.

Foreign Language Proficiency Examinations  
It is possible for students to satisfy language requirements in whole or in part by passing a noncredit proficiency 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 courses taken during the years equivalent to the United States college years.  

Passing the proficiency examination at the required level in a foreign language fulfills the language requirement in colleges requiring a foreign language. 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. Passing an exemption or proficiency examination does not 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 must contact the Department of Linguistics, Douglass 200 E, The University of Arizona, PO Box 210028, Tucson, AZ 85721-0028, (520) 621-6897, FAX: (520) 621-9014, e-mail: admin@linguistics.arizona.edu.

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 are 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 are 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-point 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 grade-point average.

Limitations  
1. The credit earned by examination 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 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 Advanced Placement program.

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

The following is a list of the Advanced Placement examinations offered and their course equivalents at the University:

<table>
<thead>
<tr>
<th><strong>AP EXAMS</strong></th>
<th><strong>Grades</strong></th>
<th><strong>Courses</strong></th>
<th><strong>Credit</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AMERICAN HISTORY</strong></td>
<td>4 or 5</td>
<td>HIST 106 &amp; 107</td>
<td>6 Units</td>
</tr>
<tr>
<td></td>
<td>1, 2 or 3</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>ART (STUDIO)</strong></td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>ART HISTORY</strong></td>
<td>4 or 5</td>
<td>HIST 106 &amp; 107</td>
<td>6 Units</td>
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<tr>
<td></td>
<td>1, 2 or 3</td>
<td>None</td>
<td>None</td>
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<tr>
<td><strong>BIOLOGY</strong></td>
<td>4 or 5</td>
<td>ECOL lower-division credit</td>
<td>8 Units</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>ECOL lower-division credit</td>
<td>4 Units</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Placement by department</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Placement by department</td>
<td>None</td>
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<tr>
<td><strong>CHEMISTRY</strong></td>
<td>4 or 5</td>
<td>CHEM 103a-103b, 104a-104b</td>
<td>8 Units</td>
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<tr>
<td></td>
<td>3</td>
<td>CHEM 104a-104b</td>
<td>4 Units</td>
</tr>
<tr>
<td></td>
<td>1 or 2</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>COMPUTER SCIENCE A</strong></td>
<td>3, 4 or 5</td>
<td>CSC lower-division credit or MIS 111</td>
<td>3 Units</td>
</tr>
<tr>
<td></td>
<td>1 or 2</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>COMPUTER SCIENCE AB</strong></td>
<td>5</td>
<td>CSC 227</td>
<td>3 Units</td>
</tr>
<tr>
<td></td>
<td>3 or 4</td>
<td>CSC lower division</td>
<td>3 Units</td>
</tr>
</tbody>
</table>

**ECONOMICS-MICROECONOMICS**

| 4 or 5 | ECON 201a | 3 Units |
| 1, 2 or 3 | None | None |

**MACROECONOMICS**

| 4 or 5 | ECON 201b | 3 Units |
| 1, 2 or 3 | None | None |

**ENGLISH LITERATURE/COMPOSITION**

| 4 or 5 | Engl Comp 1- lower-division credit | 6 Units |
| 1, 2 or 3 | None | None |

1 A combination of AP composition credit and credit for English 10911 with a grade of C or better satisfies the University freshman-composition requirement. Credit can be earned in either English Literature/Composition or English Language/Composition but not both.

**EUROPEAN HISTORY**

| 4 or 5 | HIST 101 & 102 | 6 Units |
| 1, 2 or 3 | None | None |

**FRENCH LANGUAGE**

| 5 | FREN 201, 202, 305a-305b | 14 Units |
| 4 | FREN 201, 202, 305 | 11 Units |
| 3 | FREN 201, 202 | 8 Units |
| 2 | Proficiency met at 16-unit level | None |
| 1 | None | None |

**FRENCH LITERATURE**

| 5 | FREN 201, 202, 350, 401 | 14 Units |
| 4 | FREN 201, 202, 350 | 11 Units |
| 3 | FREN 201, 202 | 8 Units |
| 2 | Proficiency met at 16-unit level | None |
| 1 | None | None |

**GERMAN**

| 5 | GER 101, 102, 291, 202 | 22 Units |
| 3 or 4 | GER 101, 102, 201 | 16 Units |
LATIN: VIRGIL & CATO/HORACE
4 or 5 LAT 201, 202, 250 4 Units
3 Advanced Placement: Automatic satisfaction of the foreign language requirement None
1 or 2 None None None

SPANISH LANGUAGE*
5 SPAN 201, 202, & 6 upper-division credits 14 Units
4 SPAN 201, 202, & 3 upper-division credits 11 Units
3 SPAN 201, 202, & 8 upper-division credits 14 Units
2 Placement at 202 level None None None
1 None None None

SPANISH LITERATURE*
5 SPAN 201, 202, & 6 upper-division credits 14 Units
4 SPAN 201, 202, & 3 upper-division credits 11 Units
3 SPAN 201, 202, & 8 upper-division credits 14 Units
2 Placement at 202 level None None None
1 None None None

MUSIC THEORY
5 MUS 130a - 130b 4 Units
4 MUS 130a 2 Units
3 MUS 107 3 Units
1 or 2 None None None

PSYCHOLOGY
4 or 5 PSYC 101 3 Units

* If a student earns a grade of 5 in both the Spanish language exam and the Spanish literature exam, credit will be given for SPAN 201, 202, 250, and for 6 units of upper division literature credit for a total of 17 units. If a student earns a grade of 5 in the language examination and a 4 in the literature examination, credit will be given for SPAN 201, 202, 250, and for 3 units of upper division literature, for a total of 14 units. If a student earns a grade of 4 in both the Spanish language exam and the Spanish literature exam, credit will be given for SPAN 201, 202, 250, and 3 units of upper division Spanish literature, for a total of 14 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 advisors or the offices' of their college deans for more information.

All CLEP examinations are available through the Testing Office, Old Main 222, The University of Arizona, PO Box 210021, Tucson, AZ 85721-0021, (520) 621-7589, FAX: (520) 621-3993. A limited list of CLEP examinations is available also through the testing centers at Arizona State University and Northern Arizona University. Resident students at The University of Arizona should contact the Testing Office for additional information.

The University of Arizona 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 examinations:

1) English Composition: 6 units; (2) Mathematics: 3 units; (3) Social Sciences/History: 6 units; (4) Humanities: 4 units.

A score of 565 on the General Exam in Natural Science will earn 6 units of science credit; a score of 530 will earn 3 units of science credit.

From 3 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.

COURSES UNITS
American Government 3
American History I (Early Colonization to 1877) 3
American History II (1865 to Present) 3
American Literature 6
Analysis & Interpretation of Literature 6
Calculus w/Elementary Functions 3
College Algebra 3
College Algebra/Trigonometry 5
simply as CR (credit), and may not necessarily be stated in terms of a specific course equivalent. No record is made of failing scores.

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 regarding class absences. Excessive or extended absence 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. If the student is administratively dropped after the end of the fourth week of classes, it will result in a failing grade being awarded in that course.

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 have a file of such reports available to instructors upon request.

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 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 contact that college.

College or School | Units
---|---
Agriculture | 19
Architecture | 19
Business & Public Administration | 19
Education | 19
Engineering and Mines | 19
Fine Arts | 19
Graduate | 16
Humanities | 19
Law | 17
Nursing | 19
Pharmacy | 19
School of Health Rel. Professions | 19
Science | 19
Social and Behavioral Sciences | 19
University | 19

Class Standing
Class standing in the various colleges and schools, based upon the number of units completed, is given in the table below. A student’s class standing does not necessarily relate to the number of semesters or units required to complete degree requirements. For Class Standing criteria for the Colleges of Medicine and Pharmacy please consult those colleges.

College | Units completed
---|---
Agriculture | Freshman 01-25  Sophomore 26-57  Junior 58-90  Senior 91+
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.

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 scheduled examination time 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.
First-Year Composition

All students working toward degrees must meet the first-year composition requirement by completing one of the following sequences: ENGL 100-101-102, ENGL 101-102, ENGL 103H-104H, ENGL 106-107-108, ENGL 107-108, ENGL 109H.

There is no exemption from the first-year composition requirement; any substitutes must be approved by the Director of Composition, Department of English. The first-year composition requirement may not be satisfied by correspondence work.

Placement in first-year composition takes into account the student’s performance on two examinations: (1) A written placement essay administered at the time a student first registers for a course in composition, and (2) the English section of the American College Test (ACT) or the verbal score on the Scholastic Aptitude Test (SAT). Both examinations require fees.

Students with superior ratings based on the above examinations enroll initially in ENGL 103H. Students whose scores indicate a need for more extensive instruction in writing initially enroll in ENGL 100 and pass this course before they enroll in ENGL 101.

International students write a placement essay and submit a score on the Test of English as a Foreign Language. Students whose scores indicate a need for more extensive instruction in writing initially enroll in ENGL 100 and pass this course before they enroll in ENGL 101. Placement in lower division writing emphasis courses is satisfactory performance on the Upper- Division Writing- Proficiency Examination, which is a prerequisite to enrolling in a writing- emphasis course. Writing- emphasis courses includes at least one required writing- emphasis course. Writing- emphasis courses are regular junior or senior level courses in an academic discipline in which at least half the grade awarded is determined by written work appropriate to the academic discipline. Such courses are identified with the phrase “writing- emphasis course” at the end of the course description.

Prerequisite to a writing- emphasis course is satisfactory performance on the Upper- Division Writing- Proficiency Examination or, in the case of students whose examinations are evaluated as unsatisfactory, further developmental work in writing, as prescribed by an academic advisor.

University Requirements in Mathematics:

Mathematics Readiness Test
Prior to taking any mathematics course below the level of 125b at The University of Arizona, students must take the math readiness test. The test is administered by the Testing Office in Old Main and the results are valid for one year. Students without University Credit in the prerequisites for 118, 119, 121, 122, 123, 124, or 125a will be required to have an appropriate score on the math readiness test to be enrolled in those courses.

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 (Special P/F grade)
S Superior (Special S/P grade)
I Incomplete
K Course in progress
W Approved withdrawal
O Audit
Y No grade submitted
CR Credit
*S included in calculation of the grade-point average.

All medical students are graded on a 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 the “Colleges, Departments and Courses of Instruction” section of this manual.

For the grading systems available in Honors individual studies courses (199H, 299H, 399H, 499H, and 499H), see the “Honors Center” entry 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 toward their degree. 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 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 information about grading policies as they apply to graduate students, contact the Graduate College or 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 should 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
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 W may also be awarded in the case of complete withdrawal from the University.

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
A Y grade on a student's transcript indicates that the course instructor did not submit a grade for that student.

Averaging of Grades
For the purpose of computing grade-point averages, grade points are assigned to each grade as follows: A, 4 points for each semester unit; 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 (1) 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 to be 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 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, but may only be eligible for grade replacement once.

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
Undergraduates who have not received a bachelor’s degree from the University may repeat 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 the semester or the first week of a summer term, Premession, 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. Grades of O or W will count as an attempt, but will not replace the original grade. A repeated course will replace only one previous grade. Units earned will not be affected by this policy, but duplicate units cannot apply towards a degree program. Credit by Exam, Grade by Exam, Correspondence Courses, and courses originally taken for Pass/Fail are not allowed to be repeated.

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 timelines 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, students should 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 final. 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 shall 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 formulate an appeal in writing, and submit copies to the instructor and 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, how the grade in question was determined, and any 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 to confer with each. The department head, who does not have the author-
ity 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 need not 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, readress 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.

<table>
<thead>
<tr>
<th>GRADE APPEAL TIMETABLE</th>
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<tbody>
<tr>
<td>Prior to:</td>
</tr>
<tr>
<td>Week 5</td>
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<tr>
<td>Week 7</td>
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<td>Week 8</td>
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<td>Week 10</td>
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<td>Week 11</td>
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<td>Week 15</td>
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**GRADUATION AVERAGES AND CREDIT REQUIREMENTS**

**Graduation Average**
A graduation average of 2.000 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 average is based only on University Credit.

**Major Average**
Majors for undergraduate degrees require an average of 2.000 or better for all University Credit work undertaken in the major field or for any work satisfied by the Special Examination for Grade.

**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-average requirements, may apply as the final course to complete the degree, a single one-semester course either 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 2.000 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 (APRR) for that major. APRRs may be accessed through the electronic catalog or directly at http://www.arizona.edu/academic/oncourse/aprr.html.

**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.

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 the Academic Records and Graduation Services Office, Administration 305, according to the following schedule:

<table>
<thead>
<tr>
<th>Date of Degree</th>
<th>Application filed no later than:</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</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>

Students must take the Upper-Division Writing-Proficiency Examination prior to filing for degree candidacy. Late applications will not be accepted after the last official day to register for credit for the semester or term immediately preceding the semester or term in which the degree is to be awarded.

Changes In Degree-Application Information
Once a degree application has been filed, applicants are required to notify the Academic Records and Graduation Services Office promptly of subsequent changes in the following information: (1) anticipated date of graduation; (2) degree, major, minor, catalog being used; (3) name, local address and telephone number, permanent address. Failure to notify the office of such changes 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 find it necessary to leave The University of Arizona and complete final course requirements through correspondence or transfer work must 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 University of Arizona 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 obtain transcripts, diplomas, or certificate of degree. The university may obtain transcripts, diplomas, or certificate of degree if the delinquent obligation is $25 or less.

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 or certificates. The University of Arizona supports academic achievement and is pleased to recognize and reward 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.

Dean’s List with Distinction is based on at least 15 units and a 4.000 grade-point average.

Dean’s List is based on at least 15 units and a grade-point average of 3.500-3.999.

Honorable Mention is based on at least 12 units of a 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.

Highest Academic Distinction is based on at least 30 units and a 4.000 grade-point average.

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

Students awarded these academic honors receive a certificate 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 part of the official record, is awarded upon graduation and appears on the transcript and diploma of the recipient.

Summa Cum Laude is awarded to candidates whose grade-point average is 3.900 or higher.

Magna Cum Laude is awarded to candidates whose grade-point average is 3.700-3.899.

Cum Laude is awarded to candidates whose grade-point average is 3.500-3.699.

To be eligible for distinction at graduation, bachelor’s degree candidates must have completed at least 60 units in undergraduate residence at The University of Arizona, with letter grades that carry a point value in a minimum of 45 units.

Also, in computing the above grade-point averages, only work for University credit is considered.

For Juris Doctor degrees, summa cum laude is awarded to candidates whose grade-point average is 3.5 or higher; magna cum laude, to candidates whose average is 3.499 to 3.250; cum laude, to candidates whose average is 3.249 to 3.000.

In computing these averages, only work carrying University credit and applicable to the Juris Doctor degree is considered. To be eligible for distinction at graduation, Juris Doctor degree candidates must have completed at least 40 units of such work.

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 the 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 the University is defined as leaving the University by dropping all classes after having paid registration fees. 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.

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 8 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.
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 college. 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.] 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. Fee.

Explanation:
406. Course number.
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 6 units of credit. It is the student’s responsibility to ensure that course content is not duplicated.

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

Critical review of modern . . . 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 and Mines uses the abbreviations ED and ES to designate the number of units in the areas of “engineering design” and “engineering science”. Thus ED, 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.
Fee Special course fees apply.

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

COURSE 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.


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

500-599: Graduate courses. Open to exceptions well-qualified seniors with 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-numbered courses comprise 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.

Special senior-level undergraduate research or project courses are identified (1) for students pursuing majors which require a synthesizing project or paper as a part of completion of the major and (2) for completion of an Honors thesis. These courses are designated as 498 and 498H respectively.

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.

498H. Honors Thesis (3) [Rpt./6 units]. An honors thesis is required of all the students graduating with honors. Students ordinarily sign up for this course as a two-semester sequence. The first semester the student performs research supervised by a faculty member; the second semester the student writes an honors thesis.

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

Small group courses are identified by numbers ending in 95, 96, and 97. The study area of such courses is indicated through a subscript and subtitle.

195, 295, 395, 495, 595, 695, 795. Colloquium (Credit varies) The exchange of scholarly information and/or secondary research, usually in a small group setting. Instruction often includes lectures by several different persons. Research projects may or may not be required.


(595, 695, 795) A, B, C, D, E, I, S/P*, W.

Freshmen should note that courses numbered 195 are part of a special First Year Colloquium series, designed to give students insight into the concepts and practices which typify different academic disciplines. First-year colloquia introduce students to the methods and standards of the discipline for discovering new knowledge, the values which characterize the field of study, advances in the field, impact on society, and career opportunities.

196, 296, 396. Proseminar and 496, 596, 696, 796. Seminar

(Credit varies) The development and exchange of scholarly information, usually in a small group setting. The scope of work shall consist of research by course registrants, with the exchange of the results of such research through discussion, reports, and/or papers.

Grades Available: (196, 296, 396, 496) A, B, C, D, E, I, P/F, S/P*, W.

(596, 696, 796) A, B, C, D, E, I, S/P*, W.

197, 297, 397, 497, 597, 697, 797. Workshop (Credit varies) The practical application of theoretical learning within a group setting, involving an exchange of ideas, practical methods, skills, and principles.

Grades Available: (197, 297, 397, 497) A, B, C, D, E, I, P/F, W.

(597, 697, 797) A, B, C, D, E, I, W.

*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.
Preceptorship (Credit varies) Specialized work, consisting of individual 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.

Internship (Credit varies) Specialized work, consisting of individual training and practice in actual service in a technical, business, or governmental establishment.

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

Legislative Internship [493 (12), 593 (9)] 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.

Practicum (Credit varies) The practical application, on an individual basis, of previously studied theory and data collection for future theoretical interpretation.

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

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.

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

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

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

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

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.

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.

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

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

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.

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

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

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.
COLLEGE OF AGRICULTURE
Forbes Building, Room 211
The University of Arizona
PO Box 210036
Tucson, AZ 85721-0036
Phone: (520) 621-3611; FAX: (520) 621-9889
e-mail: kohn@ag.arizona.edu
http://ag.arizona.edu/

The College of Agriculture provides professional education for a wide range of career opportunities 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.E.S.)
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 and 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, and 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 address listed above.

General education program
All undergraduate students are required to complete a 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 specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the undergraduate majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on line at http://www.arizona.edu/academic/oncourse/appr.html.

For academic requirements for graduate degrees 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 & 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@ag.arizona.edu
http://ag.arizona.edu/ABE/

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

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

Majors
Agricultural & Biosystems Engineering (B.S.A.B.E., M.S., Ph.D.)*

*Jointly administered with the College of Engineering and Mines
**Jointly administered with the College of Business and Public Administration
***Jointly administered with the College of Science

For academic program requirements for graduate degrees, 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.

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

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

197. Workshop
a. Solar Energy Applications (1) Open to participants in Horizons Unlimited summer program.

250. Water and Its Uses (3) GRD Introductory course on water sources, uses, management and conservation; biological, economic, and health issues. Not for ABE majors. (Identical with SWES 250).

300. Operations and Systems (2) 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) Introduction to computer aided design concepts and techniques. Two and three dimensional drawing presentation, methods of graphical communications, data analysis, design synthesis and production methods. P, computer literacy (DOS). 1R, 6L. 2ES, 1ED. (Identical with ENGR 320).


406. Applied Hydraulics (3) GRD Fundamentals of hydraulics applicable to the irrigation of agricultural lands, including fluid properties, hydrostatics, irrigation flow characteristics, open channel and pipeline applications, and measurement of flowing water. Not for ABE majors. P, MATH 118, 123 or 125a, PHY 102. (Identical with WS M 406). May be convened with 506.

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

412. Agri-biosystems Machinery Design (3) Design and evaluation of mechanized devices for agri-biosystems production and processing.

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

416. Simulation of Biological Systems (3) 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, CSMP 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 516.

423. Agricultural Systems Analysis and Design (3) Application of systems analysis to agricultural and biologically related problems; computer modeling and use of operations research methods. 2ES, 1ED. May be convened with 523.

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

447. Sensors and Controls (3) Principles of electric circuits. Selection, interfacing and calibration of digital and analog sensors to measure physical variables for manipulation with microprocessors. Development of logic and process control circuits. 2R, 3L. 2ES, 1ED. P, basic familiarity with computers. May be convened with 547.

455. Irrigation Engineering (3) Introduction to soil and water relationships, irrigation systems, irrigation water supply, and irrigation management; basic designs. 3R, 2ES, 1ED. P, C E 321 or A ME 331. (Identical with C E 455). May be convened with 555.


457. Irrigation Engineering Laboratory (1) Data acquisition and analysis pertinent to design and evaluation of irrigation systems. 3L. 1ES. Field trip. CR 455. May be convened with 557.

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


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


*Writing-Emphasis Courses: P, Satisfaction of the upper-division writing-proficiency requirement (see “Writing-Emphasis Courses” in the Academic Policies and Graduation Requirements section of this manual).

504. Irrigation Principles and Management (3) For a description of course topics see 404. Graduate-level requirements include a special project on a current irrigation topic. Not for ABE majors. P, MATH 117R/S, SWES 200. (Identical with WS M 504). May be convened with 404.

506. Applied Hydraulics (3) For a description of course topics see 406. Graduate-level requirements include a special project on current hydraulic topics. Not for ABE majors. P, MATH 118, 123 or 125a, PHYS 102. (Identical with WS M 506). May be convened with 406.

508. Environmental Simulation (3) For a description of course topics see 408. Graduate-level requirements include a special project on environmental topics. P, MATH 123 or 124a. May be convened with 408.

512. Agri-biosystems Machinery Design (3) For a description of course topics see 412. Graduate-level requirements include an additional design project. P, A ME 240, C E 217. May be convened with 412.

515. Agri-biosystems Process Engineering (3) For a description of course topics see 415. Graduate-level requirements include a special project. CR. A ME 230. May be convened with 415.

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

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

526. Soil and Water Conservation Engineering (3) For a description of course topics see 426. Graduate-level requirements include a special project. P, 406 or C E 321 or A ME 331. May be convened with 426.

547. Sensors and Controls (3) For a description of course topics see 447. Graduate-level requirements include a special project. P, Basic familiarity with computers. May be convened with 447.


555. Irrigation Engineering (3) For a description of course topics see 455. Graduate-level requirements include a special project on a current irrigation topic. P, C E 321 or A ME 331. (Identical with C E 555). May be convened with 455.

556. Irrigation Systems Design (3) For a description of course topics see 456. Graduate-level requirements include a special project. P, 455. May be convened with 456.

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

558. Drainage of Irrigated Lands (3) For a description of course topics see 458. Graduate-level requirements include a special project. P, C E 321 or A ME 331. (Identical with C E 558). May be convened with 458.

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

605. Soil-Water Dynamics (3) (Identical with SWES 605, which is home).

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

655. Surface Irrigation Analysis (3) 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, 456.

656. Pressurized Irrigation Systems (3) Analysis of design and operating criteria for sprinkler and trickle or drip irrigation systems,

696. Seminar
a. Agricultural and Biosystems Engineering (1) [Rpt/8]

**AGRICULTURAL & RESOURCE ECONOMICS (AREC)**
Economics Bldg., Rm. 319C
The University of Arizona
PO Box 210023
Tucson, AZ 85721-0023
(520) 621-6241; FAX: (520) 621-6250
e-mail: dcory@ag.arizona.edu
http://ag.arizona.edu/AREC/arechome.html

Baccalaureate degree
Bachelor of Science in Agriculture (B.S.A.)
Graduate degree
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)*

Majors
Agricultural and Resource Economics (B.S.A., M.S., Ph.D.)*
B.S.A. Options:
agricultural economics
agribusiness management
resource and environmental economics

* Jointly administered with the College of Business and Public Administration

**Program Requirements**
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.**

195. Colloquium
b. Environmental Issues in Agricultural and Resource Economics (1)

210. Introduction to Agricultural Commodity and Food Marketing (3) Basic economic concepts and marketing methods affecting agricultural and food industries in the international marketplace. Investigation of the organizational, institutional and economic principles that form the agricultural and food marketing system in the U.S.; application of microeconomic, market performance and international trade analysis. P, ECON 200 or 201a.

215. Agribusiness Economics and Management (3) 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 201a.

217. Resource and Environmental Economics (3) Relationship between man and use of natural resources and environmental systems, with emphasis on the economic implications of alternative environmental, energy and land-use policies. P, ECON 200 or 201a. (Identical with ECON 217).

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


313. Economics of Futures Markets (3) Commodities 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 201a. (Identical with ECON 313 and FIN 313).

339. Economic Statistics (3) Application and interpretation of statistical measures to problems in economics. Not available for students who have completed or are currently enrolled in ECON/MAP/MKTG 376. P, MATH 123. (Identical with ECON 339).

350. Economics, Ethics and Environmental Policies (3) 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 201a or 6 units of Individual and Societies general education.

375. Economics of Land and Water in the American West (3) Economic analysis of natural resource issues, policies and management. Case studies focus on water supplies, public and tribal lands, river basins, recreation, and wildlife resources in the western U.S. P, 217 or ECON 201a. (Identical with ECON 375 and RNR 375).

403. Marketing and Price Analysis (3) Market functions, costs, price indices, seasonality, marketing margins, commodity market models, price determination and price forecasting. P, 339, ECON 300 or 361.

404. Production Economic Analysis (3) Application of production economics principles and analytical techniques to the solution of agricultural economics problems. P, MATH 123, ECON 300 or 361.

450. Financial Management for Agribusiness (3) Application of 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 361 and 3 units of accounting. May be convened with 550.


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

476. Environmental Law and Economics (3) 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 361. (Identical with HWR 476 and RNR 476).

*Writing-Emphasis Courses. P, Satisfaction of the upper-department writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

494. Practicum
r. Research (3) [Rpt/2] P, ENGL 101, MATH 117, ABE 120, or consent of instructor.

497. Workshop
a. Strategies in Futures and Options Trading (3) P, ECON/FIN/AREC 313 or FIN 412.

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

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


514. Cost-Benefit Analysis (3) Theoretical bases and empirical techniques. Consumer-producer surplus; social and private costs; macroeconomic distortions; non-market goods; uses in policy analysis. (Identical with ECON 514).

515. Operations Research in Applied Economies (3) Application of linear, nonlinear, and multiple objective programming, decision theory, and simulation to problems of agricultural production, marketing, policy, and natural
resources use. P, ECON 361, MATH 123. (Identical with ECON 515).

516. Agricultural Development (3) Micro-economic 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 361. (Identical with ECON 516).

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

550. Financial Management for Agribusiness (3) For a description of course topics see 450. Graduate-level requirements include a research paper of publishable quality which analyzes a current financial issue or problem in the agricultural sector and selected readings in professional journals. P, ECON 300 or 361 and 3 units of accounting. May be convened with 450.

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

575. Economics of Natural Resource Policy (3) 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 361. (Identical with AR L 575, ECON 575 and RNR 575).


567. Economic Dynamics and Natural Resources (3) Covers three topic areas: mathematical structure of dynamic optimization problems; economics of exhaustible resource use; and economics of renewable resource use. The methods part of the course treats both discrete and continuous time as well as deterministic and uncertain environments. Relationships between the methods of Lagrange, dynamic programming, optimal control, the calculus of variations, and the Ito calculus are developed. The sections on natural resource applications these tools to the classical economic problems of natural resource allocation and exploitation. P, graduate student standing with one year of graduate microeconomic theory. (Identical with ECON 676).

696. Seminar
 g. Interstate Conflict Resolution (3) [Rpt.] (Identical with SIE 696g, which is home).

- AGRICULTURAL EDUCATION (A ED/AGTM)

Agricultural Education

Forbes Bldg., Rm. 224
The University of Arizona
PO Box 210036
Tucson, AZ 85721-0036
(520) 621-1523; FAX: (520) 621-9889
e-mail: ruber@ag.arizona.edu
http://ag.arizona.edu/AED/aedhome.html

Baccalaureate degree

Bachelor of Science in Agriculture (B.S.A.)

Graduate degrees

Master of Science (M.S.)

Master of Agricultural Education (M.A.Ed.)

Majors

Agricultural Education (B.S.A., M.S., M.A.Ed.)
Agricultural Technology Management (B.S.A.)

Program Requirements

For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the literature, and reflective writing. P, consent of instructor or graduate standing. May be convened with 501. The majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

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To learn more about majors, minors and other departmental information, contact the department at one of the addresses above.

AGRICULTURAL EDUCATION

(A ED)

195. Colloquium

a. Introduction to Teaching Agriculture and Related Sciences (1)

301. Youth Leadership Development (3) Characteristics of effective advisors, leadership styles, strategies for the management and organization of youth groups in agriculture, practice in leadership development techniques.

338a. The Teaching of Agriculture (4) (Identical with TTE 338a).

396H. Honors Proseminar (3)


409. Principles of Vocational Education (2) (Identical with TTE 409).

422. Communicating Knowledge in Agriculture and the Life Sciences (3) 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 522.


485. Teaching Psychomotor Skills in Laboratory Sciences (1-2) 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 585.

494. Practicum

c. Ambassador Orientation (1-2) [Rpt./1] Open to ABE 120, and consent of instructor.

496. Seminar

c. Ambassador Orientation (1-2) [Rpt./1] Open to COA Ambassadors only.

501. Leadership Concepts and Contexts (3) For a description of course topics see 401. Graduate-level requirements include additional writings, assignments, and an expanded issue paper. May be convened with 401.

522. Communicating Knowledge in Agriculture and the Life Sciences (3) For a description of course topics see 439. Graduate-level requirements include an additional report. (Identical with AGTM 422).

539. Non-Formal Education (3) For a description of course topics see 439. Graduate-level requirements include an additional research report. (Identical with FS 539). May be convened with 439.

540. International Extension Education (3) Critical evaluation of case histories of international extension education models, and integra-
tion of successful components into composite models based on cultural, political and educational situations typically encountered in developing countries.

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

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

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

597. Workshop
a. Instructional Advances in Experiential Education (1-3) [Rpt./3]
b. Advances in Youth Leadership Development (1-3) [Rpt./3]
c. Instructional Advances in Applied Biological Systems (1-3) [Rpt./3]
d. Continuing Education in Agriculture (1) [Rpt./3]
e. Program Development in Vocational/Technical Education (1-3) [Rpt./3]
g. Instructional Advances in Vocational/Technical Education (1-3) [Rpt./3] (Identical with FS 597g).


615. Investigations and Studies in Applied Research (3) 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 Implementation (3) 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, 615.

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

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

AGRICULTURAL TECHNOLOGY MANAGEMENT (AGTM)

100. Principles and Practices of Agricultural Mechanization (3) Basic principles and operative skills in construction and maintenance, which are part of agricultural operations in production and urban agriculture systems. Principles for wood and metal construction, inert gas welding, plasma cutting, and construction of wood and metal projects are included. Major emphasis is placed on safety in the laboratory. 1R, 6L.

120. Microcomputing Applications (3) (Identical with ABE 120, which is home).

195. Colloquium
a. Agricultural Technology and Public Policy (1)

330. Turf and Landscape Technology (3) The basic scientific principles and skills of construction, operation, and maintenance in turf, landscape and urban agricultural equipment. Provides student with laboratory experiences in machinery, sprinkler and drip irrigation installation, operation and maintenance, chemical application systems, and hardscaping. 1R, 6L.

350. Applications in Agricultural Mechanics (3) The fundamentals of electric power, electric motors, and leveling and measurement, and the internal combustion engine. Subject matter is selected to provide the fundamentals of applied mechanical knowledge and skills basic to urban agricultural mechanization and appropriate for instructional programs in agricultural mechanics at the secondary school level. 1R, 6L.

351. Operations in Agricultural Mechanics (3) The fundamentals of agricultural power and machinery with emphasis upon applications to urban agricultural mechanization. Competencies include set up, adjustment, lubrication, as well as operation and maintenance of machinery involved in landscape construction, turf installation, turf maintenance, and other machinery specifically suited to urban agricultural mechanization. Selected production agriculture equipment may also be included. 1R, 6L. P, 100.

380. Global Agriculture and International Relations (3) The importance of agriculture to the cultures, political structures, and economies of developing countries in Africa, Asia, South America, Oceania and North America. Special readings in conjunction with presentations made by international students selected by the instructor. P, introductory course in ANTH, SOC, or ECON. (Identical with ANTH 380).


494. Practicum
r. Research (3) [Rpt./2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

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

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

ANIMAL SCIENCES (AN S)

Shantz Bldg., Rm. 205
The University of Arizona
PO Box 210038
Tucson, AZ 85721-0038
(520) 621-7623; FAX: (520) 621-9435
e-mail: lgsxhr@ag.arizona.edu
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.)

Major
Animal Sciences (B.S.A., M.S., Ph.D.)

B.S.A. Options:
animal industry
racing industry
science and pre-professional

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

102. Animal Industry (3) A comprehensive view of the livestock and poultry industries, including the way the science of biology is used in modern livestock practice. 2R, 3L. Not open to students with more than 7 units of animal sciences.
142. Introduction to the Animal Racing Industry (2) 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) Field trips. Open to participants in the Horizons Unlimited Summer Programs.

205. Live Animal and Carcass Evaluation (3) 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.


234. Feeds and Feeding (3) Selection, evaluation, and use of feeds for specific purposes; balancing rations for livestock and poultry. Not open to students with credit or CR in 330.

250. Companion Animal Biology (3) Principles of anatomy, physiology and behavior of companion animals and their interrelationship to humans.

270. Introductory Horse Science (3) An introduction to the fundamental aspects of horse science; ownership responsibilities, economics, anatomy, physiological systems and careers in the horse industry. Field trip.

280. Science of Meat and Meat Products (3) Techniques used in meat processing, with special reference to structure and composition of the various meats. Student has option to select a processing or selection-identification lab. 2R, 3L. Field trip. (Identical with N SC 280).

295. Colloquium
a. Career Orientation (1)

297. Workshop
a. Cattle Management Practice (1) 3L. Field trips.

313. Principles of Animal Breeding (3) Basic concepts involved in the improvement of economically important traits of livestock through application of genetic principles. Field trips. P, 213; MATH 117R/S. Writing-Emphasis Course.*


315L. Physiology of Reproduction Laboratory (1) Practice in semen collection and storage, artificial insemination, and hormone assay. P or CR, 315R. (Identical with V SC 315L).

330. Nutritional Biology (3) Digestion and metabolism of proteins, carbohydrates, lipids, vitamins and minerals; energy and metabolism; nutritional ecology of ruminants; elements of gene regulation; effects of nutrients on gene expression; nutritional and hormonal influences on gene expression. P, MCB 181, CHEM 101b, 102b or 103b and 104b; CHEM 241a-241b and 243a-243b encouraged. (Identical with WFSC 330).


340. Race Track Marketing and Media Relations (3) Concepts and issues related to the marketing and promotion of the animal racing industry and facility. P, 142, CR, MKTG 361 or AREC 213.

342. Organization and Administration of the Racing Department (3) Basic duties and functions of the racing office and department. Personnel required and procedures utilized in developing the racing program. P, 142.


395. Colloquium
a. Professional Development in Animal Agriculture (1)

397. Workshop
a. Livestock Judging: Procedures & Evaluation (2) [Rpt./6 units]. Field trips.


443. Research Animal Methods (3) (Identical with V SC 443, which is home). May be convened with 543.


472. Dairy Herd Management (3) Proper milking, efficient housing, and health management of dairy cattle; marketing milk from the farm; milk production costs. Field trip. P, 330.


474. Sheep Production (2) The production, feeding and management of sheep on the farm and ranch. 1R, 3L. P, 330.


477. Beef Resource Management (2) Integration of beef production resources into a comprehensive beef production system; including breeding, feeding and marketing strategies. Field trip.

478. Feedlot Beef Production (3) Feeding and management systems of beef cattle in the feedlot. All-day field trips. P, 280, 336.

494. Practicum
r. Research (3) [Rpt./2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

496. Seminar

497. Workshop
a. Race Track (1) [Rpt./4 units]

*Writing-Emphasis Courses. P. Satisfactory of the upper-division writing-proficiency requirement (see “Writing-Emphasis Courses” in the Academic Policies and Graduation Requirements section of this manual).

501. Animal Growth and Development (2) Growth and development of domestic animals, with emphasis on skeletal muscle, bone and adipose tissue growth, from the cellular level to the whole animal. P, BIOC 460 or 462a.

512. Biological Electron Microscopy (4) (Identical with MCB 512, which is home).

513. Quantitative Genetics (3) Theory of quantitative genetics including idealized populations, forces that change gene frequency, breeding systems, and estimation of genetic parameters in a population. P, 6 units of genetics. (Identical with GENE 513).

535. Biotechnology in Animal Science (3) Survey of current recombinant DNA technology and principles. Topics include: vectors and hosts, enzymes used in molecular cloning, DNA sequencing, site-directed mutagenesis, expression systems and polymerase chain reaction. P, BIOC 460 or 462a.

543. Research Animal Methods (3) (Identical with V SC 543, which is home). May be convened with 443.

556. Developmental Biology (3) For a description of course topics see 456. 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. P, MCB 181. (Identical with CBA 556 and MCB 556). May be convened with 456.
585. Domestic Animal Endocrinology (3) Endocrine regulation of growth, metabolism and reproduction of domestic farm animals. P, 3 units of biochemistry.

596. Seminar
a. Animal Sciences (1) [Rpt./3]

609. Nutritional Biochemistry Techniques (3) (Identical with N SC 609, which is home).

615. Chemistry and Metabolism of Lipids (3) (Identical with N SC 615, which is home).

622. Mineral Metabolism (2) (Identical with N SC 622, which is home).

635. Ruminant Nutrition (3) Recent findings in ruminant nutrition; the physicochemical processes of digestion and absorption; importance and metabolism of rumen microflora; normal metabolism and abnormal metabolic disorders; modes of action of feed stimulants. P, 330, 336; CHEM 241a, 243a.


665. Analysis and Purification of Proteins (3) Principles and procedures for analyzing, purifying, and characterizing proteins and amino acids from cells or from cDNA expression systems. P, BIOC 462a preferred, BIOC 460 acceptable. (Identical with BIOC 665 and N SC 665).

684. Animal Physiology Research Techniques (2) Introduction to selected physiological and biochemical techniques used in animal research. 1R, 3L. Open to majors only. P, BIOC 460 or 462a.

687. Environmental Physiology of Domestic Animals (3) Physiological, behavioral and anatomical responses of domestic animals to their environment, with emphasis on adaptive mechanisms. P, 313, 315R, 330, 3 units of general physiology/anatomy.

696. Seminar
a. Animal Sciences (1) [Rpt./3 units]

ENTOMOLOGY (ENTO)
Forbes Bldg., Rm. 410
The University of Arizona
PO Box 210036
Tucson, AZ 85721-0036
(520) 621-1151; FAX: (520) 621-1150
e-mail: rkilby@ag.arizona.edu
http://ag.arizona.edu/

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

Major
Entomology (M.S., Ph.D.)

Program Requirements
For academic program requirements for graduate degrees, 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.

151R. Insects and Society (3) Introduction to the biology, ecology, and management of insects affecting man and his interests. Intended for non-majors.

151L. Insects and Society Laboratory (1) Provides hands-on experience with arthropods introduced in 151R, including basic disciplines and practical applications in urban, medical and agricultural entomology. Collection field trips.


195. Colloquium
a. Exploring Biology (1)
b. Agriculture as a Science (1) (Identical with PL S 195B, which is home).

202. Applied Entomology (3) [Rpt./1] 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.

402. Agriculture and the Environment: Focus on Pesticides (3) (Identical with AGTM 402, which is home). May be convened with 502.

403R. Biology of Animal Parasites (3) (Identical with V SC 403R, which is home). May be convened with 503R.

403L. Parasitology Laboratory (1) (Identical with V SC 403L, which is home). May be convened with 503L.

404. Physiological Systems (3) (Identical with ECOL 404, which is home).


408. Insect Toxicology (3) 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 508.


415R. Insect Biology (3) 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 515R.

415L. Insect Biology Laboratory (1) Survey of insect diversity through identification, classification, morphology and anatomy. P, ECOL 182. (Identical with ECOL 415L). May be convened with 515L.


427. Insect Chemical Ecology (4) 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, 507 or equivalent, and 3 units of organic or biochemistry. (Identical with V SC 427). May be convened with 527.

433. Teaching Biology Labs (2) (Identical with BIO 433, which is home). May be convened with 533.

444. Insect Ecology (3) The study of how variation in the environment, interactions with other species and the special features of insect "design," have determined the evolution of 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 544.

452. Medical-Veterinary Entomology (4) [Rpt./3] Survey of arthropods of public health and veterinary importance with emphasis on transmission dynamics of pathogens, biologies of vector populations, and current control concepts. 3R, 3L. P, parasitology recommended. (Identical with V SC 452). May be convened with 552.

465. Phylogenetic Biology (3) (Identical with ECOL 465, which is home). May be convened with 565.
468. Insect Pest Management (3) Principles underlying the management of arthropods in agricultural systems. May be convened with 568.

470. Biological Control (3) Lecture and discussion of the theory and practice of the biological control of insects, weed, and plant pathogen pests. P. May be convened with 570.

494. Practicum
r. Research (3) [Rpt./2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

496. Seminar
a. Entomology (1) [Rpt./6] May be convened with 596a.
b. Medical-Veterinary Entomology (1-3) P, 452. May be convened with 596b.
c. Topics in Insect Diversity (2) [Rpt./5] May be convened with 596c.
d. Plant-Insect Interactions (1) [Rpt./5] (Identical with PL S 496d). May be convened with 596d.
e. Insect Physiology, Biochemistry, Taxonomy (1) [Rpt./5] May be convened with 596e.
f. Topics in Pest Management (1) [Rpt./5]. May be convened with 596f.
g. Ecology, Epidemiology and Control of Vector-borne Diseases (1-3) [Rpt./5]. May be convened with 596g.

502. Agriculture and the Environment: Focus on Pesticides (3) (Identical with AGTM 502, which is home). May be convened with 402.

503R. Biology of Animal Parasites (3) (Identical with V SC 503R, which is home). May be convened with 403R.

503L. Parasitology Laboratory (1) (Identical with V SC 503L, which is home). May be convened with 403L.

505. Aquatic Entomology (3) For a description of course topics see 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, INSC 505 and WFSC 505). May be convened with 405.

507. Insect Physiology (3) 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 (i.e., growing, flying, reproducing). P, CR, 407L; biochemistry recommended. (Identical with INSC 507).

508. Insecticide Toxicology (3) 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 and TOX 508). May be convened with 408.

511. Insect Behavior (3) For a description of course topics see 411. Graduate-level requirements include a written literature review and oral presentation of a selected topic. 2R, 3L. Field trips. (Identical with ECOL 511 and INSC 511). May be convened with 411.

512. Biological Electron Microscopy (4) (Identical with MCB 512, which is home).

514. Bee Biology and Pollination (2) For a description of course topics see 414. Graduate-level requirements include a research paper on some topic of bee biology or pollination, terminating with an oral presentation. Field trips. P, one course in biology. May be convened with 414.

515R. Insect Biology (3) For a description of course topics see 415R. Graduate-level requirements include submission of reports on landmark papers in insect biology. P. ECOL 182. (Identical with ECOL 515R and INSC 515R). May be convened with 415R.

517. Insect Systematics (4) For a description of course topics see 417. Graduate-level requirements include an independent research project and oral presentation of a selected topic. 3R, 3L. Field trips. (Identical with ECOL 517 and INSC 517). May be convened with 417.

518. Laboratory Methods in Insect Physiology (3) (Identical with INSC 518, which is home).

527. Insect Chemical Ecology (4) For a description of course topics see 427. Graduate-level requirements include a written literature review and oral presentation of a selected topic. May be convened with 427.

533. Teaching Biology Labs (2) (Identical with BIOL 533, which is home). May be convened with 433.

544. Insect Ecology (3) For a description of course topics see 444. Graduate-level requirements include an independent research project and a literature review paper. Field trips and project. (Identical with ECOL 544 and INSC 544). May be convened with 444. Taylor.

552. Medical-Veterinary Entomology (4) [Rpt./3] For a description of course topics see 452. Graduate-level requirements include an independent research project and a written review of contemporary journal articles. P, parasitology recommended. (Identical with INSC 552 and V SC 552). May be convened with 452.

565. Phylogenetic Biology (3) (Identical with ECOL 565, which is home). May be convened with 465.

568. Insect Pest Management (3) For a description of course topics see 468. Graduate-level requirements include an additional report. May be convened with 468.

570. Biological Control (3) For a description of course topics see 470. Graduate-level requirements include additional written work. P, 444 or equivalent. (Identical with INSC 570). May be convened with 470.


576. Environmental Toxicology (3) (Identical with PCOL 576, which is home).

596. Seminar
a. Entomology (1) [Rpt./6] May be convened with 496a.
b. Medical-Veterinary Entomology (1-3) P, 452. May be convened with 496b.
c. Topics in Insect Diversity (2) [Rpt./5]. May be convened with 496c.
d. Plant-Insect Interactions (1) [Rpt./5]. (Identical with PL S 596d). May be convened with 496d.
e. Insect Physiology, Biochemistry, Toxicology (1) [Rpt./5]. May be convened with 496e.
g. Ecology, Epidemiology and Control of Vector-borne Diseases (1-3) [Rpt./5]. May be convened with 496g.

597. Workshop
b. Phyllogenetic Inference (2) 2D. P, 465/565, equivalent, or consent of instructor. (Identical with GEOS 597b and ECOL 597b).

660. Infectious Disease Epidemiology (3) [Rpt./1] (Identical with EPI 660, which is home).

696. Seminar
a. Entomology (1) [Rpt./6]

NUTRITIONAL SCIENCES (N SC)

Shantz Bldg., Rm. 309
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http://ag.arizona.edu/NSC/nschome.html

Baccalaureate degree
Bachelor of Science in Agriculture (B.S.A.)

Graduate degree
Master of Science (M.S.)

Major
Nutritional Sciences (B.S.A., M.S.)

B.S.A. Options: dietetics nutrition

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/onclick/aprr.html.

For academic program requirements for graduate degrees, 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.

101. Nutrition, Food, and You (3) Current concepts and controversies in nutrition and food safety; practical applications. Designed for non-majors and for majors with no previous work in nutrition.

102H. Nutrition, Food, and You (1) 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) (Identical with ABE 120, which is home).

197. Workshop a. Fitness, Nutrition and Food Technology: Issues and Answers (1) Field trips. Offered only through Horizons Unlimited Summer Program.

208. Nutrition and Metabolism (3) Introduction to nutritional sciences and the integration of the effects of nutrients and nutritional status of metabolic and physiological functions of 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, CR, CHEM 241a.


260. Science of Meat and Meat Products (3) (Identical with AN S 280, which is home).

301. Nutrition and the Life Cycle (3) Role of nutrients in human development. Physiological bases for changes in nutrient requirements throughout the life cycle (pregnancy, lactation, infancy, childhood, adolescence and aging). P, 208 (majors); 101 (non-majors); PSIO 201 or 202.


340. Introduction to Diet Therapy (3) Food composition, principles of interviewing and counseling, cultural aspects of diets, energy requirements, major diseases requiring diet therapy. P, 208, 301; CHEM 103b, 104b.

358. Institution Food Management (3) 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, 101, 251.

396H. Honors Proseminar (3)


411. Consumer Issues in Nutrition (3) Effects of misinformation and fraud on nutritional status, general health and family economic means. P, 101 or 301, ECON 201a or 201b. (Identical with RCS 411).

440. Nutritional Assessment and Management (4) 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, 340; CR 408.

441. Therapeutic Nutrition (4) Therapeutic principles of nutrient 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, 408. May be convened with 541.

443. Community Nutrition (2) 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) (Identical with PHPR 447, which is home). May be convened with 547.

448. Perspectives in Geriatrics (2) (Identical with PHPR 448, which is home).

458. Food Service Organization and Management (3) Organization and management of food service systems; responsibilities of management for leadership, sanitation, maintenance, and care of food service plant and its equipment. P, 358.

460. General Protein and Metabolic Biochemistry (3) (Identical with BIOC 460, which is home).

461. General Nucleic Acid Biochemistry (2) (Identical with BIOC 461, which is home).

463. Food Analysis (3) Laboratory procedures for chemical and physicochemical analysis of food products. 1R, 6L.

468. Food Processing (3) 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 Sanitization (3) 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) Laboratory procedures for assessment of sanitary quality of foods. P, 470 or CR. (Identical with MIC 471).

494. Practicum r. Research (3) [Rpt/2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

*Writing-Emphasis Courses: P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

508. Human Nutrition (3) For a description of course topics, see 408. Graduate-level requirements include an in-depth research paper on a current topic. P, BIOG 460, PSIO 480, 481. May be convened with 408.

520. Advanced Nutritional Science (3) Advanced physiology and biochemistry of nutrients with emphasis on present knowledge and current research topics in nutritional sciences. P, BIOG 460 or 462a.

540. Advanced Dietetics (3) Nutrition and metabolism in patient care as applied by the advanced-level practitioner. Open to majors in nutritional sciences only.

541. Therapeutic Nutrition (4) For a description of course topics see 441. Graduate-level requirements include an in-depth research paper on a current topic. P, 408. May be convened with 441.

547. Perspectives in Geriatrics Laboratory (1) (Identical with PHSC 547). May be convened with 447.

595. Colloquium c. Managing Clinical Dietetics (3)

596. Seminar n. International Nutrition (2-3) (Identical with CFM 596n, which is home).


602. Metabolic Integration (3) 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, BIOG 460 or BIOG 462a-462b.

609. Nutritional Biochemistry Techniques (3) Biochemical methods for evaluating metabolic functions of nutrients. 1R, 6L. P, 408, CHEM 324 or 325, and 323 or 326. (Identical with AN S 609).

615. Chemistry and Metabolism of Lipids (3) 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).
620. Vitamins (2) The chemistry and metabolism of vitamins. P. 408.

622. Mineral Metabolism (2) Chemistry, metabolism and biological function of minerals; current research in mineral requirements and toxicity. P. 408. (Identical with AN S 622).

628. Steroid and Lipoprotein Chemistry and Metabolism (2) Biochemistry and metabolism of steroids and lipoproteins in mammalian systems; regulation of the biosynthesis and catabolism of steroids and lipoproteins in health and abnormalities related to disease; and dietary regulators of sterol and lipoprotein metabolism as related to cardiovascular disease risk and prevention. P. 602; BIOC 460 or BIOC 462a-

640. Field Methods in Human Nutrition (3) Case-oriented approach to nutritional assessment, diagnosis, prescription, and prognosis; application of dietary, clinical and biochemical methods. 2R, 3L. Open to majors in nutrition and other health sciences areas only.

663. Chemistry of Food Carbohydrates (2) Chemical and physical properties of carbohydrates important to their presence in food. P, BIOC 460, 462a.

665. Analysis and Purification of Proteins (3) (Identical with AN S 665, which is home).

693. Internship
   a. Dietetic Internship, ADA Accredited (1-6) [Rpt/2] Field trips. Begins Mid-August and continues for 46 weeks. Consult dept. before enrolling. Open to majors only. P, Course work equivalent to American Dietetic Association DPD.

696. Seminar
   b. Nutrition (1) [Rpt/6 units] (Identical with NUSC 696b).

PLANT PATHOLOGY (PL P)
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e-mail: cjackson@ag.arizona.edu
http://ag.arizona.edu/PLP/plp/home.html

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

Major
Plant Pathology (M.S., Ph.D.)

Program Requirements
For academic program requirements for graduate degrees, consult the Graduate Catalog and the departmental website 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.

195. Colloquium
   b. Agriculture as a Science (1) (Identical with PL S 195b, which is home).

197. Workshop
   a. Genetic Engineering (1) Open to participants in Horizons Unlimited Summer Program (Identical with PL S 197a, which is home).

305. Introductory Plant Pathology (3) Detailed study of representative plant diseases, with emphasis on basic concepts of diagnosis, cause, epidemiology, and control. P, PL S 190 or MCB 181. May be convened with 305.

402. Agriculture and the Environment: Focus on Pesticides (3) (Identical with AGTM 402, which is home). May be convened with 305.

421a-421b. Microbiological Techniques (3-3) (Identical with MCB 421a-421b, which is home).


427L. General Mycology Laboratory (2) General mycology laboratory, with emphasis on the microfungi. P, 427R or CR. (Identical with MCB 427L).


451. Biology and Characterization of Plant Pathogenic Agents (4) Examines the biological properties of the various groups of plant pathogens and the contemporary methods used to characterize these agents and the diseases they cause. 3R, 3L. P, 305 and at least one laboratory course (e.g., MIC 205, MCB 181/182, etc.) or consent of instructor. May be convened with 551. (Identical with MCB 451).

494R. Practicum: Research (3) [Rpt/2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

496. Seminar

502. Agriculture and the Environment: Focus on Pesticides (3) (Identical with PL S 502, which is home). May be convened with 402.

512. Biological Electron Microscopy (4) (Identical with MCB 512, which is home).

516. Plant Nematology (2) The nature, ecology, classification, and control of nematode diseases in plants. P, 551, or consent of instructor.

528. Microbial Genetics (3) For course topics see 428. Graduate-level requirements include: analyzing three additional current research papers; analyzing unknown DNA sequence of an entire operon; extensive term paper.

550. Advanced Plant Pathology (4) Topics include major concepts in classical and molecular genetics of plant-pathogen interactions; physiology, biochemistry, and molecular biology of plant pathogenesis; principles of plant epidemiology and theories and practices of plant disease control. P, 305 or consent of instructor.

551. Biology and Characterization of Plant Pathogenic Agents (4) For a description of course topics, see 451. Graduate-level requirements include additional assignments. 3R, 3L, P, 305 and at least one laboratory course (e.g., MIC 205, MCB 181/182, etc.) or consent of instructor. May be convened with 451.

575. Advanced Mycology (3) Biology of fungi, including morphology, physiology, classification, genetics, ecological significance, and economic importance; emphasis on plant pathogens and environmentally essential fungi. 2R, 3L. P, 427 or consent of instructor.

596. Seminar
   a. Contemporary Topics in Plant Pathology (1-3) [Rpt/12] May be convened with 496a. b. Research Discussions (1-3) [Rpt/3] May be convened with 496b.


611. Molecular Plant Virology (3) Recent advances in the structure of viral genomes, function and regulation of viral genes, molecular plant-virus interactions, and molecular strategies for viral disease control. 3R. P, 305, BIOC 460.

621. Molecular Plant-Microbe Interactions (3) Molecular properties that control development of host, parasite, and symbiotic relationships. Contemporary molecular hypotheses are related to genetic and biochemical data available on disease resistance and pathogenesis. P, BIOC 460. (Identical with BIOC 621 and MCB 621).

694. Practicum
   b. Teaching Techniques in Plant Pathology (1-3) [Rpt/2] P, 551.

695. Colloquium
   b. Plant Pathology (1) (Identical with MCB 695b and PL S 695b).
305. Weed Science (4) Principles and effects of controlling agronomic and horticultural weeds, with emphasis on chemical control methods; weed identification. 3R, 3L, P, 130, 360 and SWES 200 (ECOL 302 recommended).

306. Crop Science and Production (3) An examination of the fundamental aspects of plant science as applied to crop production. Laboratory exercises require the small scale production of vegetable crops. 2R, 3L, P, 130 or SWES 200.

312. Plant Genetics (4) 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, 100 or 130, or MCB 182, CHEM 103a, 104a.

330. Plant Propagation I: Sexual & Asexual Reproduction (3) 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. 2R, 3L, P, 130 and MCB 181. Writing-Emphasis Course.*


340. Introduction to Biotechnology (3) Survey of the basic concepts and techniques used in the analysis and improvement of plants by genetic engineering. P, 130, or MCB 181R, CHEM 103a, 103b.


355. Turfgrass Management (3) Species adaptability, growth and development, establishment and cultural practices affecting use. P, 130 or MCB 181.


361. Principles of Plant Physiology Laboratory (1) [Rpt.] Laboratory exercises in plant physiology. P, 360 or CR. (Identical with MCB 361).

401. Cotton Crop Production (3) Principles and practices of growing and harvesting cotton crops, with emphasis on cotton production, fiber technology, and utilization. PL S 130 or equivalent, basic biology knowledge; consent of the instructor.

403. Citrus Production (3) Cultural practices used in citrus production and the physiological basis for those practices. P, basic biology knowledge; consent of instructor.


410. Cell Biology (3) (Identical with MCB 410, which is home).

415. Principles of Plant Breeding (3) Application of the principles of genetics, botany and statistics to the improvement of plants. P, 312 or ECOL 320. May be convened with 515. Writing-Emphasis Course.*

439. Plant Cell Biology (3) 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 539.

450. Developmental Plant Anatomy (4) Structure, function, and development of vascular plants. 3R, 3L, P, 100 or 130 or MCB 181. May be convened with 550.


465. Vegetable Physiology (3) Examination of the growth, development and maturation of vegetable crops with special emphasis on postharvest processes. Designed for upper level undergraduates and graduate students with some prior knowledge of plant biochemistry and physiology. P, 360, 560 or BIOL 460. May be convened with 565.

472. Systematic Botany (4) (Identical with ECOL 472, which is home). May be convened with 572.

473. Recombinant DNA Methods and Applications (4) Fec. (Identical with MCB 473, which is home).

475. Physiology of Crop Production (3) Plant processes, modifications, and environmental interactions in relation to growth of crop plants, with emphasis on recent advances and research techniques. P, 360. May be convened with 575.

494. Practicum r. Research (3) [Rpt./2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.
495. Colloquium
a. Senior Report (1) Writing-Emphasis Course."

496. Seminar
d. Plant-Insect Interactions (1) [Rpt./5] (Identical with ENTO 496d, which is home). May be convened with 496d.

"Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).


509. Information Sources for Agricultural Scientists (1) Information systems and retrieval techniques, with particular reference to concepts, uses and limitations; emphasis on abstracts, indexes, alerting services, journals and government documents. (Identical with LI S 509).


515. Principles of Plant Breeding (3) For a description of course topics see 415. Graduate-level requirements include participation in computer-aided exercises in simulated recurrent selection. P, 312 or ECOL 320. May be convened with 415.

539. Plant Cell Biology (3) For a description of course topics see 439. Graduate-level requirements include a substantive term paper. P, MCB 410 or equivalent. (Identical with MCB 539). May be convened with 439.

541. Economic Botany of Arid Lands (3) Examines past, present, and potential future industries based on plant resources in arid lands. Survey of useful products from arid lands plants, their biosynthesis and physiological function, taxonomic and geographic sources, and their role in local and global economies. P, 360. (Identical with ARL 541).

550. Developmental Plant Anatomy (4) For a description of course topics see 450. Graduate-level requirements include preparation of an in-depth research project. 3R, 3L, P, 100 or 130 or MCB 181. May be convened with 450.

560. Current Advances in Plant Physiology (3) Investigation of the physiological, biochemical and molecular mechanisms that allow a plant to perceive and respond to environmental and chemical signals during normal growth and development and when it is experiencing a stress. P, 360, CHEM 462a-462b. (Identical with ECOL 560 and MCB 560).

563. Plant-Water Relations (3) For a description of course topics see 463. Graduate-level requirements include preparation of an in-depth research project. P, 360 or ECOL 260. (Identical with WS M 563). May be convened with 463.

565. Vegetable Physiology (3) For description of course topics see 465. Graduate-level requirements include an additional term paper. May be convened with 465.

572. Systematic Botany (4) (Identical with ECOL 572, which is home). May be convened with 472.

575. Physiology of Crop Production (3) For description of course topics see 475. Graduate-level requirements include preparation of an in-depth research project. P, 360. May be convened with 475.

595. Colloquium
b. Current Topics in Plant Science—Advanced Topics in Plant Science (1-3) [Rpt./4] P, graduate standing or consent of instructor.

596. Seminar
d. Plant-Insect Interactions (1) [Rpt./5] (Identical with ENTO 596d, which is home). May be convened with 496d.

620. Plant Biochemistry (3) 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 and 462b, PL S 560.

627: Advanced Genetics (3) 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, 312 or ECOL 320. (Identical with GENE 627).


695. Colloquium
a. Plant Biology (1) (Identical with PL P 695a, which is home).

b. Plant Pathology (1) (Identical with PL P 695b, which is home).

696. Seminar
a. Plant Science (1) [Rpt./4]

SOIL, WATER & ENVIRONMENTAL SCIENCES (SWES)
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e-mail: sw@ag.arizona.edu
http://ag.arizona.edu/SWES/

Baccalaureate degrees
Bachelor of Science in Agriculture (B.S.A.)
Bachelor of Science in Environmental Sciences (B.E.S.)

Graduate degrees
Master of Science in Soil and Water Science (M.S.)
Doctor of Philosophy in Soil and Water Science (Ph.D.)

Majors
Environmental Science (B.E.S.)
Soil and Water Science (B.S.A., M.S., Ph.D.)
B.S.A. Options: soil science
soil-plant-water relations

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or department office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

105. Introduction to Environmental Science: Land, Water and Air (3) 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, 106 encouraged.

106. Environmental Science Laboratory: Land, Water and Air (1) 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. Field trips. P, algebra and high school chemistry recommended.
197. Workshop
a. Environmental Science (1) Field trips. Offered only through the Horizons Unlimited Summer Program.

200. Soils (3) 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 and 102a or 103a and 104a.


250. Water and Its Uses (3) GRD (Identical with ABE 250, which is home).

302. Introduction to Environmental Toxicology (3) (Identical with PCOL 302, which is home).


317. Soil Fertility and Plant Nutrition Laboratory (1) 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. Field trip. P, CR, 316.

325. Soil Microbiology (3) Introduction to the biology and soil microorganisms, their interaction 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. 2R, 3L. P, CHEM 103b, MCB 181.

330. Introduction to Remote Sensing (3) (Identical with GEOG 330, which is home).

397. Workshop
a. Teaching Workshop (2-3) P, open to students with sophomore or higher standing and a grade of “A” in 105-106, or majors in environmental science.

401. Management of Arid Lands and Saline Affected Soils (3) 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. 2R, 3L. Field trips. P, 200, 201. May be convened with 501.

404. Irrigation Principles and Management (3) GRD (Identical with ABE 404, which is home). May be convened with 504.

405. Environmental, Soil and Water Chemistry Laboratory (3) Principles and methods of the chemical analysis of soils, water and biological materials with emphasis on illustrating important soil and environmental concepts and processes. 1R, 6L. P, CHEM 322, 323; PHYS 102. May be convened with 505.

417. Geographic Information Systems for Natural Resources (3) (Identical with RNR 417, which is home). May be convened with 517.

420. Environmental Physics (3) Physical principles used in assessment, prevention or reduction of environmental problems. Main themes include energy sources; energy and mass transport; and pollution within soil, water and air. P, MATH 125b, PHYS 103. May be convened with 520.

421a-421b. Microbiological Techniques (3-3) (Identical with MIC 421a-421b, which is home).


426. Environmental Microbiology Laboratory (2) Basic techniques for isolation and characterization of environmental soil and water microflora including methods for enumeration and measurement of physiological activity. P, 425. (Identical with MIC 426). May be convened with 526.

428. Genetic Microbiology (3) (Identical with PL P 428, which is home).

430. Environmental Monitoring (2) Theory and application of environmental measurements to the sampling and monitoring of groundwater, soil, surface water, and near-surface atmospheric systems. 1R, 3L. P, HWR 450 or SWES 411 or equivalent. May be convened with 530.

431. Soil Morphology, Classification and Interpretations (3) Theory and practice of describing characteristics of soils; principles of soil classification and classification systems; making soil interpretations for selected land uses. 2R, 3L. Field trips. P, 200, 201. May be convened with 531.

438. Environmental, Soil, and Water Chemistry (3) Basic soil and water chemical properties and interactions, chemical behavior, and processes in the environment. Natural and anthropogenic examples. P, 200, CHEM 103b, 104b.

440. Biodegradation of Pollutants in Soil and Groundwater (3) 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, 425. May be convened with 540. (Identical with MIC 440).

444. Applied Environmental Law (3) A guided journey 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 544.

450. Anticipating the Future: Focus on Environmental (3) Techniques and approaches to understand broad issues and evaluate the future focus on environmental topics. Uses computer conferencing with Internet and significant student discussion and opportunities for team approaches and reporting. P, upper-division standing. May be convened with 550. Writing-Emphasis Course.*

453. Remote Sensing for the Environment (3) 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. 2R, 3L. Field trips. P, 330 or PHYS 102b. May be convened with 553.

461. Soil and Water Conservation (3) Consideration of major world 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. 2R, 3L. Field trips. P, 200. May be convened with 561.

466. Soil and Groundwater Restoration (3) Methods for remediation of contaminated soil and groundwater; factors influencing efficacy of remediation systems. Emphasis on scientific basis of restoration. May be convened with 566.

470. Soil Physics (3) 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. 2R, 3L. P, PHYS 103. May be convened with 570.

474. Aquatic Plants and the Environment (4) 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 WFSC 474 and ECOL 474). May be convened with 574.

475. Freshwater and Marine Algae (4) (Identical with ECOL 475, which is home).

483. Geographic Applications of Remote Sensing (3) (Identical with GEOG 483, which is home). May be convened with 583.

490. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 490, which is home). May be convened with 590.
494. Practicum in Research (3) [Rpt./2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see Writing-Emphasis Courses in the Academic Policies and Graduation Requirements section of this manual).

501. Management of Arid Lands and Salt-Affected Soils (3) For a description of course topics see 401. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. Field trips. P, 200, 201. May be convened with 401.

504. Irrigation Principles and Management (3) GRD (Identical with ABE 504, which is home). May be convened with 404.

505. Environmental Soil and Water Chemistry Laboratory (3) For a description of course topics see 405. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. P, CHEM 322, 323; PHYS 103, 182. May be convened with 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. 2R, 3L. P, 200, CHEM 241, 322. May be convened with 411.

517. Geographic Information Systems for Natural Resources (3) (Identical with RNR 517, which is home). May be convened with 417.

520. Physics of Plant Environments (3) For a description of course topics see 420. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. P, MATH 125b, PHYS 103. May be convened with 420.


526. Environmental Microbiology Laboratory (2) For a description of course topics see 426. Graduate-level requirements include additional assignments. P, 525 (Identical with MBIM 526). May be convened with 426.

530. Environmental Monitoring (2) For a description of course topics see 430. Graduate-level requirements include preparation of a term project. 18, 3L. P, HWR 450 or 517 or SWES 511 or equivalent. May be convened with 430.

531. Soil Morphology, Classification and Interpretations (3) For a description of course topics see 431. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. Field trips. P, 200, 201. May be convened with 431.

540. Biodegradation of Pollutants in Soil and Groundwater (3) For a description of course topics see 440. Graduate-level requirements include a short oral presentation about a recent journal article and a paper pertaining to recent advances in biodegradation studies. P, MBIM 525. (Identical with MBIM 540). May be convened with 440.

541. Soil Genesis (3) Physical and chemical processes and mineralogy of weathering and soil formation; quantitative pedology; the soil as part of the ecosystem. Field trips. P, GEOS 101 and CHEM 103b. (Identical with GEOS 541).

544. Applied Environmental Law (3) For a description of course topics see 444. Graduate-level requirements include extra term papers and case studies. May be convened with 444.


550. Anticipating the Future: Focus on Environment (3) For a description of course topics see 450. Graduate-level requirements include a report in an area of special interest. May be convened with 450.

553. Remote Sensing of the Environment (3) For a description of course topics see 453. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. Field trips. P, 330 or PHYS 103. May be convened with 453.

561. Soil and Water Conservation (3) For a description of course topics see 461. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. Field trips. P, 200. May be convened with 461.

564. Environmental Chemistry (3) 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 310b, 480a.

565. Contaminant Transport in Porous Media (3) 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, 570 or HWR 518 or 531.

566. Soil and Groundwater Restoration (3) For a description of course topics see 466. Graduate-level requirements include a research paper. May be convened with 466.

570. Soil Physics (3) CDT For a description of course topics see 470. Graduate-level requirements include an in-depth research paper on a single aspect of a current topic. P, 200, PHYS 103, CR, MATH 125a. May be convened with 470.

573. Monitoring Biosphere Processes (3) 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, 200; 330 or 453.

574. Aquatic Plants and the Environment (4) For a description of course topics see 474. Graduate-level requirements include an additional research project and class presentation. Field trips. (Identical with WFS 574 and ECOL 574). May be convened with 474.

583. Geographic Applications of Remote Sensing (3) (Identical with GEOS 583, which is home). May be convened with 483.

590. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 590, which is home). May be convened with 490.

602. Soil-Plant Relationships (3) Principles of soil solution and colloid chemistry, soil-water relationships, soil microbiology, and plant physiology and metabolism will be discussed. These principles will be applied to processes of soil nutrient cycling, nutrient availability, and plant growth. P, 200.


696. Seminar

a. Topics in Soil, Water and Environmental Science (1) [Rpt./4].

VETERINARY SCIENCE AND MICROBIOLOGY (V SC/MIC)
Veterinary Science/Microbiology Bldg., Rm. 202
The University of Arizona
PO Box 210090
Tucson, AZ 85721-0090
(520) 621-2355; FAX: (520) 621-6366
e-mail: hilgert@ag.arizona.edu
http://ag.arizona.edu/VSC/vschehme.html

Baccalaureate degrees
Bachelor of Science (B.S.)
Bachelor of Science in Agriculture (B.S.A.)

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

Majors
Veterinary Science (B.S.A.)
Microbiology (B.S., B.S.A.)
Pathobiology (M.S., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs).
APRs for the majors listed above may be obtained from the college or departmental office. APRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/appr.html.

For academic program requirements for graduate degrees, 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.

VETERINARY SCIENCE (V SC)


195. Colloquium d. This Wormy World (1) (Identical with MIC 195d).

315R. Physiology of Reproduction (3) (Identical with AN S 315R, which is home).

315L. Physiology of Reproduction Laboratory (1) (Identical with AN S 315L, which is home).


400a-400b. Animal Anatomy and Physiology (3-3) Physiology, gross and comparative anatomy. 400a: Nervous, musculoskeletal, immune, hemolymphatic, circulatory, and renal systems. 400b: Respiratory, digestive, endocrine and reproductive systems. 400a is not prerequisite to 400b. P, ECOL 181, 182; CHEM 243a; MATH 117R/S. May be convened with 500a-500b.

403R. Biology of Animal Parasites (3) 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, 8 units of biology or microbiology. (Identical with ENTO 403R, ECOL 403R, and MIC 403R). May be convened with 503R.

403L. Parasitology Laboratory (1) Parasite morphology and diagnostic laboratory techniques. P, 9 units of ecology or microbiology, CR, 403R. (Identical with ECOL 403L, ENTO 403L and MIC 403L). May be convened with 503L.


405. Animal Diseases (3) Survey of selected diseases of domestic animals. Includes disease mechanisms, immunology and infectious agents; husbandry, management, and nutrition. May be convened with 505.

419. Immunology (3) Basic concepts of the immune system. Presentation of the roles of antigens, 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.*

420. Pathogenic Bacteriology (3) Etiology and pathogenesis of bacterial diseases in humans, domestic animals, and wildlife. P, 325, CHEM 241b, 243b. Students are expected to be familiar with use of the World Wide Web and, ideally, have access via Netscape. (Identical with MIC 420). May be convened with 520.

421a-421b. Microbiological Techniques (3-3) (Identical with MIC 421a-421b, which is home).

423. Mechanisms of Disease (4) General pathophysiology of animal and selected human diseases with emphasis on pathogenesis, pathophysiology, and morphologic changes at the macroscopic, microscopic and molecular levels. Recitation will stress general mechanisms of disease. Laboratory will reinforce recitation and stress recognition of disease in organs and tissues at the gross and microscopic levels. 3R, 1L. P, 400a-400b, 459 or CR, MIC 205, MIC 419R or equivalent or consent of instructor. (Identical with MIC 423 and PCOL 423). May be convened with 523.

427. Insect Chemical Ecology (4) (Identical with ECOL 427, which is home). May be convened with 527.

428. Microbial Genetics (3) (Identical with PL P 428, which is home).

429. General Virology (3) (Identical with MIC 429, which is home). May be convened with 529.


437. Vertebrate Physiology (4) (Identical with ECOL 437, which is home).


443. Research Animal Methods (3) Regulations, care, diseases and techniques involving common laboratory animals used in research and teaching programs. (Identical with AN S 443, BIOC 443, VIC 443). May be convened with 543.

449. Diseases of Wildlife (3) Important diseases of wildlife. Disease mechanisms, infectious agents, diagnostic procedures, and post-mortem techniques as well as a survey of selected but generally well-recognized diseases of wildlife. (Identical with WFSC 449). May be convened with 549.

452. Medical-Veterinary Entomology (4) (Identical with ECOL 452, which is home). May be convened with 552.

454. Host-Microbial Interactions (3) Review of bacterial-host interactions with the emphasis on mucosal immunity following bacterial infection. Important issues such as molecular mechanisms of virulence factors, bacterial resistance to host factors, immune modulation, and regulation of the host response to bacterial assault will be discussed. P, 419 and 420, or consent of instructor. (Identical with MIC 454). May be convened with 554.

456. Aquaculture (3) (Identical with WFSC 456, which is home). May be convened with 556.

459. Comparative Vertebrate Histology (4) Identification, phylogeny, and function of normal vertebrate tissues. 2R, 6L. P, 12 units of animal biology. Evolution and gross structure of vertebrate organ systems. A vertebrate anatomy and/or systematics course is strongly recommended. (Identical with ECOL 459). May be convened with 559.

466. Physiology Laboratory (3) (Identical with ECOL 466, which is home). May be convened with 566.

468. Comparative Physiology (3) (Identical with ECOL 468, which is home). May be convened with 568.

475. Parasite Immunology (3) An updated understanding and review of host-parasite interactions with emphasis on host immunological mechanisms operative in the control of parasitic infection. (Identical with MBIM 475, MCB 475, and MIC 475). May be convened with 575.

494. Practicum r. Research (3) [Rpt/2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.


* Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

500a-500b. Animal Anatomy and Physiology (3-3) For a description of course topics see 400a-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, 182; CHEM 243a; MATH 117R/S. May be convened with 400a-400b.

503R. Biology of Animal Parasites (3) For a description of course topics see 403R. Graduate-level requirements include an in-depth re-

503L. Parasitology Laboratory (1) For a description of course topics see 403L. Graduate-level requirements include an in-depth research paper dealing with the differential diagnostic techniques used to identify a single parasite species. P, 9 units of ecology or microbiology, CR, 403R. (Identical with ECOL 503L, ENTO 503L, INSC 503L, and MBIM 503L). May be convened with 403L.

504. Molecular Parasitology (3) GRD For a description of course topics see 404. Graduate-level requirements include attainment of a higher overall examination score and a research paper. P, 403R, BIOC 460/462a. (Identical with MBIM 504). May be convened with 404.

505. Animal Diseases (3) For a description of course topics see 405. Term paper required for graduate credit. May be convened with 405.

512. Biological Electron Microscopy (4) (Identical with MCB 512, which is home).


520. Pathogenic Bacteriology (3) For a description of course topics see 420. P, MIC 325, CHEM 241b, 243b. (Identical with MBIM 520). May be convened with 420.

523. Mechanisms of Disease (4) For a description of course topics see 423. Graduate level requirements include preparation of a research proposal on a selected relevant topic and analysis of selected publications from the current literature. (Identical with MBIM 523 and PCOL 523). May be convened with 423.

527. Insect Chemical Ecology (4) (Identical with ENTO 527, which is home). May be convened with 427.

529. General Virology (3) (Identical with MBIM 529, which is home). May be convened with 429.

532. Pathogenic Virology (3) [Rpt.] For a description of course topics see 432. Graduate-level requirements include a research term paper and class presentation. (Identical with MBIM 532). May be convened with 432.

538. Ecology of Infectious Disease (3) For a description of course topics see 438. Term paper required for graduate credit. P, 419 or 420. (Identical with MBIM 538). May be convened with 438.

543. Research Animal Methods (3) For a description of course topics see 443. 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, and MBIM 543). May be convened with 443.

549. Diseases of Wildlife (3) For a description of course topics see 449. Graduate-level requirements include either a term paper based on assigned reading or a research paper compiling field studies on other research experiences in wildlife disease. (Identical with WFSC 549). May be convened with 449.

550L. Medical Mycology Laboratory (2) (Identical with MBIM 550L, which is home).

550R. Medical Mycology (2) (Identical with MBIM 550R, which is home).

552. Medical-Vertebrate Entomology (4) [Rpt./3] (Identical with ENTO 552, which is home). May be convened with 452.

554. Host-Microbial Interactions (3) For a description of course topics see 454. Graduate-level requirements include a five-page proposal. (Identical with MBIM 554). May be convened with 454.

556. Aquaculture (3) (Identical with WFSC 556, which is home). May be convened with 456.

559. Comparative Vertebrate Histology (4) For a description of course topics see 459. Graduate-level requirements include a written report on a selected topic. (Identical with ECOL 559). May be convened with 459.

565. Shrimp Pathology (3) [Rpt./1] Comprehensive lectures and practical laboratory training on the current methods used to diagnose, prevent and treat the principal diseases of cultured penaeid shrimp. Field trip. P, B.S., M.S., and/or D.V.M. in biological and/or medically oriented fields.

566. Physiology Laboratory (3) (Identical with ECOL 566, which is home). May be convened with 466.

568. Comparative Physiology (3) (Identical with ECOL 568, which is home). May be convened with 468.

575. Parasite Immunology (3) For a description of course topics see 475. Graduate-level requirements include a major research project. (Identical with MBIM 575, MCB 575, and MCB 575). May be convened with 575.

612. Biological Electron Microscopy (4) (Identical with MCB 612, which is home).

630. Experimental Methods for Research (4) (Identical with MBIM 630, which is home).

649. Fishery-Water Quality and Toxicology (3) (Identical with WFSC 649, which is home).

660. Infectious Disease Epidemiology (3) [Rpt./1] (Identical with EPI 660, which is home).

695. Colloquium
a. Veterinary Laboratory (1-3) [Rpt./9 units]

696. Seminar
a. Research (1) [Rpt./3]

MIRCROBIOLOGY (MIC)

181L. Introductory Biology I Laboratory (1) (Identical with MCB 181L, which is home).

181R. Introductory Biology I (3) (Identical with MCB 181R, which is home).

182. Introductory Biology II (4) (Identical with ECOL 182, which is home).

195. Colloquium
a. Great Experiments in Microbiology (1) (Identical with BIOC 195a and MCB 195a).

b. Biotechnology (1) (Identical with BIOC 195b, which is home).

c. Society and Science (1) (Identical with BIOC 195c, which is home).

d. This Wormy World (1) (Identical with V SC 195d, which is home).

205. Microbiology (5) Introduction to general, applied, and pathogenic microbiology and immunology. Not available for major credit. 4R, 4L.

305. Introductory Plant Pathology (3) (Identical with PL P 305, which is home).

328. Microbial Physiology (3) P, 325, ECOL 320, CHEM 241a-241b. (Identical with V SC 328, which is home).

403R. Biology of Animal Parasites (3) (Identical with V SC 403R, which is home). May be convened with MBIM 503R.

403L. Parasitology Laboratory (1) (Identical with V SC 403L, which is home). May be convened with MBIM 503L.

404. Molecular Parasitology (3) GRD (Identical with V SC 404, which is home). May be convened with MBIM 504.

410. Cell Biology (3) (Identical with MCB 410, which is home).

411. Molecular Biology (3) (Identical with MCB 411, which is home).

419. Immunology (3) (Identical with V SC 419, which is home).

420. Pathogenic Bacteriology (3) (Identical with V SC 420, which is home).

421a-421b. Microbiological Techniques (3-3) Experiments to facilitate the development of laboratory skills in basic and applied microbiology and biotechnology with emphasis in physiology and metabolism genetics, immunology, and pathogenesis. 1R, 6L. P, 325. (Identical with MCB 421a-421b, PL P 421a-421b, SWES 421a-421b, V SC 421a-421b).

423. Mechanisms of Disease (4) (Identical with V SC 423, which is home). May be convened with V SC 523.

425. Environmental Microbiology (3) (Identical with SWES 425, which is home). May be convened with 525.
426. Environmental Microbiology Laboratory (2) (Identical with SWES 426, which is home). May be convened with MBIM 526.

427R. General Mycology (3) (Identical with PL P 427R, which is home).

427L. General Mycology Laboratory (3) (Identical with PL P 427L, which is home).

428. Microbial Genetics (3) (Identical with PL P 428, which is home).


430. Introduction to Biophysics (2) (Identical with PHYS 430, which is home). May be convened with MBIM530.

432. Pathogenic Virology (3) [Rpt.] (Identical with V SC 432, which is home).

438. Ecology of Infectious Disease (3) (Identical with V SC 438, which is home). May be convened with MBIM 538.

440. Biodegradation of Pollutants in Soil and Groundwater (3) (Identical with SWES 440, which is home). May be convened with MBIM 540.

443. Research Animal Methods (3) (Identical with V SC 443, which is home). May be convened with MBIM 543.


454. Host-Microbial Interactions (3) (Identical with V SC 454, which is home). May be convened with MBIM 554.

470. Food Microbiology and Sanitation (3) (Identical with N SC 470, which is home).

471. Food Microbiology and Sanitation Laboratory (2) (Identical with N SC 471, which is home).

473. Recombinant DNA Methods and Applications (4) (Identical with MCB 473, which is home).

475. Parasite Immunology (3) (Identical with V SC 475, which is home) May be convened with 475.

494R. Practicum: Research (3) [Rpt./2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

495. Practicum (3) R, Research (3) [Rpt./2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

565. Women in International Development (3) (Identical with ANTH 565, which is home). May be convened with 465.

695. Colloquium (1)

696. Seminar (1)

FAMILY AND CONSUMER RESOURCES (FCR)

120. Microcomputing Applications (3) (Identical with ABE 120, which is home).

195. Colloquium (1)

197. Workshop (1)

297. Workshop (1)

465. Women in International Development (3) (Identical with ANTH 465, which is home). May be convened with 565.

FAMILY STUDIES (FS)

117. Human Development and Relations (3) Behavioral science approach to human development through the life span.

137. Life Span Family Relations (3) Behavioral science approach to family development through the life span.

223. Infancy/Child Development (3) Growth, development, and socialization of the child within the family setting, from conception to the middle school years; observations of infants and preschoolers. P, PSYC 101.

288. Observation/Participation in Family and Consumer Science Education (3) 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. 2R/3L.

337. Dynamics of Family Relations (3) The modern family and its relationships with emphasis on marriage and interpersonal relationships. P, 137.

338g. Teaching Family and Consumer Sciences Education (3) Teaching models and active learning strategies for life management and family life educators. Taken semester immediately preceding FS 489. P, FS 377 or ED 320; FS 403; ED 310; CR, RS 388 and EDUC 350. (Identical with TTE 338g). Writing-Emphasis Course.

347. Child Development in Group Settings (3) Laboratory experience with young children. Supervised experience with 3-5 year-old children in a group setting; interactions, observations, discussions. 2R, 3L, P, 223.

377. Adolescence (3) Growth, development and socialization of the child from the middle school years through adolescence. P, 117, PSYC 101.

401. Basic Skills in Counseling (3) Selected counseling skills and their applications to non-counseling settings. Designed for non-majors
403. Pre-Adolescent and Adolescent Development (3) (Identical with ED P 403, which is home).

404. Principles of Adlerian Psychology (3) Techniques for the study of human behavior; implications for improving adult-child relationships, with emphasis on Adlerian principles. P, 6 units of social science.


409. Occupational Family and Consumer Sciences Programs (3) Purposes and methods of teaching family and consumer science-related occupations, with emphasis on cooperative vocational education. P, CR, 338g. May be convened with 509.

411. Consumer Issues in Nutrition (3) (Identical with N SC 411, which is home).

412. Issues in Aging (3) Introduction to gerontology, with emphasis upon contemporary issues. (Identical with GERO 413.)

413. The Design of the Mind: Genes, Adaptation, and Behavior (3) (Identical with PSYC 415, which is home). May be convened with 515.

427. Problems in Marriage and the Family (3) Identification and analysis of major problem areas in marriage and the family, including economic, sexual, role conflict, emotional disorders, and child rearing. P, 137.

428. Professional Presentations and Techniques (3) Theory and practice of educational techniques in non-formal settings in positions in business, government, and human services. CR, 3L. May be convened with 528.

439. Non-Formal Education (3) (Identical with A ED 439, which is home). May be convened with 539.

447. Problems in Human Development and Family Relations (3) In-depth examination of various dimensions of human growth and development. P, 223; 6 units of PSYC. May be convened with 547. Writing-Emphasis Course.*

457. Bio-Social Determinants of Socialization (3) Bio-social factors, including genetic influences, related to human development, socialization, and cross-cultural patterns of behavior. P, 223; 6 units of child development or SOC or PSYC. (Identical with SOC 457). Writing-Emphasis Course.*

458. Violence in Youth (3) (Identical with PSYC 458, which is home).

466. Family Economics (3) Analysis of the family as an economic-decision-making unit within the larger economic system. P, ECON 201b. May be convened with 566.

477. Genetic Basis of Normal and Deviant Traits (3) 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 577.

487. Advanced Family Relations (3) Critical analysis of selected studies and current research in family relations. P, 337, or SOC 321. May be convened with 587. Writing-Emphasis Course.*

489. Teaching in Family and Consumer Sciences Education (12) 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, 228, 338g, CR, 408, 428. Only pass/fail grade available.

493. Internship c. Family Life Education (1-8) [Rpt/2] Open to family life education majors only.

494. Practicum r. Research (3) [Rpt/2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

*Writing-Emphasis Courses. P, Satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

500. Life Span Development (3) (Identical with ED P 500, which is home).

503. Advanced Adolescent Development (3) (Identical with ED P 503, which is home).

505. Principles of Adlerian Psychology (3) For a description of course topics see 403. Graduate-level requirements include an additional research paper dealing with a theoretical aspect of Adlerian psychology.

507a-507b. Research Methods in Family Studies (3-3) 507a: Design issues of general relevance to behavioral research. 507b: Design issues of particular relevance to family and developmental research. Both 507a and 507b are offered in the fall semester only.

509. Occupational Family and Consumer Sciences Programs (3) For a description of course topics see 409. Graduate-level requirements include developing two teaching materials, e.g., job training manual. P, CR, FS 338g. May be convened with 409.

515. The Design of the Mind: Genes, Adaptation, and Behavior (3) (Identical with PSYC 515, which is home). May be convened with 415.

523. Socio-Cultural Context of Human Development (3) For description of course topics see 423. Graduate-level requirements include a review of research literature. (Identical with ED P 523). May be convened with 423.

528. Professional Presentations and Techniques (3) For a description of course topics see 428. Graduate-level requirements include a paper and a 30 to 60-minute presentation on a topic from the outline. In addition, graduate students must discuss an educational program tailor-made to their interest. May be convened with 428.

537. Analysis of Family Studies (3) An analysis of research topics; critical resources relevant to graduate training, and ethical/professional issues related to the conduct of research.

539. Non-Formal Education (3) (Identical with A ED 539, which is home). May be convened with 439.

546. Foundations of Family and Interpersonal Theory (3) 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 interpersonal relationships of the theories. P, 6 units in family studies, psychology or sociology.

547. Advanced Child Development (3) For a description of course topics see 447. Graduate-level requirements include additional assignments. P, 223; 6 units of PSYC. May be convened with 447.

550. Counseling and Human Sexuality (3) Sexual function, dysfunction, and disorders in context of individual and couple; interview techniques and intervention strategies. P, 6 units of counseling or related area.

555. Addictions Counseling (3) 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) Theories and principles of counseling for premarital, marital, and group counseling situations.

558. Violence in Youth (3) (Identical with PSYC 558, which is home). May be convened with 458.

566. Family Economics (3) For a description of course topics see 466. Graduate-level requirements include extra required readings and an in-depth term paper. P, ECON 201b. May be convened with 466.

567. Theories of Human Development (3) 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.
477. Graduate -level requirements include a research proposal or paper. May be convened with 477.

587. Advanced Family Relations (3) For a description of course topics see 487. Graduate-level requirements include extra required readings and an in-depth term paper. P, 337, or SOC 321. May be convened with 487.

597. Workshop
d. Counseling Children and Adolescents (3) Professional Relationships: Building Cooperation and Mediating Conflict (3) g. Computer Application in Agricultural and Non-Formal Education (1) [Rpt./3] (Identical with A ED 597g, which is home). h. Family Development through Family & Consumer Sciences Programs (1-2).

599. The Counseling Process (3) Introduction to theories of counseling; collation and interpretation of counseling data; the counseling process; study of cases. P, 601, 622.

601. Foundations of Counseling (3) The role of the counselor at all levels, in current and historical perspective; examination of the different types of counseling and the relationship of counseling to other aspects of the community.

607. Topics in Family Studies (1-3) [Rpt./3] Variable content: cognitive, developmental, and social theories of development, role theory, middle childhood, and others.

608. Studies in Family and Consumer Sciences Education (3) Study and analysis of research literature, methods, techniques, and procedures for conducting investigations, selecting and developing plans for research problems.


622. Appraisal of the Individual (3) Methods of appraising and reporting individual behavior, with emphasis on nonpsychometric data.

623. Testing in Counseling (3) Evaluation and selection of psychological tests for guidance; use of psychometric data in counseling. Open to majors only.

631. Career Counseling (3) Theories of vocational development; types, sources, and use of occupational and educational information in career counseling and decision making. P, 601 or CR.

636. Economics of Aging (3) Analysis of economic issues and policies as they affect the aging individual, family, and society. (Identical with GERO 636).

637. Trends in Human Relations (3) Philosophy, content, and resources for understanding, teaching, and working in the field of human relations.

644. The Counseling Process (3) Introduction to theories of counseling; collation and interpretation of counseling data; the counseling process; study of cases. P, 601, 622.

645. Theories of Counseling (3) Rationale, development, and research underlying major counseling theories. P, 631, 644.

647. Premarriage and Marriage Counseling (3) Contemporary issues, concepts, and procedures in premarriage and marriage counseling. P, 622.


649 Procedures in Marriage Counseling (3) Application of counseling theory and techniques to the diagnosis of marital relationships and strategies for behavior change. P, 403, 601, 622.

672. Cross-Cultural Counseling (3) Issues, research, and procedures involved in counseling with culturally different persons. P, 601, 622.

683. Group Counseling (3) Theory and process in group counseling; applications in community and mental health settings; laboratory experience. P, 644.

696. Seminar
e. Ethics and Professional Practice (3) P, 601, 622, 644.

115. Fundamentals of Design (3) Theory and exploration of design elements and principles; contemporary trends. Open to FCR majors only or consult department before enrolling.

215. Retail Advertising and Promotion (3) Activities used to influence sale of merchandise and services to promote trends and ideas; promotional plans including advertising, visual display, special events and publicity. P, 115 or CR.

255. Visual Merchandising and Display (3) 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, 115 or ART 101.

284. Textile Science (4) Survey of the chemical and physical properties used in manufacturing soft goods. Emphasis on end use applications and product specifications. P, 4 units of Physical Science as specified by RCS division.

304. Merchandising Analysis (3) Study of retail planning and control procedures with emphasis on retail mathematics and computer applications. P, 114, MATH 117, ACCT 200, ABE 220.

310. Consumer Economics (3) (Identical with AREC 310, which is home).

330. Food Retailing Principles (3) Study of food retailing principles and promotional techniques related to food retail establishments; inventory planning and control, buying, pricing, operation, human resources; current global issues affecting the food industry including production agriculture, manufacturing and wholesale distribution, strategic management and food consumption behavior. P or CR, MKTG 361.


340. Consumer Concepts and Theory (3) Decision-making processes as related to business environment. P or CR 400, MKTG 361, a statistics course, and senior standing. May be convened with 540. Writing-Emphasis Course.*


356. Retailing, Business and Culture in Mexico (3) A concentrated introduction to retail industry and other business realities in present-day Northern Mexico within the context of Mexican culture and society. Field trip.

376. Consumer and the Market (3) The buyer-seller relationship, with emphasis on consumer problems, the consumer movement, and business and consumer rights and responsibilities. Writing-Emphasis Course.*

384. Professional Development (3) Preparation for internship programs and careers; topics
556. Store Planning and Design (3) For description of course topics see 456. Graduate requirements include in-depth research paper or project. May be convened with 456.

606. Advanced International Consumption and Retailing (3) Analysis of major retailers’ strategies; retailing environments in specific regions of the world. Implementation of international strategies utilizing the case methods. P, 446 or equivalent.

607. Topics in Merchandising and Retailing (3) [Rpt./6 units] Analysis of current major topics or issues facing merchandising and retailing industries. P, 606.

614. Non-Store Retailing (3) 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, 400 or CR, MKTG 361.

624. Advanced Services Retailing (3) 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, 400 or CR, MKTG 361.

634. Retail Merchandising Analysis (3) 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, 400 or CR, MKTG 361.

656. Consumer Socialization (3) 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) Analysis of theoretical applications in retail management focusing on particular issues in retail management and consumer studies.

695. Colloquium
- a. Advanced Professional Teaching Development (1)
- b. Advanced Professional Research Development (1)
- c. Advanced Professional Leadership Development (1)

500. The Profession of Landscape Architecture (1) An examination of principles and practices of the profession. Course includes a brief history of the profession as well as famous practitioners and projects. P, senior or graduate standing.
507. The American Landscape (3) (Identical with GEOG 507, which is home). May be convened with 407.

510. Design Studio I (4) 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. Field trips.


520a-520b. Plant Materials and Design (2-2) 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. 520a is not prerequisite to 520b.

531a-531b. Computer Applications in Design (2-1) Two- and three-dimensional computer-aided design and video techniques for solving landscape architectural-related site problems. Use of computers for constructing high quality design solutions. Video animation for design evaluation.

542. History and Theory of Landscape Architecture (3) 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) 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 (4) 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. Field trips. P, 510.


574. Field Methods in Environmental Psychology (3) (Identical with PSYC 574, which is home). May be convened with 474.

596. Seminar
u. Interdisciplinary Environment-Behavior-Design (3) [Rpt./1] (Identical with PSYC 596u, which is home).

597. Workshop
i. Community Design for Non-Designers (3) (Identical with ARCH 597i, which is home). May be convened with 497i.

610. Landscape Planning Studio (4) Theories and models in landscape planning; planning issues and methods; case studies; one major studio planning project. Field trips. P, 511.

611. Interdisciplinary Studio (4) Complex landscape design and planning problems within an interdisciplinary area. Field trips. P, 610.

612. Social Dimensions in Landscape Architecture (2) Social and behavioral factors that influence the planning/design process; project goals and objectives; evaluation of planning/design alternatives; and evaluation of completed projects and plans.

631. Computer Applications in Planning (3) Techniques in planning, 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. P, 531.

660. Professional Practice (2) The practice of landscape architecture including professionalism, registration, the landscape architecture profession, services and fees, construction contract documents, bid documents and procedures, and business organization and operation. P, 611.

694. Practicum
a. Landscape Architecture Teaching (1-2)

b. Landscape Architecture Professional Experiences (4) [Rpt.] P, 511. Limited to LA AR majors, or by approval of LA AR faculty.

695. Colloquium
d. Landscape Architecture Research (2)
e. Research Design (3) P, 695d.

696. Seminar
a. Landscape Architecture (1) [Rpt.]

RANGE MANAGEMENT (RA M)

382. Rangeland Plant Communities of the West (3) Structure and function of western U.S. rangeland plant communities focusing on vegetation dynamics and anthropogenic influences. Laboratory includes classroom and field identification of communities and plant species.

436. Grazing Ecology and Management (3) 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 536.

446. Rangeland Inventory and Monitoring (3) Techniques of mapping and measuring attributes of vegetation and soils for inventory and monitoring of rangelands. Interpretation of data with respect to range condition and trend, watershed protection, value for livestock and wildlife habitat. P, RNR 202, 321. May be convened with 556. Writing-Emphasis Course.*

487. Rangeland Management Plan (2) Conduct a field inventory, develop management alternatives, and provide environmental and economic analyses of alternative management proposals in a written plan. 6L. All-day field trips. P, 456. May be convened with 587. Writing-Emphasis Course.*

494. Practicum
r. Research (3) [Rpt./2] P, ENG 101, MATH 117, ABE 120, and consent of instructor.

*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

536. Grazing Ecology and Management (3) For a description of course topics, see 436. Graduate-level requirements include additional required readings and research paper on selected topic. May be convened with 436.

546. Rangeland Vegetation Improvement (3) For a description of course topics, see 446. Graduate-level requirements include a research paper on an aspect of rangeland improvements. P, MCB 181, ECOL 182, SWES 200. May be convened with 446.

556. Rangeland Inventory and Monitoring (3) For a description of course topics, see 456. Graduate-level requirements include additional assigned readings and discussion periods. P, RNR 202, 321. May be convened with 456.

570. Functional Ecology of Arid Land Plants (2) 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) For a description of course topics, see 487. Graduate-
level requirements include development of additional management alternatives and environmental and economic analyses. All-day field trips. P. 456. May be convened with 487.

595. Colloquium
a. Rangeland Policy (3) [Rpt.]
  c. Diet Selection of Free-ranging Ruminants (2)

695. Seminar
a. Rangeland Management (1) [Rpt.]

**RENEWABLE NATURAL RESOURCES (RNR)**

105. American Design on the Land (2)
Survey of the profession of landscape architecture.

135. Conservation of Natural Resources (3)
Conservation and multiple use of renewable natural resources, including forest, watershed, range, wildlife, and recreation; history of forest and range use and its present status.

197. Workshop
a. The Natural Environment: Its Uses and Protection (1) Field trips. Offered only through the Horizons Unlimited Summer Program.

200. Foundations in History and Policy (3)
Historical and philosophical developments in natural resources management; social, political, and economic factors affecting natural resource use; the role of natural resource managers in today's society.

202. Natural Resources Plant Identification (3) Plant classification, identification and nomenclature, with emphasis on the grass, rose, legume, composite, pine, and other plant families containing important forest and range plants. Use of dichotomous keys and recognition of representative species will be utilized to develop plant identification skills. 1R, 6L.

271. Natural Resources Computer Applications (3) Application of microcomputer software for management of renewable natural resources. Includes spreadsheets, database management systems, and statistical programs with emphasis on the introduction to geographic information systems and their applications. 2R, 3L. Open to majors only. P, MATH 160 or 263, prior computer experience.

316. Natural Resources Ecology (4) Principles of plant, animal, and community ecology important to the understanding and management of renewable natural resources. Field trips. P, ECOL 182, RNR 202; CR, SWES 200, 201.

321. Natural Resources Measurements (3) Study of basic land, weather, hydrologic and vegetation measurements, and recreation use and animal census techniques employed in management of renewable natural resources. Field trips. P, ECOL 182, RNR 202; CR, SWES 200, 201.

375. Economics of Land and Water in the American West (3) (Identical with AREC 375, which is home).

384. Natural Resources Management Practices (4) Introduction to resource management practices used to achieve societal goals. Includes practices used to produce water, wood, forage, wildlife and other renewable resources; to protect water, soil, wilderness and scenic attractions; and to mitigate the adverse impacts of management and land-use activities on the environment. Field trips. P, basic ecology course, 316 or RA M 382.

406. Conservation Biology (3-4) (Identical with ECOL 406, which is home). May be convened with 506.

416. Geographic Information Systems for Geography and Regional Development (3) (Identical with GEOG 416, which is home).

417. Geographic Information Systems for Natural Resources (3) Introduction to the application of GIS and related technologies to natural resource management. Conceptual issues in GIS database design and development, analysis, and display. 2R, 3L. P, basic knowledge of computer operations. (Identical with GEOG 417 and SWES 417). May be convened with 517.

419. Cartographic Modeling for Natural Resources (3) Computer techniques for analyzing, modeling, and displaying geographic information. Development of spatially oriented problem design and the use of logic are applied to the use of GIS programs. Emphasis on applications in land resources management and planning. P, 417 or 517 or GEOG 481 or 581. (Identical with GEOG 419) May be convened with 519.

420. Advanced Geographic Information Systems (3) Examines various areas of advanced GIS applications such as dynamic segmentation, surface modeling, spatial statistics, and network modeling. The use of high performance workstations will be emphasized. 2R, 3L. P, 419. (Identical with GEOG 420). May be convened with 520.

422. Photointerpretation (2) Reading and interpretation of aerial photographs; natural resource inventory from aerial photographs; remote sensing techniques. 1R, 3L. May be convened with 522.

437. Modeling Natural Systems (3) Techniques for conceptualization, parameterization, programming, analysis and validation of computer simulation models of natural and managed systems. Process-oriented modeling methodologies emphasized. P, MATH 123, 124 or 125a, RNR 316, computer programming skills. May be convened with 537.

438. Fire Ecology (3) Ecological role and use of prescribed fire in forest and range ecosystems; fire history; concepts and specific fire effects on vegetation, wildlife, soils and watersheds. P, basic ecology course, 316 or RA M 382. May be convened with 538.

476. Environmental Law and Economics (3) (Identical with AREC 476, which is home).

478. Global Change (3) (Identical with GEOS 478, which is home). May be convened with 578.

480. Natural Resources Policy and Administration (3) Resource policy formation; ethics of resource use; administration and organization for resource management; analysis of present policy and trends. P, 200. May be convened with 580. Writing-Emphasis Course*

481. Environmental Policy (3) (Identical with POL 481, which is home). May be convened with 581.

483. Geographic Applications of Remote Sensing (3) (Identical with GEOG 483, which is home). May be convened with 583.

486a-486b. Natural Resources Management and Economics (3-3) Introduction to decision-making techniques in natural resources management, including planning; GIS, modeling, applied economics, and systems analysis techniques. 2R, 3L. P, AREC 375, RNR 271, 384. May be convened with 586a-586b. 486b is a Writing-Emphasis Course*

489a-489b. Advanced Environmental Interpretation (2-2) Advanced training and experience in communication of natural history and environmental principles to the public. Students must be available for some weekend field work. 489a is part of a two-semester sequence. Credit and grade for 489a will be awarded only upon completion of 489b. Field trips. P, 12 units in biology or renewable natural resources. May be convened with 589a-589b.

490. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 490, which is home). May be convened with 590.

497. Workshop
b. Desert Ecosystems (1) [Rpt./3] May be convened with 597b.
  w. Advanced Cadastral Survey (1-4) P, prior training and work experience in cadastral surveying. (Identical with C E 497w). May be convened with 597w.

*Writing-Emphasis Courses. P. Satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

506. Conservation Biology (3-4) (Identical with ECOL 506, which is home). May be convened with 406.

516. Geographic Information Systems for Geography and Regional Development (3) (Identical with GEOG 516, which is home).

517. Geographic Information Systems for Natural Resources (3) For a description of course topics see 417. Graduate-level requirements include a thorough bibliographic review and a scholarly paper on a current application of geographic information systems in the student's major field. P, basic knowledge of computer operations. (Identical with GEOG 417 and SWES 417). May be convened with 417.
519. Cartographic Modeling for Natural Resources (3) For a description of course topics see 419. Graduate-level requirements include a research paper. (Identical with GEOG 519). May be convened with 419.

520. Advanced Geographic Information Systems (3) For a description of course topics see 420. Graduate-level requirements include a more extensive project and report. P, 519. (Identical with GEOG 520). May be convened with 420.

522. Photointerpretation (2) For a description of course topics see 422. Graduate-level requirements include the preparation of a detailed report based on the application of the principles of photointerpretation to a specific problem in the management of natural resources. May be convened with 422.

527. Artificial Intelligence in Resource Management (3) Use of artificial intelligence as it applies to natural resources, including knowledge representation, problem solving, expert systems, feature recognition, neural networks, and genetic algorithms. Examples will be derived from current applications using various techniques to address management problems. P, computer programming skills.

537. Modeling Natural Systems (3) For a description of course topics see 437. Graduate students will do an expanded project and report. P, MATH 123, 124 or 125a, RNR 316, computer programming skills. May be convened with 437.

538. Fire Ecology (3) For a description of course topics see 438. Graduate-level requirements include a research report on the ecological impacts of fire in a specific vegetation type. P, basic ecology course, 316 or RA M 382. May be convened with 438.

546. Principles of Research (3) Philosophy of science and the principles of conducting research, including formulation of problems, problem analysis, study plans, and preparation of manuscripts for publication.

555. Advanced Applied Plant Ecology (3) Discussion of advanced topics in plant ecology, with emphasis on applied ecology of terrestrial ecosystems. P, basic ecology and statistics.

575. Economics of Natural Resource Policy (3) (Identical with AREC 575, which is home).

576. Advanced Natural Resource Economics (3) (Identical with AREC 576, which is home).

578. Global Change (3) (Identical with GEOS 578, which is home). May be convened with 478.

580. Natural Resources Policy and Administration (3) For a description of course topics see 480. Graduate-level requirements include an in-depth policy analysis paper. May be convened with 480.

581. Environmental Policy (3) (Identical with POL 581, which is home). May be convened with 481.

583. Geographic Applications of Remote Sensing (3) (Identical with GEOG 583, which is home). May be convened with 483.

586a-586b Natural Resources Management and Economics (3-3) For a description of course topics see 486a-486b. Graduate-level requirements include additional research on a planning project. May be convened with 486a-486b.

589a-589b. Advanced Environmental Interpretation (2-2) For a description of course topics see 489a-489b. Graduate-level requirements include development and presentation of an original interpretive program. Students must be available for some weekend field work. 589a is part of a two-semester sequence. Credit and grade for 589a will be awarded only upon completion of 589b. Field trips. P, 12 units in biology or renewable natural resources. May be convened with 489a-489b.

590. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 590, which is home). May be convened with 490.

595. Colloquium
   a. Public Natural Resource Management (2)
   b. Human Dimensions in Renewable Natural Resources (3)
   c. Heritage Resources Planning and Management (2)

596. Seminar
   i. Management and Policy for Ecological Sustainability (3) (Rpt.) (Identical with POL 596i, which is home).
   m. Conservation Biology (1) (Rpt./6 units) (Identical with ECOL 596m, which is home).

597. Workshop
   a. Natural Resource Conservation Workshop (1) (Rpt./2) Field trips.
   b. Desert Ecosystems (1) (Rpt./3) May be convened with 497b.
   c. Advanced Cadastral Survey (1-4) P, prior training and work experience in cadastral surveying. (Identical with CE 597m). May be convened with 497w.

599. Practicum
   a. Teaching in Renewable Natural Resource Studies (1-3) (Rpt./4 units)
   b. Teaching in Range Management (1-3) (Rpt./4 units)
   c. Teaching in Watershed Management (1-3) (Rpt./4 units)
   d. Teaching in Wildlife and Fisheries Science (1-3) (Rpt./4 units)

606. Applied Hydraulics (3) (Identical with ABE 406, which is home). May be convened with 506.

480. Wildland Fire Management (3) 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 508.

426. Soil and Water Conservation Engineering (3) (Identical with ABE 426, which is home). May be convened with 526.

435. Water Management in Dryland Ecosystems (3) Hydrologic principles as applied to arid and semi-arid ecosystems with water management applications in dryland resources management. For non-majors only. P, MATH 160 or 263, SWES 201. May be convened with 535.

460. Watershed Hydrology (4) Application of fundamental principles to quantifying the basic hydrologic processes occurring on watersheds. P, GEOS 101, SWES 200, 201; MATH 160 or 263. 3R, 3L. (Identical with HWR 460). May be convened with 560.

462. Watershed Management (4) Evaluating hydrologic impacts of management activities on watersheds to include silviculture, range, mining, and recreation use. 3R, 3L. P, 460 or one course in hydrology. May be convened with 562.

463. Plant-Water Relations (3) (Identical with PL S 463, which is home). May be convened with 563.

464. Introduction to Dendrochronology (4) (Identical with GEOS 464, which is home). May be convened with 564.

467. Advanced Watershed Hydrology (3) Advanced topics in watershed hydrology; rainfall-runoff, infiltration, overland flow routing, sediment modeling, statistical analysis and research methods in hydrology. P, 460. May be convened with 567.

468. Wildland Water Quality (3) Introduction to water quality and its influences in natural environments. Interactions with land management and relationships to the larger issues of environmental quality. Field trips. May be convened with 568.

504. Practicum
   a. Research (3) (Rpt./2) P, ENGL 101, MATH 117, ABE 120, and consent of instructor.
   b. Field trip.
   c. Dendrochronology (1-4) 3L or 6L. Field trip. (Identical with GEOS 497c). May be convened with 597c.

506. Applied Hydraulics (3) (Identical with ABE 506, which is home). May be convened with 406.

508. Wildland Fire Management (3) For a description of course topics see 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 408.


526. Water Conservation Engineering (3) (Identical with ABE 526, which is home). May be convened with 426.

531. Dryland Forest Management (3) 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) Ecological and socio-economic 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) For a description of course topics see 435. Graduate-level requirements include a report and oral presentation on a topic related to hydrology or water management in dryland ecosystems. For non-majors only. (Identical with ARIL 535). May be convened with 435.

560. Watershed Hydrology (4) For a description of course topics see 460. Graduate-level requirements include an in-depth paper on the application of hydrologic principles to problems in watershed management. 3R, 3L, P, GEOS 101; SWES 200, 201; MATH 160 or 263. (Identical with HWR 560). May be convened with 460.

562. Watershed Management (4) For a description of course topics see 462. Graduate-level requirements include the development of a watershed management scenario and accompanying report. 3R, 3L, P, 460 or one course in hydrology. May be convened with 462.

563. Plant-Water Relations (3) (Identical with PL S 563, which is home). May be convened with 463.

564. Introduction to Dendrochronology (4) (Identical with GEOS 564, which is home). May be convened with 464.

567. Advanced Watershed Hydrology (3) For a description of course topics see 467. Graduate students will be required to do additional exercises. P, 560. May be convened with 467.

568. Wildland Water Quality (3) For a description of course topics see 468. Graduate-level requirements include a class report and presentation on a negotiated topic of interest. Field trips. May be convened with 468.

569. Spatial Analysis for 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 417/517. (Identical with HWR 569).

574. Aquatic Plants and the Environment (4) (Identical with SWES 574, which is home). May be convened with 474.

577. Advanced Topics in the Economics of Environmental Regulation (3) (Identical with AREC 577, which is home).

595. Colloquium (Identical with GEOS 595).

597. Workshop (Identical with GEOS 595).


605. Watershed Modeling (3) Distributed modeling of hydrological and sedimentation processes at the watershed scale; emphasis on current concepts and applications. P, 560 and computer programming.

696. Seminar (Identical with V SC 449, which is home). May be convened with 549.

WILDLIFE AND FISHERIES SCIENCE (WFSC)


126. Wildlife Conservation Laboratory (1) Laboratory exercises and field trips covering conservation techniques; animal census, habitat analysis, population dynamics, and management techniques. 3L. Field trips. P, CR, 125.

213. Animal Genetics (3) (Identical with AN S 213, which is home).

300. Nutritional Biology (3) (Identical with AN S 330, which is home).

405. Aquatic Entomology (3) (Identical with ECOL 405, which is home). May be convened with 505.

444. Wildlife Management/Mammalian Species (4) Management of wildlife as a resource; characteristics of wildlife species; principles of population dynamics in wildlife populations; techniques used in studying wildlife. 3R, 3L and field work. Weekend field trips. P, RNR 384. Writing-Emphasis Course.*

446. Wildlife Management/Alian Species (4) Field and laboratory methods used in avian species management; evaluation of avian habitats; census, productivity, diagnosis, and control of avian populations. 3R, 3L and field work. Weekend field trips. P, RNR 384.

448. Current Problems in Wildlife Ecology (1) [Rpt.] Discussions and assignments covering current problems, including the biological, economic, aesthetic, political, and sociological phases of wildlife management. P, 444 or 446.

449. Diseases of Wildlife (3) (Identical with V SC 449, which is home). May be convened with 549.

455F. Fishery Management (3) Methods and concepts pertaining to fishery investigations and management; application of principles for enhancement of fisheries and aquatic habitats. P, 441 or 444. May be convened with 555F. Writing-Emphasis Course.*

455L. Fishery Management Laboratory (1) Field and laboratory methods pertaining to fishery investigations and management. P, CR, 455F, 482. May be convened with 555L.

456. Aquaculture (3) Overview lectures and assigned readings on the theory and practice of aquaculture. Includes the culture of seaweeds, mollusks, crustaceans, and fish. Field trips. P, ECOL 181, 182, CHEM 103a-103b, 104a-104b. (Identical with V SC 456). May be convened with 556.

474. Aquatic Plants and the Environment (4) (Identical with SWES 474, which is home). May be convened with 574.

475. Freshwater and Marine Algae (4) (Identical with ECOL 475, which is home). May be convened with 575.

482. Ichthyology (4) (Identical with ECOL 482, which is home). May be convened with 582.

483. Herpetology (4) (Identical with ECOL 483, which is home). May be convened with 583.

484. Ornithology (4) (Identical with ECOL 484, which is home). May be convened with 584.

485. Mammalogy (4) (Identical with ECOL 485, which is home). May be convened with 585.

488R. Arizona Mammals (3) (Identical with ECOL 488R, which is home). May be convened with 588R.

488L. Arizona Mammals Laboratory (1-2) (Identical with ECOL 488L, which is home). May be convened with 588L.

489. Selected Studies of Birds (2) [Rpt.] (Identical with ECOL 489, which is home). May be convened with 589.
584. Ornithology (4) (Identical with ECOL 584, which is home). May be convened with 484.

585. Mammalogy (4) (Identical with ECOL 585, which is home). May be convened with 485.

588R. Arizona Mammals (3) (Identical with ECOL 588R, which is home). May be convened with 488R.

588L. Arizona Mammals Laboratory (1-2) (Identical with ECOL 588L, which is home). May be convened with 488L.

589. Selected Studies of Birds (2) [Rpt.] (Identical with ECOL 589, which is home). May be convened with 489.

595. Colloquium c. Wildlife Habitat Analysis (2)
e. Advanced Topics in Population Ecology (1)

601. Population Regulation in Animals (2) Exploration of theoretical and empirical basis of population regulation; critical review of literature on extrinsic and intrinsic forces; implications for management.

649. Fishery-Water Quality and Toxicology (3) Pertinent water quality parameters essential for fish life, and the effects of various substances and their interrelationships to fish and aquatic organisms. 2R, 3L. P, 441 or 455R; CHEM 241a. (Identical with V SC 649).

696. Seminar a. Fish and Wildlife Ecology (1) [Rpt.]

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: sandersu.arizona.edu
http://w3.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 element of focus, 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 degree
Master of Architecture (M.Arch.)

Majors and degrees
Architecture (B.Arch., M.Arch.)

Undergraduate minor
No minor is required for the undergraduate program.

General education program
All undergraduate students are required to complete a 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
This is a five-year program with competitive admission to the second year. For specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). An APRR for the undergraduate major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available online at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic requirements for graduate degrees 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.

101. Architecture and Society (3) An overview of architecture and its relationship to society through a study of its history, its contemporary forms and its future; designed for non-majors.

112. Introduction to Design Communication (3) Overview of the principles of architectural drawing; lectures on various types of design communication supplemented by studio exercises; experience in graphic projections, perspective and freehand sketching. Fee.

114. Introduction to Architectural Theory (3) A broad introduction to the historical, cultural and cultural forces that affect the formation of buildings and physical environments. Lectures with slides and small discussion groups examine current and recurring problems and principles.

118. Structure in Architecture (2) An introduction to the role of structure in architecture; to the principles of structure, and to the behavior of structural elements, subsystems and systems. Fee.

201. Fundamentals of Architectural Design (6) Basic design principles and introduction to design of built form and exterior space, with attention to site analysis and natural siting, horizontal circulation systems, basic materials and structural systems. Fee. P, admission to the second year. For specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). An APRR for the undergraduate major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available online at http://www.arizona.edu/academic/oncourse/aprr.html.

202. Environmental Influences in Architectural Design (6) Design of built form and exterior space, site planning, climatic analysis and passive methods of environmental condition, including daylighting; horizontal and vertical systems of circulation, sustainable materials and structural systems. Fee. P, 201, 212.

212. Design Communications (3) Methods of generating, studying, and communicating architectural concepts. Direct perspective, shadow casting, and conceptual diagramming. P, 112 and
222. Techniques of Design Communication (3)
Rendering techniques and media for use in finished architectural presentation. Shade and shadow, en-
tourage, reflections, reproduction techniques, color rendering. P, 201 and 212.

226. Environmental Analysis (2) Introduction to theory and methods of environmental analysis in architecture including the influences of site, climate and social/physical context. Open to majors only. P, admission to professional phase in architecture.

227. Architectural Programming (2) Introduction to theory and methods of architectural programming including influences of users, economics, time, technology, safety, and aesthetics. Open to majors only. P, admission to professional phase of architecture.


270. Introduction to Architectural Computing (3) Micro-computer presentation techniques in architecture, including CAD, desktop publishing, and computer presentation. Previous experience is required with word processing, spread sheets and the DOS and Macintosh operating systems. P, professional phase admission.


302. Architectural Design (6) 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. Fee. P, 301.

318. Elements of Structural Systems (3) Force systems in equilibrium, introductory mechanics of materials, response of structural elements to stresses, principles of structural design including general characteristics of structural hierarchies. P, 118 and admission to professional phase.

324. History of Architecture and Western Civilization: Ancient through Medieval (4) 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 standing or permission of instructor. Open to non-majors.

328. Wood and Steel Structural Systems (3) 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, 318.

334. History of Architecture and Western Civilization: Renaissance to Present (4) 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 standing or consent of instructor; 324 is recommended. Open to non-majors.


336. Environmental Control Systems (3) 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, 236.

343. Watercolor Techniques for Architects (2) Techniques of watercolor communication utilized in architecture.

344. The Art and Architecture of the Islamic World (3) (Identical with ARH 344 and NES 344, which is home).


402. Topics in Architectural Design (6) 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. Fee. P, 401. May be convened with 502.

403. Solar Utilization in the Built Environment (3) Survey of solar energy utilization principles, methods and case studies focused upon building and site planning design. May be convened with 503.

404. Architecture and Planning in Mexico (3) Study of architectural development in Mexico during the prehispanic, Spanish colonial and contemporary periods, with emphasis on design ideas from each period. (Identical with LAS 404). May be convened with 504.

412. Publication Graphics (3) Designing compositions of text and graphics, and preparing them for publication. Class produces annual Archivaledar and other publications. P, 222, 301. May be convened with 512.

413. Architecture and the Arid Region (2) Studies of the relationship between architecture and the climatic characteristics of arid regions with emphasis on passive cooling techniques. P, 302. May be convened with 513.

414. History of American Architecture (3) Developments in American architecture from the colonial to the early modern period. P, 334 or permission of instructor. Open to non-majors. May be convened with 514.

418. Concrete and Masonry Structural Systems (3) 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./6 units] 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 522.

424. Modern Architecture (3) Study of recent architectural developments throughout the world, focusing on the personalities, theories and issues influencing built form since 1945. P, 334 or by consent of instructor; upper-division standing. May be convened with 524.


432. Video and Media in Design Communications (3) [Rpt./1] 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 532.

433. Lightweight Construction Techniques (3) Survey of lightweight construction techniques, including pneumatics, tensile membranes, three-dimensional cable nets, grid shells and flexure stiff plates. May be convened with 533.

434. History of the American House (3) Survey of American domestic buildings from European settlement to the present including social, political, and economic forces affecting architectural change. P, 334 or permission of instructor. (Identical with ARH 434). Open to non-majors. May be convened with 534.

44.2. Architectural Photography (3) Theory 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, scale models and simulation. Introductory hands-on exploration of large format photography with polaroid film. May be convened with 542.

443. Architecture in the Mediterranean (3) 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 543.

444. Site Planning (3) 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. P, 302. (Identical with PLAN 444). May be convened with 544.

451. Emphasis Areas in Architecture (6) 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. Fee. P, 334, 335, 336, 402, 428. May be convened with 551.

452. Senior Project (6) Studio-based project demonstrating a synthesis of knowledge or development of theoretical concepts. Fee. P, 451.

452H. Honors Senior Project (6) Studio-based honors project demonstrating a synthesis of knowledge or development of theoretical concepts. P, 451, admission into Honors Program.

459. Ethics and Practice (3) Standards and values of architectural services and professional project and practice management. P, 270 and 402. May be convened with 559.

462. Readings and Research in Design Communication (3) Reading and discussion of design communication theory and research. Generating, developing and defending a research proposal in design communication. P, 402. May be convened with 562.


473. Introduction to the Conservation of Cultural Resources (3) 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 573.

474. Field Methods in Environmental Psychology (3) (Identical with PSYC 474, which is home). May be convened with 574.

480. Computer Presentations in Architecture (3) 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, 470. May be convened with 580.

527. Field Methods in Environmental Psychology (3) (Identical with PSYC 527, which is home). May be convened with 427.

532. Video and Media in Design Communications (3) [Rpt./1] For description of course topics see 432. Graduate-level requirements include an additional project demonstrating a comprehensive grasp of video and media. May be convened with 432.

533. Lightweight Construction Techniques (3) For a description of course topics see 433. Graduate-level requirements include an additional research project. (Identical with ARH 533). May be convened with 433.

534. History of the American House (3) For a description of course topics see 434. Graduate-level requirements include an additional research project. (Identical with ARH 534). Open non-majors. May be convened with 434.

539. Construction Documents (3) For a description of course topics see 439. Graduate-level requirements include an in-depth research paper focusing on a particular aspect of developing new techniques in the field. May be convened with 439.

542. Architectural Photography (3) For description of course topics see 442. Graduate-level requirements include a research project. May be convened with 442.

543. Architecture in the Mediterranean (3) For a description of course topics see 443. Graduate-level requirements include a research paper. May be convened with 443.

544. Site Planning (3) For a description of course topics see 444. Graduate-level requirements include an in-depth research paper focusing on a particular aspect of developing new techniques in the field. (Identical with PLAN 544). May be convened with 444.

551. Emphasis Areas in Architecture (6) For a description of course topics see 451. Graduate-level requirements include additional project development focusing on a particular aspect of the topic under study. May be convened with 451.

559. Ethics and Practice (3) For a description of course topics see 459. Graduate-level requirements include an additional research paper focusing on a particular aspect of contemporary professional practice. May be convened with 459.

560. Introduction to Architecture Graduate Computing (3) 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.

562. Readings and Research in Design Communications (3) For a description of course topics see 462. Graduate-level requirements include an additional research paper on the topic. May be convened with 462.

563. Computer Energy Analysis (3) [Rpt./1] For description of course topics see 463. Graduate-level requirements include an additional research paper or project. May be convened with 463.

564. Women in American Architecture (3) For a description of course topics see 464. Graduate-level requirements include an additional research project. (Identical with ARH 564 and W S 564). P, permission of instructor. Open to non-majors. May be convened with 464.

565. The Art and Architecture of LeCorbusier (3) [Rpt./1] For a description of course topics see 466. Graduate requirements include an additional research paper or project. (Identical with ARH 566). May be convened with 466.

566. Computer Graphics in Architecture (3) For a description of course topics see 470. Graduate-level requirements include a special project demonstrating in-depth comprehension of an architectural concept or technique covered in the course. May be convened with 470.

573. Introduction to the Conservation of Cultural Resources (3) For a description of course topics see 473. Graduate-level requirements include an additional research paper focusing on a particular concept or methodology utilized in preservation practice. Field trips. May be convened with 473.

574. Field Methods in Environmental Psychology (3) (Identical with PSYC 574, which is home). May be convened with 474.

580. Computer Presentations in Architecture (3) For a description of course topics see 480. Graduate-level requirements include an additional research paper on the topic. May be convened with 480.

583. Advanced Computer Energy Analysis (3) [Rpt./1] For description of course topics see 483. Graduate-level requirements include an additional research paper focusing on a particular aspect of the topic. May be convened with 484.

584. Planning the Built Environment (2) For a description of course topics see 484. Graduate-level requirements include an additional research paper focusing on a particular aspect of the topic. May be convened with 487.

587. Space: A Social-Cultural View (3) [Rpt./1] For description of course topics see 487. Graduate-level requirements include an additional research paper focusing on a particular aspect of the topic. May be convened with 487.

b. Special Projects in Architecture (1-3) [Rpt./6 units] Consult college before enrolling. May be convened with 497b.

b. Community Design for Non-Designers (3-6) Field trips. Open to non-majors only. (Identical with L AR 597i and PLAN 597i). May be convened with 497i.

696. Seminar a. Readings in Architectural Theory (2-4) [Rpt.] Open to majors only. May be convened with 496a.
b. Research Methods in Architecture (3) Graduate-level requirements include longer research project or additional research project criteria. P, graduate admission. May be convened with 496b.
d. Mediterranean Cities in the 15th-16th Centuries: Cairo, Istanbul, Florence and Venice (3) (Identical with NES 596d, which is home). May be convened with 496d.

u. Interdisciplinary Environment-Behavior Design (3) [Rpt./1] (Identical with PSYC 596u, which is home).

b. Special Projects in Architecture (1-3) [Rpt./6 units] Consult college before enrolling. May be convened with 497b.

i. Community Design for Non-Designers (3-6) Field trips. Open to non-majors only. (Identical with L AR 597i and PLAN 597i). May be convened with 497i.

696. Seminar a. Readings in Architectural Theory (2-4) [Rpt.] Open to majors only. May be convened with 496a.
b. Research Methods in Architecture (3) Graduate-level requirements include longer research project or additional research project criteria. P, graduate admission. May be convened with 496b.
d. Mediterranean Cities in the 15th-16th Centuries: Cairo, Istanbul, Florence and Venice (3) (Identical with NES 596d, which is home). May be convened with 496d.
Exempt programs
Exempt programs must have the approval of the Dean of the College of BPA, and the dean of the college which offers the degree program. Students who qualify under this provision will be permitted to take only those required upper-division BPA courses 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.B.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 international business internship. Students apply for admission during the Spring semester of their junior year. Interested students should see an advisor in the freshmen or sophomore year. Contact an International Business advisor in McClelland Hall 203 for more information.

Undergraduate minors
A minor is not available for degrees within the College of Business and Public Administration. There is, however, a list of approved minors available to students in other colleges who qualify for BPA advanced standing or are in exempt programs. For more information, consult the advisors in McClelland Hall 203 for more information.

General education program
All undergraduate students are required to complete a 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.

College specific academic requirements
--120 units to graduate
--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

Program requirements
For specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/ oncourse/aprr.html.

For academic requirements for graduate degrees 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)
McClelland Hall, Rm. 301
The University of Arizona
PO Box 210108
Tucson, AZ 85721-0108
(520)621-2620; FAX:(520)621-3742
e-mail: accounting@bpa.arizona.edu
http://www.bpa.arizona.edu/bpa_departments/ acct/index.html

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

Graduate degrees
Master of Accounting (M.Ac.)

Major
Accounting (B.S.B.A., M.Ac.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/ oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

195. Colloquium
a. Freshman Colloquium in Accounting (1)


305. * Inference in Accounting and Auditing (3) The application of statistical tools to accounting and auditing problems. P, MATH 275.
400a-400b. Intermediate Financial Accounting (3-3) Theory and methodology involved in contemporary accounting for assets, liabilities, stockholders' equity, net income and funds, analysis and interpretation of financial statements. P. 210. Credit allowed for this course or 500a-500b but not for both. May be convened with 500a-500b.

401.* Advanced Accounting (3) Theory and methodology involved in the preparation of consolidated financial statements and in accounting for partnerships. P. 400b. Credit allowed for this course or 501 but not for both. May be convened with 501.

410.* Principles of Profit Planning and Control (3) Examination of the value of managerial accounting in organizational decision-making and control, addressing specific managerial accounting problems and their solution. P. 310. Credit for this or 510 but not for both. May be convened with 510.

420.* Introduction to Federal Taxation (3) Principles of federal income taxation, with emphasis on how individuals are taxed; additional topics. P. 210. Credit allowed for this course or 520 but not for both. May be convened with 520.

422.* Advanced Federal Taxation (3) Introduction to advanced topics: taxation of corporations and stockholders' transactions in stocks, taxation of partnerships and fiduciaries, gift and estate taxation. P. 420. Credit allowed for this course or 522 but not for both. May be convened with 522.

425.* Issues in Accounting and Taxation (3) Professional discussion of current issues such as estate and income tax, financial planning, IRS audits, bankruptcy, accounting developments, and accounting in business formation. P. 420. Credit allowed for this course or 525 but not for both. May be convened with 525.

429.* International Corporate Taxation (3) Concepts of U.S. taxation of international transactions, including rules for sourcing income and allocating deductions and such fundamental multistate concepts as nexus, unitary taxes and apportionment. P. 422 or permission of instructor. Credit allowed for this course or 529 but not for both. May be convened with 529.

431.* Principles of Auditing (3) The opinion formulation process of the professional auditor, the auditor's reports, professional standards, internal and operational auditing. P. 305, 400b. Credit allowed for this course or 531 but not for both. May be convened with 531.

451.* Analysis of Financial Statements (3) Examination of demand and supply forces underlying the provision of financial statements, the properties of financial statement information. P. 400b. Credit for this course or 551 but not for both. May be convened with 551.

451.* Accounting Information Systems (3) The analysis, design and implementation of information systems with special emphasis on financial applications. P., 310. (Identical with MIS 461).

471.* Policy Formation and Accounting Information Systems (3) Integrative course using the case study approach and focusing on the financial impact of accounting, marketing and production strategies. P. 310, 400b, FIN 311, MAP 305, MKTG 361. Open only to BPA majors. Writing-Emphasis Course.**

**Open only to students who meet the requirements for Advanced Standing as specified in the College of Business and Public Administration section of this catalog.

**Writing-Emphasis Courses. P. Satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

500a-500b. Intermediate Financial Accounting (3-3) For a description of course topics see 400a-400b. Graduate-level requirements include a special project. P. 550. Credit allowed for this course or 400a-400b but not for both. Open to MBA candidates only. May be convened with 400a-400b.

501. Advanced Accounting (3) For a description of course topics see 401. Graduate-level requirements include a special project. P. 400b or 500b. Credit allowed for this course or 401 but not for both. May be convened with 401. Open to MBA candidates only.

510. Principles of Profit Planning and Control (3) For a description of course topics see 410. Graduate-level requirements include a special project. Credit allowed for this course or 410 but not for both. P. 310 or 550. May be convened with 410.

520. Introduction to Federal Taxation (3) For description of course topics see 420. Graduate-level requirements include a special project. P. 550. Credit allowed for this course or 420 but not for both. Open to MBA candidates only. May be convened with 420.

522. Advanced Federal Taxation (3) For a description of course topics see 422. Graduate-level requirements include a special project. P. 420. Credit allowed for this course or 422 but not for both. May be convened with 422.

525. Issues in Accounting and Taxation (3) For course topics see 425. Graduate-level requirements include a special project. P. 520. Credit allowed for this course or 425 but not for both. May be convened with 425.


529. International Corporate Taxation (3) For a description of course topics see 429. Graduate-level requirements include a special project. P. 422/522 or permission of instructor. Credit allowed for this course or 429 but not for both. May be convened with 429.

531. Principles of Auditing (3) For a description of course topics see 431. Graduate-level requirements include a special project. P. 400b/500b, 305. Credit allowed for this course or 531 but not for both. Open to MBA candidates only. May be convened with 431.


696. Seminar a. Auditing (1-3) b. Managerial Accounting (1-3) c. Taxation (1-3) d. Theory (1-3) e. Behavioral (1-3)

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

BUSINESS ADMINISTRATION (B AD)
McClelland Hall
The University of Arizona
Accounting (520) 621-2620
Finance (520) 621-7554
Management Information Systems (520) 621-2748
Management and Policy (520) 621-1035
Marketing (520) 621-3519
Karl Eller Graduate School of Management
(520) 621-2169

Committee on Business Administration
Graduate degrees
Master of Business Administration (M.B.A.)
and international economic issues. An introduction to economic analysis. Not available to students who have completed or are enrolled in 201a, 201b, or 210.

201a-201b. Principles of Economics (3-3) CDT 201a: Nature of economics, price theory for the product market, factor prices, international economics. 201b: Introduction to the theory of national income and employment, money and banking, economic growth and stabilization. P, 201a. Not available to students who have completed or are enrolled in 200 or 210.

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 200, 201a, or 201b.

217. Resource and Environmental Economics (3) (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, 200 or 201a-201b or 210.

242. World Food Economy (3) (Identical with AREC 242, which is home).

300. Microeconomic Analysis for Business Decisions (3) Examination of industrial structure; theory of prices under varying market conditions; applications to business problems. P, 200 or 201a-201b or 210. For non-majors. Not available to students who have completed or are enrolled in 361.

303. History of Economic Thought (3) The origins and evolution of contemporary economic doctrines; classical, socialist, Keynesian and neoclassical thought in past and present social contexts. P, 200 or 201a-201b or 210.


313. Economics of Futures Markets (3) (Identical with AREC 313, which is home).

330. Macroeconomic Institutions and Policy (3) The study of how the macroeconomy is affected by institutions, technology and other forces, and governmental policies. P, 200 or 201a-201b or 210. For non-majors. Not available to students who have completed or are enrolled in 332.

332. Intermediate Macroeconomics (3) Analysis of output, employment, interest rates, and the price level; the effects of these on changes in monetary and fiscal variables. P, 200 or 201a-201b or 210; MATH 123, 124, or 125. Not available to students who have completed or are enrolled in 330.

339. Economic Statistics (3) (Identical with AREC 339, which is home).


406. Introduction to Experimental Economics (3) 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, 210 or 300 or 361.

407. Studies in Microeconomics (3) Studies in microeconomics, such as the economics of imperfect information and uncertainty, externalities and public goods, and imperfect competition. P, 361, MATH 125h. May be convened...
411. *Microeconomic Theory and Behavior (3) Microeconomic theory with an emphasis on the use of experimental laboratory and field methods for testing the behavioral implications of the theory. P, 300 or 361, MATH 125b. May be convened with 511.

418. *Introduction to Econometrics (3) 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, 339 or 376. May be convened with 518.

421. *Introduction to Mathematical Economics (3) Comparative statics, stability, classical optimization, the Kuhn-Tucker theorem, calculus of variations, linear algebra, game theory, and application of these techniques in economic analysis. P, six upper-division units in economics; MATH 125b. May be convened with 521.

422. *Introduction to Health Economics (3) (Identical with PA 422, which is home).


425. *Topics in the Economic History of the United States (3) 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, 300 or 361. May be convened with 525.


431. Games and Decisions (3) Introduction to decision theory and game theory and their application to various economic situations under conditions of complete and incomplete information. P, 300 or 361. May be convened with 531.


443. *International Trade Theory (3) General equilibrium analysis of product and input markets of international trade, tariffs, commercial policy, and growth and the welfare aspects of each. P, 300 or 361. May be convened with 543.


449. International Business Environments (3) Study of the widely-varying social, political, cultural and economic factors which make up different countries' unique business environments. Open to international business majors only. P, 300 or 361; 330 or 332.


453. *Business and Economic Forecasting (3) 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, 300 or 361; 418. May be convened with 533.

460. *Industrial Organization (3) Structure, conduct, and performance of American industry; governmental institutions and policies affecting business. P, 300 or 361; 339 or 376. May be convened with 560.

461. *Economics of Regulated Industries (3) Economic analysis of the regulated sector of the American economy, including communications, transportation and energy industries; impact of existing and alternative public policies. P, 300 or 361. May be convened with 561.

480. *New Venture Market and Industry Analysis (4) (Identical with MKTG 480, which is home).

481. *Economics of Wage Determination (3) 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, 339 or 376; 361.

482. *Labor and the Economy (3) Macro aspects of labor economics: unemployment causes and cures; unemployment and inflation; distribution of income. P, 339 or 376; 361.

484. *Economics of Fuels and Energy (3) Analysis of demand/ supply/ pricing, competitive behavior, transportation, interfuel competition, technical change, and externalities for markets for coal, oil, nuclear and natural gas. P, 300 or 361. May be convened with 584.

485. *Economics of Non-Fuel Mineral Industries (3) Analysis of national and international minerals markets; reserves/deposits, production technologies, market structure and pricing, recycling, and international trade. P, 300 or 361. May be convened with 585.

486. *Economics of Minerals, Residuals, Effluents, and the Environment (3) 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, 300 or 361. May be convened with 586.


*Open only to students who meet the requirements for Advanced Standing as specified in the College of Business and Public Administration section of this manual.

500. Managerial Economics (3) Microeconomic theory and applications. P, MATH 119 or 123. Advanced degree credit available for non-majors only. Open only to students admitted to a BPA graduate program.


504. Production Economics (3) (Identical with AREC 504, which is home).

505. Comparative Economic Systems (3) For a description of course topics see 405. Graduate-level requirements include a research project and different tests. Advanced credit available for non-majors only. P, 361 or 500. May be convened with 405.


507. Studies in Microeconomics (3) For a description of course topics see 407. Graduate-level requirements include a research paper or additional problem sets, depending on exact content. Advanced degree credit available for non-majors only. P, 361, MATH 125b. May be convened with 407.

508. Applied Economic Analysis (3) Uses economic history to show how research methods in economics are used to analyze data collected through empirical observation. P, 501a, 520.


511. Microeconomic Theory and Behavior (3) For a description of course topics see 411.
Graduate-level requirements include a research paper or additional problem sets, depending on exact content. P, 521. May be convened with 411.

512. Economic Policy in Developing Countries (3) (Identical with AREC 512, which is home).

513. Consumption Economics and Price Analysis (3) (Identical with AREC 513, which is home).

514. Cost-Benefit Analysis (3) (Identical with AREC 514, which is home).

515. Operations Research in Applied Economics (3) (Identical with AREC 515, which is home).

516. Agricultural Development (3) [Rpt.] (Identical with AREC 516, which is home).

518. Introduction to Econometrics (3) For a description of course topics see 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. P, 339 or 376 or MKTG 552. May be convened with 418.

519. Mathematical Economics (3) Introduction to the theory and methods of mathematical economics and its applications. Designed primarily for entering graduate students majoring in economics. P, CR, 520; consult department before enrolling.

520. Theory of Quantitative Methods in Economics (3) 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, CR, 519; consult with department before enrolling.

521. Introduction to Mathematical Economics (3) For a description of course topics see 421. Graduate-level requirements include a research paper or additional problem sets, depending on exact content. May be convened with 421.


524. The Chinese Economy (3) For a description of course topics see 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 424.

525. Topics in the Economic History of the United States (3) For a description of course topics see 425. 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 425.

526. Health Economics (3) (Identical with PA 526, which is home).

530. Macroeconomic Aspects of Finance (3) The effects of changing economic conditions upon a firm's operation, including capital decisions as well as production decisions. P, 500.

531. Games and Decisions (3) For a description of course topics see 431. Graduate-level requirements include a research paper. May be convened with 431.

535. Public Sector Economics (3) For a description of course topics see 435. Graduate-level requirements include an in-depth research project on a major current public sector issue. Advanced credit available for non-majors only. P, 500. May be convened with 435.

536. Innovation and Economic Growth (3) (Identical with MKTG 536, which is home).

537. International Public Finance (3) For a description of course topics see 437. Graduate-level requirements include a research project and different tests. Advanced credit available for non-majors only. May be convened with 437.

542. International Macroeconomics (3) For a description of course topics see 442. Graduate-level requirements include a research project and different tests. Advanced credit available for non-majors only. P, 330, 332, or 510. May be convened with 442.

543. International Trade Theory (3) For a description of course topics see 443. Graduate-level requirements include a research project and different tests. Advanced credit available for non-majors only. P, 361 or 500. May be convened with 443.


553. Business and Economic Forecasting (3) For a description of course topics see 453. Graduate-level requirements include a research project and different tests. Advanced credit available for non-majors only. P, 361 or 500; MKTG 552. May be convened with 453.

560. Industrial Organization (3) For a description of course topics see 460. Graduate-level requirements include an applied research project that examines the impact of public policy on industry performance. Advanced degree credit available for non-majors only. P, 300 or 361 or 500; 339 or 376 or MKTG 552. May be convened with 460.

561. Economics of Regulated Industries (3) For a description of course topics see 461. Graduate-level requirements include a case of regulation/deregulation or other approved research project in regulatory theory or policy. Advanced degree credit available for non-majors only. P, 300 or 361 or 500. May be convened with 461.


568. Environmental Scanning and Business Strategy (3) (Identical with MKTG 568, which is home).

575. Economics of Natural Resource Policy (3) (Identical with AREC 575, which is home).

576. Advanced Natural Resource Economics (3) (Identical with AREC 576, which is home).

577. Advanced Topics in the Economics of Environmental Regulation (3) (Identical with AREC 577, which is home).

580. Mathematics for Economists (2) (Identical with AREC 580, which is home).

584. Economics of Fuels and Energy (3) For a description of course topics see 484. Graduate-level requirements include a research project and different tests. Advanced degree credit available for non-majors only. P, 300, 361, 500, 501a or AREC 504. May be convened with 484.

585. Economics of the Non-Fuel Mineral Industries (3) For a description of course topics see 485. Graduate-level requirements include a research project and different tests. Advanced degree credit available for non-majors only. P, 300, 361, 500, 501a, or AREC 504. May be convened with 486.

586. Economics of Minerals, Residuals, Effluents, and the Environment (3) For a description of course topics see 486. Graduate-level requirements include a research project and different tests. Advanced degree credit available for non-majors only. P, 300, 361, 500, 501a, or AREC 504. May be convened with 486.

589. Public Choice (3) For a description of course topics see 489 (Identical with POL 589). May be convened with 489.

597. Workshop


b. Computational Methods in Laboratory Economics (1-3) [Rpt.] P, MATH 125a-125b; consult department before enrolling.

c. Teaching Methods in Economics (1-3) Consult instructor before enrolling.

d. Summer Institute on the American Economy (3) Consult instructor before enrolling.

e. Economics/Education Workshop (2) Consult instructor before enrolling.

f. Economic Development for Educators (2) Open to non-majors only. Consult with department before enrolling.
676. Economic Dynamics and Natural Resource Use (3) P, graduate student standing with one year of graduate microeconomic theory. (Identical with AREC 676, which is home).

696. Seminar
a. Experimental Economics I (3) [Rpt./3]
b. Experimental Economics II (3) [Rpt./3]
c. Applied Economic Analysis I (3) [Rpt./3]
d. Applied Economic Analysis II (3) [Rpt./3]
e. Econometric Modeling I (3) [Rpt./3]
f. Econometric Modeling II (3) [Rpt./3]
g. Monetary Economics (3) [Rpt./3]
h. Labor Economics I (3) [Rpt./3]
i. Labor Economics II (3) [Rpt./3]
j. Public Policy Analysis I (3) [Rpt./3]
k. Public Policy Analysis II (3) [Rpt./3]
l. International Economics I (3) [Rpt./3]
m. International Economics II (3) [Rpt./3]
n. Advanced Macroeconomic Theory I (3) [Rpt./3]
o. Advanced Macroeconomic Theory II (3) [Rpt./3]
p. Industrial Organization and Regulation I (3) [Rpt./3]
q. Industrial Organization and Regulation II (3) [Rpt./3]
r. Advanced Microeconomic Theory I (3) [Rpt./3]
s. Advanced Microeconomic Theory II (3) [Rpt./3]
t. Mathematical Economics (3)
u. Game Theory (3)
v. Public Choice I (3)
w. Public Choice II (3)
x. Economic History I (3) [Rpt./3]
y. Economic History II (3) [Rpt./3]

697. Workshop
d. Labor Economics (3) [Rpt./4] P, 696g, 696h.
g. Advanced Macroeconomic Theory (3) [Rpt./4] P, 696m, 696n.
i. Advanced Microeconomic Theory (3) [Rpt./4] P, 696q, 696r.
j. Economic History (3) [Rpt./4] P, 696s, 696t.

FINANCE (FIN)
McClelland Hall, Rm. 315R
The University of Arizona
PO Box 210108
Tucson, AZ 85721-0108
(520) 621-7554; FAX: (520) 621-1261
e-mail: gthompson@bpa.arizona.edu
http://www.bpa.arizona.edu/bpa_departments/fin/index.html

Baccalaureate degree
Bachelor of Science in Business Administration

(B.S.B.A.)

Major
Finance (B.S.B.A.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.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.

195a. First-Year Colloquium (1) Open to freshmen only.

311.* Corporation Finance (3) Financial problems involved in the organization and conduct of business enterprise. P, ACCT 210, ECON 200 or 201b.

313.* Economics of Futures Markets (3) (Identical with AREC 313, which is home).


421.* Investments (3) Operation and analysis of the stock, bond, and commodity markets; theory and practice in construction and management of investment alternatives. P, 311, ACCT 305 or MAP 376.

431.* Financial Intermediaries (3) 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, 311, ECON 330 and MAP 376.

444.* International Financial Management (3) (Identical with ECON 444, which is home).


471.* Policy Formulation and the Finance Function (3) Integrative course utilizing the case study approach and focusing on the financial impact of marketing and production strategies. P, 412, MAP 305, MKTG 361. Writing-Emphasis Course.**


484.* Development of New Venture Plans (4) (Identical with MAP 484, which is home).

511. Managerial Finance (3) 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) Financial theory applied to capital structure; investment decisions; corporate valuation; and corporate financial policies. P, 412 or 511.


518. Investment Banking (3) 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, 511.


528. Topics in Public and Nonprofit Financial Management (3) (Identical with PA 528, which is home).


537. Finance for New Ventures (3) Value maximization; simulation of value distribution; sources of venture capital; timing of initial public offering; new venture ownership structuring. Open only to students in the entrepreneurship program. P, 511, MKTG 500. (Identical with MAP 537).

539. Planning of New Ventures (3) (Identical with MAP 539, which is home).

555. Special Topics in Finance (3) [Rpt./2]

600. Theory of Finance (3) Theoretical models
and empirical evidence regarding financial decisions. P, 511.

601. Financial Decision Making Under Uncertainty (3) Theoretical and applied financial economics relating to uncertainty in markets, information, and choice.


695. Colloquium
a. Research and Finance (1-3) [Rpt./4]

696. Seminar
a. Investments (3) [Rpt./1]
b. Financial Markets (3) [Rpt./1]
c. Corporate Finance (3) [Rpt./1]
d. Financial Institutions (3)
e. Financial Theory (3) [Rpt./1]
f. Research Methods (3) [Rpt.]

697. Workshop
a. Research Issues (1-3) [Rpt./5] P, Admission to a graduate program in BPA.

THE KARL ELLER CENTER FOR THE STUDY OF PRIVATE MARKET ECONOMY
McClelland Hall, Rm. 202
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http://www.bpa.arizona.edu/programs/berger/
The Eller Center's Berger Entrepreneurship Program provides a unique curriculum that combines business coursework 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 information about the Master's in Business Administration, see the Karl Eller Graduate School of Management entry in this manual.

Major
Entrepreneurship (B.S.B.A.)

Program requirements
For specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the undergraduate major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on line at http://www.arizona.edu/academic/oncourse/aprr.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.

MANAGEMENT & POLICY
(MAP)
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The University of Arizona
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Tucson, AZ 85721-0108
(520) 621-1053; FAX: (520) 621-4171
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.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

305. Management and Organizational Behavior (3) 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.

320. Legal, Social and Political Environment of Business (3) Introduction to the social, legal and political environment of business. The relationship between business and government; regulation and interest groups, the legal process.

330. Human Resources Management (3) GRD Policies and current practices in utilizing human resources effectively at all organizational levels.

376. Statistical Inference in Management (3) Further topics in statistical inference and analysis; applications to managerial decision making. Not available to students who have completed or are enrolled in AREC/ECON 339 (Identical with ECON 376 and MKTG 376).

420. Advanced Business Law (3) GRD Negotiable instruments, partnerships, corporations, and property rights. P, CR 320 or permission to BPA graduate programs.

426. Wills, Estates, and Trusts (3) 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.


432. Bargaining and Negotiation in Organizations (3) 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, 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, 305. (Identical with SOC 444).

450. Training and Development (3) 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) 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.

471. Management Policies (3) Analysis plus case studies of management in business enterprises. Open only to BPA majors. An honors section of this course will be available for entrepreneurship program students. P, 305, FIN 311, MKTG 361. Writing-Emphasis Course.**

475. Topics in Management (3) [Rpt./1] Critical examination of various research activities taking place in the field of management and
organizational behavior. P, 305.

480. Men, Women and Work (3) 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, 305. (Identical with W S 480).

481. Finance and New Venture Development (4) (Identical with FIN 481, which is home).

483. Marketing Planning and Operational Decision-Making (4) (Identical with MKTG 483). 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. (Identical with MKTG 483).


486. Managerial Judgment and Decision (3) Development of a working understanding of decision analysis (DA) and its use in decision making. Emphasis on practical applications in professional and personal decisions.

496. Seminar a. Honors (3) [Rpt./2]

*Open only to students who meet the requirements for Advanced Standing as specified in the College of Business and Public Administration section of this manual.

**Writing-Emphasis Course. P, Satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

500. Management Case Analysis and Presentation (3) 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) (Identical with PHL 502).

503. Human Resource Management (3) Principles, methods, research relevant to management of an organization's human resources, with emphasis on employment psychology, training, development, compensation. P, 305 or 502.

505. Organizational Power (3) 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, 502.

506. Business Communication in Management (1) 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. CR, 502. Open to MBA students only.

532. Conflict and Cooperation in the Dyad (3) Critical exposition of the essential ideas of two-person game theory and the findings of experimental research on strategic interactions in the dyad.

534. Studies in International Management (3) For description of course topics see 435. Graduate-level requirements include additional research and writing on more complex issues. (Identical with PA 535).

537. Finance for New Ventures (3) (Identical with FIN 537, which is home).

538. Marketing, Negotiation and Decision Tactics (3) Development of bargaining and decision-making skills through simulated negotiations and role playing. Open only to students in the entrepreneurship program. P, ECON 500a-500b, FIN 511, MKTG 500. (Identical with MKTG 538).

539. Planning of New Ventures (3) New venture development, financial projections, resource assessment, and long-range planning. Open only to students in the entrepreneurship program. P, ECON 500a-500b, FIN 511, MKTG 500. (Identical with FIN 539).

543. White Collar and Organizational Crime (3) (Identical with PA 543, which is home).

545. Interactive Behavior in Small Groups (3) 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) Behavioral research techniques; bias, validity, reliability, and applicable statistical techniques; critiques of research articles and reports.

556. Gender Issues in Organizational Behavior (3) 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) 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, 305 or 502.

568. Environmental Scanning and Business Strategy (3) (Identical with MKTG 568, which is home).


579. Issues in Rural Health Care (3) (Identical with NURS 579, which is home).

580a-580b. Theory of Management and Organization (3-3) 580a: Analysis of behavior in organizational systems; review of classical, behavioral, and contingency theories of management with a focus on internal systems phenomena. 580b: Organizations in their environments; analysis of organizations in the context of their environmental interfaces. P, 305 or 502. 580a is not prerequisite to 580b.


600. Behavioral Science Theory and Method in Management (3) [Rpt./1] Conceptual and theoretical frameworks for the analysis of management problems from a behavioral science perspective. Emphasis on formulation of research questions and alternative research strategies for answering them.

696. Seminar a. Development Administration (1-3)

b. Program Planning and Development (1-3)
c. Performance Measurement and Accountability (1-3)
d. Judgment and Decision Making (3) [Rpt./2]


600. Behavioral Science Theory and Method in Management (3) [Rpt./1] Conceptual and theoretical frameworks for the analysis of management problems from a behavioral science perspective. Emphasis on formulation of research questions and alternative research strategies for answering them.

696. Seminar a. Development Administration (1-3)

b. Program Planning and Development (1-3)
c. Performance Measurement and Accountability (1-3)
d. Judgment and Decision Making (3) [Rpt./2]


600. Behavioral Science Theory and Method in Management (3) [Rpt./1] Conceptual and theoretical frameworks for the analysis of management problems from a behavioral science perspective. Emphasis on formulation of research questions and alternative research strategies for answering them.
Baccalaureate degree
Bachelor of Science in Business Administration (B.S.B.A.)
Graduate degree
Master of Science (M.S.)

Majors
Management Information Systems (B.S.B.A., M.S.)
Operations Management (B.S.B.A.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

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, 111.

301.* Data Structures and Algorithms (3) Application system development techniques, fundamental data structures and algorithms; design and implementation of selected software procedures using Pascal. P, 121, MATH 123.

307.* Computer Architecture and Data Communications (3) Computer architecture, operating systems principles, systems software, data communications, networks, protocols and distributed processing. P, 121.

331.* Database Management Systems (3) Introduction to database management systems; relational, CODASYL, and hierarchic models; security concurrency, integrity and recovery issues; query interfaces. P, 301.

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, 121.

342.* Data Structures and Algorithms (3) (Identical with C SC 342, which is home).

372.* Comparative Programming Languages (3) (Identical with C SC 372, which is home).

373.* Basic Operations Management (3) GRD 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.

396H.* Honors Proseminar (3)

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. May be convened with 511.


422.* Linear Programming and Applications (3) Recognition, formulation and solution of linear programming models for decision making. Modelling issues illustrated using examples from systems design, manufacturing, logistics, finance, etc. P, MATH 119. May be convened with 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 systems and organizations. P, 341.

450.* International Dimensions of Information Technologies (3) National 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. May be convened with 550.

451.* Advanced Business Programming (3) Business systems programming environment; basic and advanced COBOL; file organization and access methods; external sort and multi-key files; 4GLs in data processing. P, 301. May be convened with 551.

453.* Software Systems (3) 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, 301. May be convened with 553.

461.* Accounting Information Systems (3) (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 acting. Open only to BPA majors. P, FIN 311, MAP 305, MKTG 361, Senior Standing. Writing Emphasis Course.**

473a-473b.* Production and Operations Management (3-3) Productive systems, including service type industries; activities entailed in selecting, designing, operating, controlling, and updating systems. 473a: Forecasting, aggregate planning, MRP, inventory models under uncertainty, scheduling. P, 373. 473b: Topics include project management, quality control, reliability, facility layout and decision theory. Case studies, group projects and industry speakers give students an understanding of the human problems and quantitative methods. P, 373. May be convened with 573a-573b.

474.* Current Topics in Operations Management (3) Coverage of new techniques and technologies in operations management. Examples of topics that may be covered are JIT, OPT, robotics. P, 473b or CR. May be convened with 574.

475.* Managing for Quality Improvement (3) Operational aspect of quality improvement. Topics include statistical process control, total quality management. P, 373. May be convened with 575.

476.* Management of Service Operations (3) Application of operations management concepts to service organizations; exploration of critical issues such as facility location, layout, scheduling, and capacity management; case analyses and/or term project. P, 373. May be convened with 576.

477.* Materials and Logistics Management (3) Organization, management and control of material flow processes; logistical strategies and relationships of procurement, handling, warehousing, transportation, and inventory control. P, 373, 473a. May be convened with 577.

478.* Project Management (3) Definition of programs and projects, organizational forms, developing the work breakdown structure, scheduling techniques (PERT and CPM), control mechanisms such as milestones, cost reports and progress reports. Lectures and case analyses. P, 373. May be convened with 578.

479.* Computer Models for Operations Management (3) Use of available software packages to analyze complex operations man-
506. Business Communication in Operations Management (1) 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. C, 567. Open to MBA students only.

507a-507b. Information Systems Architecture and Data Communications (3-3) 507a: Fundamental concepts of operating systems. The principles and techniques required for engineering and understanding operating systems are covered. Examples from real systems are given to illustrate application of particular concepts. Hardware architecture that is relevant for understanding operating systems. 507b: Comprehensive view of data and computer communications. Explores key issues in the field, in the general categories of principles (including basic concepts and terminology used in the field); design approaches and applications in business; standards such as the IEEE, OSI, TCP/IP and others. P, 507a.

511. Social Issues of Computing (3) For a description of course topics see 411. Graduate-level requirements include an additional term paper. May be convened with 411.

521a-521b. Systems Modeling and Simulation (3-3) 521a: Topics include concepts of simulation, simulation software, model validation, selecting input probability distributions, random variable generation, statistical analysis of output data. SIMAN simulation language is covered. Previous programming experience is helpful, but not required. P, fundamental knowledge of probability and statistics. 521b: Modeling and analyzing complex business systems using advanced simulation and statistical techniques. A semester project is required. P, 521a or equivalent course. (Identical with C SC 521a-521b and SIE 521a-521b).

522. Linear Programming and Applications (3) For a description of course topics see 422. Graduate-level requirements include an additional term paper or program. May be convened with 422.

531a-531b. Data Structures and Database Management (3-3) 531a: Abstract data types, data structures and their implementation in Pascal programs. Data structures covered include stacks, queues, lists and trees. 531b: 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, 531a.

541a-541b. Computer-Aided Information Systems Analysis and Design (3-3) 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-541b).

546. Algorithms for Graphs and Network (3) Model formulation and solution of problems on graphs and networks. Topics include heuristic and optimization algorithms for shortest paths, min-cost flow, matching and traveling salesman problems. Credit is allowed for this course or SIE 546, P, 552 or SIE 544 or consent of instructor.

550. International Dimensions of Information Technologies (3) For a description of course topics see 450. Graduate-level requirements include an additional term paper or program. May be convened with 450.

551.* Advanced Business Programming (3) For a description of course topics see 451. Graduate-level requirements include an additional in-depth term paper and 30 percent more reading. P, 551a. May be convened with 451.

553. Software Systems (3) For a description of course topics see 453. Graduate-level requirements include the production of several medium-sized programs, with emphasis on the program life-cycle, maintainability, and life-cost. P, 553a. May be convened with 453.

554. Computer Graphics (3) Interactive computer graphics; user interface design; pictorial data structures and management. P, 553a.

567. Design and Control of Production Systems (3) Introduction to the basic concepts in operations management. Topics covered include project planning, aggregate planning, forecasting, classical inventory, models, linear programming and simulation. Open only to graduate students in BPA.

570. Management and Evaluation of Information Systems (3) 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. Open only to students admitted to BPA graduate programs. P, ECON 500 or consent of instructor.

573a-573b. Production and Operations Management (3-3) For a description of course topics see 473a-473b. Graduate-level requirements include an additional term paper or program. May be convened with 473a-473b.

574. Current Topics in Operations Management (3) For a description of course topics see 474. Graduate-level requirements include an additional term paper or program. May be convened with 474.

575. Managing for Quality Improvement (3) For a description of course topics see 475. Graduate-level requirements include an additional term paper or program. May be convened with 475.

576. Management of Service Operations (3) For a description of course topics see 476. Graduate-level requirements include an additional term paper or program. May be convened with 476.

577. Materials and Logistics Management (3) For a description of course topics see 477. Graduate-level requirements include an additional term paper or program. May be convened with 477.

578. Project Management (3) For a description of course topics see 478. Graduate-level requirements include an additional term paper or program. May be convened with 478.

579. Computer Models for Operations Management (3) For a description of course topics see 479. Graduate-level requirements include an additional term paper or program. May be convened with 479.

580. Introduction to Expert Systems (3) For description of course topics see 480. Graduate-level requirements include an additional term paper. May be convened with 480.

583. Stochastic Models in Management Science (3) Markov chains, models or arrival processes, continuous-time Markov chains, queu-
ing theory, models of computer and manufacturing systems. P, MATH 123.

584. Combinatorial Optimization and Integer Programming (3) Introduction to the formulation, solution and implementation of integer programming models, for decision making where the choices are discrete. Topics include network flow models, computational complexity, branch-and-bound and cutting-plane methods. P, 422 or 522.


588. Systems Design for Management (3) 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.

597. Workshop a. Collaboration Computing (3) May be con
evined with 497a.

611a-611b. Topics in Research Methodologies in MIS (3-3) 611a: Introduces beginning doctoral degree students and advanced master’s degree students to important research and survey articles in the field of management information systems. 611b: Provides a knowledge of research methodologies used in the MIS discipline, including experimental design, surveys, case studies, field work, and software engineering.

646. Combinatorial Optimization and Integer Programming (3) Formulation, solution and implementation of integer problems, for decision making where choices are discrete. Methods include branch-and-bound, cutting-plane methods and Lagrangean relaxation. Credit is allowed for this course or SIE 646. P, 522 or SIE 544 or consent of instructor.

671. International Issues (3) Analysis of technological developments and issues related to the international impact.


796. Seminar a. Research Issues (3) [Rpt./6 units] Open to majors only.


*Open only to students who meet the requirements for Advanced Standing as specified in the College of Business and Public Administration section of this manual.

MARKETING (MKTG)
McClelland Hall, Rm. 320
The University of Arizona
PO Box 210108
Tucson, AZ 85721-0108
(520) 621-7479; FAX: (520) 621-7483
http://www.bpa.arizona.edu/bpa_departments/mkt/index.html

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

Major Marketing (B.S.B.A.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.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.

195a. Advertising (1)

361.* Introduction to Marketing (3) Role of marketing in the economy and in business and nonprofit organizations; environmental factors affecting marketing; nature of marketing management decisions. P, ECON 200.

370. Marketing for Nonprofit Organizations (3) 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. Not acceptable for credit toward the marketing major. P, 361.

376.* Statistical Inference in Management (3) (Identical with MAP 376, which is home).

400. Retail Management (3) (Identical with RCS 400, which is home).

424. Services Retailing (3) (Identical with RCS 424, which is home).

440. Marketing Research (3) 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, 361, 376, MATH 123. In exceptional cases, concurrent registration with MKTG 376 may be allowed with permission of the department.

450.* Buyer Behavior (3) Customer behavior and the application of concepts and research findings from the behavioral sciences in the solution of marketing problems. P, 361, 376, MATH 123.

452.* Advertising and Promotion Management (3) Role of advertising and special promotions in the economy and business and nonprofit organizations, concepts and strategy for programs, budgets, media selection, evaluation of effectiveness. P, 361, 376, MATH 123.

454.* Management of Sales Operations (3) 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, 361, 376, MATH 123. May be convened with 554.

455.* Management of Distribution Systems (3) Nature and operation of channels in the distribution of goods and services; economic and behavioral problems in wholesaling and retailing; marketing logistics. P, 361, 376, MATH 123.

456.* International Marketing Management (3) Marketing operations for foreign environments; cultural, political and economic factors affecting the international marketer. P, 361.

459.* Product Management (3) Product (services) strategy for achieving financial growth; evaluating opportunities; generating ideas; launching new offerings; managing the product (services) portfolio. P, 361, 376, MATH 123.

470.* Marketing and Public Policy (3) Trends in public opinion, legislation and practices of governmental regulatory bodies; implications for marketing decision making; role of marketing research in public policy development. P, 361.

471.* Marketing Policies and Operations (3) An integrative, capstone course focusing on comprehensive marketing problems; development, control, and auditing of marketing organizations and operations. P, 361, FIN 311, MAP 305. Writing-Emphasis Course.*
486. *New Venture Market and Industry Analysis (4) Assessment of market opportunity; competitive strategy development, market structure analysis, forecasting techniques. Open only to entrepreneurship program students. P, 361, ECON 330, FIN 311. (Identical with ECON 480).

483. *Marketing Planning and Operational Decision-Making (4) (Identical with MAP 483, which is home).

*Open only to students who meet the requirements for Advanced Standing as specified in the College of Business and Public Administration section of this manual.

500. Marketing Management (3) Scope, environment and nature of marketing management; customer and market analysis for product, service, price, promotion and distribution decisions. Open only to students admitted to B.P.A. graduate programs.

506. Business Communication in Marketing (1) 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 marketing. CR 500. Open to MBA students only.

530. Management of Marketing Communications (3) Application of communications theory and research findings in advertising, sales promotion, publicity, personal selling; planning, conduct and administration of programs of information and persuasion. P, 500.

536. Innovation and Economic Growth (3) Role of entrepreneurship and innovation in economic growth. Development of the new venture idea and assessment of market potential. Open only to students in the entrepreneurship program. P, ECON 500, FIN 511, MKTG 500. (Identical with ECON 536).

538. Marketing, Negotiation and Decision Tactics (3) (Identical with MAP 538, which is home).

550. Consumer and Organizational Buyer Behavior (3) 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. P, 500.

552. Statistical Decision Making (3) 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 123.

554. *Management of Sales Operations (3) For a description of course topics see 454. Graduate-level requirements include an in-depth research paper. P, 361, 376, MATH 123. May be convened with 454.


559. Product Strategy (3) Formulating and implementing strategy for growth; analyzing and influencing market structure; developing, pricing, testing new entries; managing the portfolio. P, 500.

560. International Marketing (3) Marketing planning and strategies for foreign environments; cultural, political, economic factors affecting the international marketer, multinational corporation and multinational market groups. P, 500.

565. Management for Global Competitive Success (3) Developing comprehensive strategies and programs for delivering quality goods and services to consumers as a basis for global competitive success. P, 500 or consult department before enrolling.

568. Environmental Scanning and Business Strategy (3) An MBA integrative course. 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, 500, ECON 500, FIN 511. (Identical with ECON 568 and MAP 568).

572. Marketing Research for Managers (3) Specification of management information needs, evaluation of research proposals and findings, methods of gathering and analyzing data, administrative aspects of research and decisions. P, 500.

582a-582b. Multivariate Analysis in Management (3-3) 582a: Multiple, polynomial, stepwise regression including indicator variables, inference, remedial measures. 582b: Analysis of variance and covariance, principal components, discriminant analysis, canonical correlation. P, 552. 582a is not prerequisite to 582b.

672. Survey and Qualitative Marketing Research Methods (3) Survey and qualitative research for marketing management information needs; secondary data search methods; instrumentation, sampling, field work and data analysis; ethno- graphic, depth interview and projective methods. P, 500.

673. Experimental Research Methods in Marketing (3) Statistical, methodological and interpretive issues in the design of laboratory and field experiments/quasi-experiments for marketing and consumer research. P, 500.

695. Colloquium a. Research in Marketing (1) [Rpt./7]

696. Seminar a. Perspectives and Principles for Research in Marketing (3)
c. Marketing Management and Strategy (3) P, admission to marketing graduate program or approval of department.

d. Consumer Behavior (3) P, admission to marketing graduate program or approval of department.


KARL ELLER GRADUATE SCHOOL OF MANAGEMENT
McClelland Hall, Rm. 210
The University of Arizona
PO Box 210108
Tucson, AZ 85721-0108
(520) 621-3915; FAX: (520) 621-2606
e-mail: ellernet@bpa.arizona.edu
http://www.bpa.arizona.edu/programs/eller_school/

Graduate degree
Master of Business Administration (M.B.A.)

Major
Business Administration (M.B.A.)

Program requirements
For more information about the undergraduate minor (i.e., the 3/2 Program), contact the departmental office listed above.

For academic requirements for graduate degrees 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.

SCHOOL OF PUBLIC ADMINISTRATION & POLICY (PA)
McClelland Hall, Rm. 405
The University of Arizona
PO Box 210108
Tucson, AZ 85721-0108
(520) 621-7965; FAX: (520) 621-4171
e-mail: trsuitman@bpa.arizona.edu or
lpeterson@bpa.arizona.edu
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
Public Administration (M.P.A.)
Public Management (B.S.P.A.)
Health and Human Services Administration (B.S.P.A.)
Criminal Justice Administration (B.S.P.A.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Aca-
Methodology of evaluating the performance of public and nonprofit organizations and their interactions with technology and structure. P. 501.

503. Politics and the Policy Process (3) Various theories of how public policy is formulated.


505. Methods for Policy Analysis and Program Evaluation (3) Techniques for analyzing the effects of public policies and programs. P, MKTG 552 or permission of instructor.

506. Bureaucracy, Politics and Policy (3) (Identical with POL 506, which is home).


509. Government and the Nonprofit Sector (3) 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 deliver public services in health, welfare and 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 Planning and Management (3) Methods and models for program planning and policy analysis; forecasting, service demand, facility location in capital investment programming, task sequencing, program analysis and evaluation. P, MKTG 552, GEOG 557 or permission of instructor. (Identical with GEOG 514 and PLAN 514).


522. Analysis of Health Systems (3) 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) 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. P. 522. (Identical with PLAN 523).
596. Colloquium: Management and Policy for Ecological Sustainability (3) [Rpt.] (Identical with POL 596i, which is home).

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
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.

Undergraduate admission
The College of Education is an upper-division college, providing undergraduates with course work at the junior and senior level only. Undergraduates normally apply for admission to the college at the end of their sophomore year, after two years at a two- or four-year institution as pre-education majors. If enrolled at The University of Arizona, pre-education majors are administratively housed in University College. Persons who have already earned baccalaureate degrees in other fields and wish to gain teacher certification may apply to the college's post-baccalaureate program. All students seeking admission to the College of Education are strongly encouraged to consult an academic advisor early in their college career.

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.)
Doctoral degrees
Doctor of 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.)
Foundations of Education (M.A., Ph.D.)
Higher Education (M.A., Ph.D.)
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)
Extended 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)
Language Arts/Social Studies (B.A.E)**
Latin (B.A.E)
Mathematics (B.S.E.)
Physical Education (B.S.)
Physics (B.S.E.)
Political Science (B.A.E)
Russian (B.A.E)
Social Studies (B.A.E)**
Spanish (B.A.E)
Special Education and Rehabilitation (B.S.E., M.A., Ed.S., Ed.D., Ph.D.)
Teaching and Teacher Education (M.A., M.Ed., Ed.D., Ph.D.)

*Teaching majors are also available as teaching minors, unless otherwise indicated.
**Not available as a teaching minor

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 requires a minor chosen from the following disciplines:

Anthropology
Psychology
Sociology
Special Education

(Other minors may be approved by the department.)

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-
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 and degree
Academic unit
Agricultural Education (B.S.A.)
College of Agriculture
Art Education (B.F.A.)
College of Fine Arts
Health Education (B.S.H.S.)
School of Health
Related Professions
School of Music & Dance
Music Education (B.M.)
Theatre Arts Education (B.F.A.)
College of Fine Arts

Students in the programs listed earn degrees specific to the units. Refer to the administering unit for more information.

General education program
All undergraduate students are required to complete a 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 specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the undergraduate majors listed above may be obtained from the college or departmental office listed above. APRRs for all undergraduate majors are available on line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic requirements for graduate degrees 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)
350. Schooling in America (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. Writing-emphasis course* for all TTE students. P, satisfaction of the upper-division writing-proficiency requirement.

600. Disciplined Inquiry in Education (3) Introduction to research methods in education; analysis of research; writing of research reviews; applying research results in educational settings.

614. History of Education in the United States (3) The development of American educational thought from its colonial origin to the present.

615. Educational Sociology (3) The school as a social institution; social functions of the school; social processes, socialization, and stratification in education; informal and formal systems and the bureaucratic structure of the school.

EDUCATIONAL ADMINISTRATION & HIGHER EDUCATION (ED A/H ED)
Education Bldg., Rm. 321
The University of Arizona
PO Box 210069
Tucson, AZ 85721-0069
(520) 621-7951; FAX: (520) 621-1827
e-mail: oscs@mail.ed.arizona.edu
http://www.ed.arizona.edu/departs/tte/underinf.htm

Graduate degrees
Educational Specialist (Ed.S.)
Master of Arts (M.A.)
Doctor of Education (Ed.D.)
Doctor of Philosophy (Ph.D.)

Majors
Educational Administration (Ed.S., Ed.D.)
Higher Education (M.A., Ph.D.)
Foundations of Education (M.A., Ph.D.)

Program Requirements
For academic program requirements for graduate degrees, 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)

479. Workshop
a. Trends in Educational Leadership (3) [Rpt./12 units]. May be convened with 597a.

597. Workshop
a. Trends in Educational Leadership (3) [Rpt./12 units]. May be convened with 497a.
b. School Evaluation/Accreditation: Problems and Procedures (3)

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 Program (3) 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.

663. Computer Applications in School Administration (3) Techniques for using computers to make school administration more efficient; using computers to enhance the management of information. P, 660 or CR.


666. Curriculum and Instructional Leadership (5) Techniques for administrators to use in analyzing the quality of the curriculum in schools as well as the appropriateness of instructional techniques used to support the curriculum. P, 660 or CR.

671. School Finance (3) Historical background of the financing of education in the United States; economics and principles; sources and distribution of funds for education; budgeting, accounting, and reports. P, 660, 661 or CR.

672. School Business Management (3) The general management of school business; administration and accounting of school funds; administration of equipment and supplies; other business operations. P, 660 or CR.

675. Leadership and Organizational Theory and Behavior (5) Perspectives on the nature of the individual in the school organization; nature of schools as organizations; development of individual-organizational relationships. P, 660.

681. The Principalship (3) Functions and activities of building-level administrators, with emphasis on instruction, staff development, student services evaluation, and operational services. P, 693a and 15 units of educational administration, CR, 693b.

682. The Superintendent (3) Functions and responsibilities of the chief school executive and central office staff, with emphasis on external and internal system relationships in policy formulation and decision making. P, 693a, 693b or CR.

693. Internship a. Educational Leadership (2-3) [Rpt./4 units] P, 660, 661 or 662 or CR.

694. Colloquium a. Issues in Educational Leadership (1-3) [Rpt./12 units]

696. Seminar a. Topics in Educational Leadership (1-3) [Rpt./12 units]

HIGHER EDUCATION (H ED)

561. The Community College (3) The scope, objectives, and educational functions of the community college, patterns of community college programs.

569. Organization and Administration in Higher Education (3) Organizational theory, structures, systems, and administrative procedures in varied higher education institutions; patterns of governance and policy development.

671. Student Personnel Services in Higher Education (3) Student personnel services, philosophy, history, administrative procedures, representative programs, current trends.

682. Teaching in Higher Education (3) Planning, organizing, presenting and evaluating learning experiences for mature students.

641. Institutional Research and Planning (3) Development of institutional research programs for short-term/long-term planning; input/output measures.

650. Higher Education Finance (3) 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) Budget planning and execution; systems of resource allocation; personnel management; physical plant planning and construction; information systems and use in management.

693. Internship c. Higher Education (1-3) [Rpt./12 units]

695. Colloquium c. Issues in Higher Education (1-3) [Rpt./12 units]

696. Seminar c. Topics in Higher Education (1-3) [Rpt./12 units]

EDUCATIONAL PSYCHOLOGY (ED P)

Education Bldg., Rm. 602

The University of Arizona
PO Box 210069
Tucson, AZ 85721-0069
(520) 621-7828; FAX: (520) 621-2909
e-mail: edp@u.arizona.edu
http://www.ed.arizona.edu/departs/edpsych/

Graduate degrees
Educational Specialist (Ed.S.)
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major
Educational Psychology (Ed.S., M.A., Ph.D.)

Program Requirements
For academic program requirements for graduate degrees, 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.

300. Development Throughout Life (3) 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) 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) 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) Basic concepts essential to the comprehension of research in education, including measurement principles and descriptive statistics.


402. Early Adolescent Development (3) Major cognitive, psychosocial, physical and anthropological developmental theory of early adolescence (ages 10-14 years old). Also, the implications of theory into practice regarding early adolescents and schooling.

403. Preadolescent and Adolescent Development (3) 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) Essentials of computer operations; presentations software; software evaluations; telecommunications; computer-based diagnosis; appli-
412. Multimedia Production in Education
(3) Developing hypermedia materials for classrooms. Design models and structures for the development of hypermedia materials. Team development for creating hypermedia materials. Design and implementation of hypermedia materials for instruction. P, 411 or consent of instructor.

500. Life Span Development
(3) Overview of major findings of theories of development from infancy throughout 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) Aspects of growth and development which influence behavior of the school-age child; emphasis on current research findings. P, 301.

502. Motivation and Development in Classroom Learning
(3) 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) Major developmental tasks within the adolescent years. Emphasis on the importance or theoretically grounded research and the integration of theory, research and practice. (Identical with FS 503).

510. 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) For a description of course topics see 411. Graduate-level requirements include a substantial multimedia production project. May be convened with 411.

512. Multimedia Production in Education
(3) For a description of course topics see 412. Graduate-level requirements include justification of production with learning bases. P, 511 or consent of instructor.

517. Classroom Application of Behavior Modification Techniques
(3) Application of behavior principles and techniques to promote learning and social development of school-related behavior. P, 510 or CR.

523. Socio-Cultural Context of Human Development
(3) (Identical with FS 523, which is home). May be convened with 423.

541. Statistical Methods in Education
(3) Descriptive, correlational, and inferential procedures for presenting and analyzing school and research data. For students in all fields. 3R, 4L.

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, 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) Theoretical and practical application of psychometric techniques to test construction, analysis, and interpretation of test results. P, 541.

559. Assessment of Minorities
(3) 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.

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.

613. Psychological Theory in Educational Practice
(3) Major theories of psychological thought; strategies for utilizing such theories in educationally relevant research. P, 510.

614. Research in Educational Technologies
(3) Theoretical bases for research. Review of research design. Examination of research and technologies. Identification of designs useful in research on use of technologies. Design and implementation of mini-study with report to class. P, 511, EDUC 500, or LRC 530.

615a-615b. Developmental Issues in Schooling
(3-3) Policy, theory, research for understanding and assessing student's development and socialization in instructional settings. 615a: Affecting development. Theory and research needed for exploring how students develop and learn the informal curriculum in educational settings. 615b: 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.

619a-619b. Design of Instructional Technologies

640. Advanced Statistical Methods in Educational Research
(3) Inferential procedures for analyzing data in educational research. P, 640.

647. Factor Analytic Techniques in Education
(3) Principles and techniques of factor analytic procedures for analyzing data in educational research. P, 640.

658a-658b. Theory of Measurement
(3-3) Advanced topics in theoretical and practical issues in psychometrics. 658a: Classical test theory including generalizability theory. 658b: Item response theory, scaling, and computer-adaptive testing. P, 548, 558, and 640 or CR. 658a is not prerequisite to 658b.

673. Theories of Intellectual Assessment
(3) Various theories and models of human ability and their implications for intellectual assessment. P, 558 or CR.

679. Psychoeducational Assessment in the Schools
(3) Psychoeducational assessment techniques; practice in prescribing remedial programs.

682. Evaluation of Educational Technologies
(3) Evaluation for use in educational settings of instructional, measurement, and tool software; hardware; local and wide area network systems. P, 511 or consent of instructor.

692. Internship
a. Research/Evaluation (1-3) [Rpt.12 units]
b. College Teaching (1-3) [Rpt./12 units]

695. Colloquium
b. Issues in Educational Psychology (1-3) [Rpt./12 units]

696. Seminar
b. Issues in Educational Psychology (1-5) [Rpt./12 units]

LANGUAGE, READING & CULTURE (LRC)

Education Bldg., Rm. 512A
The University of Arizona
PO Box 210069
Tucson, AZ 85721-0069
Voice/TTY: (520) 621-1311
FAX: (520) 621-1853
e-mail: lrcinfo@mail.arizona.edu
http://www.ed.arizona.edu/departments/lrc/
lrcinfo.htm

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
Bilingual/Bicultural Education (M.Ed.)
Bilingual/Multicultural Education (M.A.)
Language, Reading & Culture (M.A., Ed.S., Ed.D., Ph.D.)

Program Requirements
For academic program requirements for graduate
degrees, 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.

139. Literacy Tutoring (3) Introduction to literacy and study strategies theory and practices; observation of literacy learning; supervised literacy tutoring.

197. Workshop a. Investigating Learning Strategies (3)

304. Decoding Skills in the Elementary School (2) Basic decoding skills needed in reading; methods and materials used in teaching reading.

320. Teaching with New Technologies (3) Surveys current technological developments, including hardware and software, and their impact on teaching and learning processes in schools today.

406. Foundations of Reading Instruction in Spanish (3) 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.

410. Foundations of Bilingual Education (3) 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 510.

412. Educating the Culturally Diverse (3) 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 512.

414. Bilingual Reading and Writing (3) Analysis of reading and writing situations encountered by bilingual students; phonological, semantic, and syntactic aspects of instruction; methods and materials. May be convened with 514.

415. 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 515.

418. Methods and Materials in Bilingual Education (3) 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. P, 504.

May be convened with 518.

428. Bilingual Curriculum Development (3) Theory and application of curriculum development to bilingual instructional programs: design, organizational patterns, materials and media, change strategies, and evaluation. May be convened with 528.

430. Computer Application for Teachers (3) Introduction to computer applications for language arts and other educators; examination of current and proposed hardware and software; survey of technological developments and trends impacting education; examination of social, psychological and educational consequences of technology in education. May be convened with 530.

435. Content Area Literacy in a Multicultural School (3) Prepares teachers to integrate knowledge of cultural diversity and literacy processes with their content and specialization. P, admission to the College of Education. (See "Restricted Enrollment in Professional Education Courses" in the College of Education section of this manual.) May be convened with 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 580.

504. Language and Culture in Education (3) Introduction to aspects of language and culture that affect education, particularly in reading, writing and the language arts; discussion of social and political concerns.

505. Essentials of Reading and Writing (3) Survey of reading and writing relationships: development, instruction, and evaluation.

507. Teaching of Reading: Decoding and Comprehension (3) 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) For description of course topics see 410. Graduate-level requirements include an in-depth research paper or other project. May be convened with 410.

512. Educating the Culturally Diverse (3) For description of course topics see 412. Graduate-level requirements include an in-depth research paper or other project on an aspect related to the course. May be convened with 412.

514. Bilingual Reading and Writing (3) For a description of course topics see 414. Graduate-level requirements include an in-depth research paper or other project. May be convened with 414.

515. Media and Reading, Language and Arts (3) For a description of course topics see 415. Graduate-level requirements include an in-depth research paper or project. May be convened with 415.

518. Methods and Materials in Bilingual Education (3) For a description of course topics see 418. Graduate-level requirements include an in-depth research paper or other project on an aspect related to the course. P, 504. May be convened with 418.

527. Developing Language Arts Curriculum (3) Curriculum theory and models; staff development for implementing change; scope and sequence; planning effective learning experience. P, 504 and 505.

528. Bilingual Curriculum Development (3) For description of course topics see 428. Graduate-level requirements may include an in-depth research paper or other project on an aspect related to the course. May be convened with 428.

530. Computer Application for Teachers (3) For a description of course topics see 430. Graduate-level requirements include an in-depth research paper or other project. May be convened with 430.

532. Pre-Reading and Beginning Reading Development (3) 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) For description of course topics see 435. Graduate-level requirements include an in-depth research paper or other project. May be convened with 435.

537. Classroom Diagnosis and Instruction (3) Procedures for diagnosing and developing reading and writing skills for pupils of below-average achievement level. P, 505, 507 or CR.

545. Research in Computer Language Arts (3) 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) 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) 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) The application to curriculum, teaching and learning of concepts from linguistics, psycholinguistics and sociolinguistics. P, 551 or CR.

557. Application of Misuse Analysis (3) Study of misuse 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, 551 or CR.

559. Whole Language: Curriculum and Organization (3) Whole language pedagogy: theory, curriculum, organization, and practice. Application will be made to all levels in first and second languages. Field trip.

570. Language Research Methodology in Education (3) Investigation of procedures for conducting literacy research; examples of literacy research paradigms; critical analysis of evidence supporting literacy practices. P, 507 or 551.

578. Field Experience (3) Supervised experience in assessment and instruction of literacy-related practices. P, 504, 505 or CR.

580. Children's Literature in the Classroom (3) For a description of course topics see 480. Graduate-level requirements include an in-depth research paper or other project. May be convened with 480.

581. Multietnic Literature and Literacy (3) Analyzes the use of multietnic literature that fosters self-concept, acceptance, and a sense of identity to develop literacy. Includes readings from the major categories of multietnic literature about Black, Native, Hispanic, and Asian Americans.

583. Literature Discusisons (3) Issues related to dialogue about children's literature within a community of readers. Research, theory and practice related to literature discusison groups, text, sets, reader response and collaborative learning.

595. Colloquium a. Issues in Language, Reading and Culture (1-3) P, 504, 505. [Rpt./12 units] b. Language, Learning, and Reading Disabilities (3) (Identical with SER 595b, which is home). c. Issues in Educating Bilingual/Multicultural Children (1-3) [Rpt./9 units] d. Applications of Language and Literacy (3) [Rpt./9 units]

597. Workshop a. Southern Arizona Writing Project (3-9) [Rpt./12 units] (Identical with ENGL 597a, which is home). b. Discourse Analysis in Teacher Education (2-3) c. Teaching of English (3) [Rpt/3] (Identical with ENGL 597b, which is home)

612. Grammatical Analysis (3) (Identical with ENGL 612, which is home).

613. Methods of Teaching English to Speakers of Other Languages (3) (Identical with ENGL 613, which is home).

627. Curriculum Development and Supervision in Language Arts (3) Organizational patterns of language arts curricula; approaches to improvement of language arts instruction; personnel relations. Designed for the language arts supervisor and school administrator. P, 527.

634. Reading Comprehension: Theories, Research, and Methods (3) Factors affecting cognitive development; methods of influencing growth in reading comprehension; evaluation and analysis of instructional materials; research related to comprehension and cognitive development. P, 507.

635. Reading and Writing in Content Areas (3) Methodology appropriate for reading and writing to learn content; compatible organizational models; program implementation. P, 504, 505, 507 or 551 or CR.

638. Reading Diagnostic Laboratory (3-6) [Rpt./6 units] Supervised practice in reading assessment; identification of factors influencing reading achievement, evaluation, construction, and administration of assessment procedures; development of interview techniques. P, 507, 537.

639. Reading Instructional Laboratory (3-6) [Rpt./6 units] Supervised practice in teaching reading and writing, preparing, analyzing, and critiquing special instructional programs for students. Open to majors only. P, 507, 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, 505, 553.


696. Seminar a. Language, Reading and Culture (1-3) P, 15 graduate units including 504, 505, 507. b. Research in Bilingual Education (1-6) c. Research in Language and Literacy (1-6) [Rpt./9 units]

796. Colloquium a. Theory and Research in Language, Reading and Culture (1-3) [Rpt./15 units]

SPECIAL EDUCATION & REHABILITATION (SER)

Education Bldg, Rm. 412
The University of Arizona
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Tucson, AZ 85721-0069
(520) 621-7822; FAX: (520) 621-3821
e-mail: rgamal@mail.ed.arizona.edu
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.)

Education Specialist (Ed.S)
Doctor of Education (Ed.D)
Doctor of Philosophy (Ph.D.)

Major
Special Education and Rehabilitation (B.S.E., M.A., Ed.S., Ed.D., Ph.D.)
Options: general
deaf studies

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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 Office of Student Services at one of the addresses above.

301a-301b. Mainstreaming (2-2) GRD Introduction to the integration of special students into the regular elementary (301a) and secondary (301b) classrooms. 301a is open to elementary education majors currently enrolled in student teaching. 301b is open to secondary education majors currently enrolled in student teaching. P, TTE 322, 323, 324, 326, 327.

370a-370b. American Sign Language (4-4)
Designed for students with no previous knowledge of ASL and/or deaf culture. To develop basic skills in ASL vocabulary, grammar and use. Must be taken in sequence.

400. Survey of Special Education and Rehabilitation (3) 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 for Students with Early Reading and Spelling Difficulties (3) 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 501a.

401b. Assessment and Instruction for Preschool Children with Learning Problems (3) 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 development, socioemotional development, and the development of adaptive behavior will
be emphasized. P, 400, 460, 575. Open to
students in dual certification program in TTE.

402. Behavior Principles and Disability (3)
Use of behavior principles to positively support
individuals with disabilities, especially those with
moderate and severe disabilities. 3R, 1L. P, 400.
May be convened with 502.

403. The Special Services in the Schools (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 503.

404. Cultural and Linguistic Diversity in
Exceptional Learners (3) Provides a theoreti-
cal 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 504.

405. Introduction to Learning Disabilities
(3) Theories and history of programs for individ-
uals with learning disabilities—definition, char-
acteristics, etiology. Degree candidates must
complete 400 prior to taking 405. May be
convened with 505.

410. Introduction to Mental Retardation and
Severe Disabilities (3) History and philoso-
pies of educational programs for persons
with mental retardation and other developmental
disabilities; etiology, classification, and char-
acteristics, with consideration of educational,
social, and psychological problems. P, 400 or
CR. May be convened with 510.

411. Service Delivery Trends in Rehabili-
tation and Special Education (3) Critical ex-
amination of current trends, issues and initia-
tives affecting service systems for persons with
disabilities.

415. Physical and Multiple Disabilities (3)
[Rpt/1] Physical and multiple impairments, etiology,
intervention practices, adaptations, trans-
ferring and handling skills, and integration
into typical environments. Field trips. May be
convened with 515.

421. Introduction to Visual Impairments
and Deaf-Blindness (3) An overview of edu-
cational services for the student with visual
impairments and multiple sensory impairments.
An emphasis is placed on the psychosocial ef-
fects of visual impairments on the individual and
methods of compensating for those effects. May
be convened with 521.

423a. Tactile Communication (3) Funda-
mentals of Braille reading and writing, methods
of teaching Braille and preparation of materials.
May be convened with 523a.

425. Strategies of Vocational Development
and Supported Employment (3) Systematic
study of the strategies used to place and retain
individuals with disabilities in paid, community
employment. Topics to include job develop-
ment, consumer assessment, job placement, jobs-
ite training, and follow-up. P, 400. May be
convened with 525.

429. Education and Rehabilitation of Deaf
and Hard of Hearing Individuals (3) Current
and historical perspectives; educational and re-
habilitative services; etiology, impact on fam-
ilies, psychosocial, cognitive and intellectual
development and functioning of deaf and hard of
hearing individuals. May be convened with 529.

431a-431b. American Sign Language (4-4)
Designed to develop intermediate ASL conver-
sational skills in a variety of settings, topics, and
functions. P, 370B or department permission.
May be convened with 531a-531b. Must be
taken in sequence.

433a-433b-433c-433d. Special Topics in Deaf
Studies (3-3-3-3) 433a: Introduction to the
structure of ASL; 433b: Languages and cultures of
defaf communities; 433c: History of the deaf
community; 433d: ASL literature and film.
Classes will be offered on a rotating basis in a-
abc-c sequence; however, courses need not be taken
in sequence. P, 431b or permission of depart-
ment. May be convened with 533a-533b-533c-
533d.

439a-439b-439c. Special Topics in Sign Lan-
guage Studies (3-3-3) Special classes will be offered
on a rotating basis in the following sequence-
439a: ASL Acquisition and Bilingualism; 439b:
Signed Language Policy, Planning, and Inter-
vention; 439c: Methods and Materials of ASL/
ESL Instruction. Courses need not be taken
in sequence. P, 431b or permission of depart-
ment. May be convened with 539a-539b-539c.

440. Education of Gifted Children (3) Issues
in education of the gifted; discussion of defini-
tions, characteristics, development, screening,
identification, curriculum, teaching strategies,
and program development. P, 400. May be
convened with 540.

444a-444b-444c. ASL Discourse Processes
(3-6/3-6/3-6) 444a: Intensive ASL. 444b: Intro-
duction to Interpreting. 444c: Classroom in-
struction in ASL. Courses need not be taken in
sequence. P, 431b or permission of depart-
ment. May be convened with 544a-544b-544c.

450. Introduction to Emotional or Behav-
ioral Disorders (3) Issues in education of the
emotionally or behaviorally disordered; discus-
sion of history, current issues, definitions, char-
acteristics, and theoretical perspectives. P, 400.
May be convened with 550.

455. Rehabilitation and Aging (3) Emphasis
on aging from the viewpoint of the aging person
and those working with the aged. May be
convened with 555.

460. Introduction to Early Childhood Spe-
cial Education (3) 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,
400. May be convened with 560.

468. Transition Methods (3) Provides an
understanding of effective strategies for prom-
oting the smooth transition of students with
disabilities from school to work and adult living.
May be convened with 568.

475. Observation and Participation in Spe-
cial Education Programs (1-3) [Rpt/6 units]
Practical experiences with individuals having
special needs with focus on psychological, edu-
cational and service-related implications and
practices. Field trips, class observations and
seminars. P, 400/500.

478. Prevention of Addictions (3) Analysis of
addictive behaviors (e.g., drug addictions, eating
disorders, compulsive gambling) from a psycho-
social and biological perspective and the impli-
cations of this analysis for primary, secondary,
and tertiary prevention of addictions. May be
convened with 578.

481. Interviewing and Client Services (3)
The development of essential interviewing skills
for case management of rehabilitation clients. P,
400, 411, 425/525.

483. Supervised Casework in Rehabilita-
tion (3) Application of fundamental profes-
sional rehabilitation theories and skills in field
settings. P, 400, 411; 481 or CR.

484: Problems of Drug Abuse (3) [Rpt/1]
Survey course for teachers, counselors, and agency
workers concerned with drug abuse; examination
of community, cultural, and educational ap-
proaches to drug use and abuse. May be convened
with 584.

485. Rehabilitating the Public Offender (3)
Components in service delivery to the public
offender, how the offender enters the criminal
justice system, and treatment and rehabilitation
services available.

494. Practicum
a. Teaching Exceptional Children (1-10) P, 400,
field work, student teaching in area of emphasis.

500. Foundations of Special Education and
Rehabilitation (3) Provides beginning gradu-
ate students with a knowledge of issues surround-
ing the fields of special education and rehabilita-
tion. Issues include legal; principles and con-
cepts of assessment; principles of teaching and
counseling. Students will examine and develop
their personal philosophies regarding assessment of,
services to and intervention with individuals with
exceptionalities. P, 400.

501a. Assessment and Instruction for Stu-
dents with Early Reading and Spelling Diffi-
culties (3) For a description of course topics
see 401a. Graduate-level requirements include
in-depth projects. May be convened with 401a.

502. Behavior Principles and Disability (3)
For a description of course topics see 402.
Graduate-level requirements include in-depth
paper(s) on aspects of current issues in the field.
May be convened with 402.

503. The Special Services in the Schools (3)
For a description of course topics see 403.
Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with 403.

504. Cultural and Linguistic Diversity in Exceptional Learners (3) For a description of course topics see 404. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with 404.

505. Introduction to Learning Disabilities (3) For a description of course topics see 405. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with 405.

507a-507b. Methods for Diagnosing Specific Learning Disabilities (3-3) Educational and psychological assessment of academic areas and learning processes involving perception, integration, and expression, with emphasis on strategies for planning and implementing instructional programs at the elementary level. P, 405/505 or permission of department; CR, 593.

508. Teaching Elementary Students with Learning Disabilities (3) Remediation 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, 405/505 or permission of department; CR, 593.

510. Introduction to Mental Retardation and Severe Disabilities (3) For a description of course topics see 410. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. May be convened with 410.

512. Teach Learning Disabled Adolescents (3) Intervention alternatives for teaching the learning disabled adolescent at the secondary level. Emphasis on current intervention methods and practices. 400/500.

513. Educating Students with Mental Retardation and Severe Disabilities (3) 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./J] For a description of course topics see 415. Graduate-level requirements include additional assignments. Field trips. May be convened with 415.

517. Behavior Modification and Theory in Schools (3) Application of behavior principles and techniques to promote learning and social development of school-related behavior. 3R, 3L. P, ED P 510 or equivalent or permission of instructor.

518. Nonoral Communication (3) [Rpt./3] Techniques for assessment and intervention of alternative communication skills other than speech for students with severe disabilities.

Nonorsymbolic communication skills development for all ages; social interaction skills; augmentative communication aids.

520. Low Vision and Visual Functioning (3) 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, 521.

521. Introduction to Visual Impairments and Deaf-Blindness (3) For a description of course topics see 421. Graduate-level requirements include writing a grant proposal to obtain monies to enhance service delivery. May be convened with 421.

522a. Orientation and Mobility for Teachers of Individuals with Visual Impairments I (3) Methods of teaching orientation and mobility skills to visually impaired and blind students. Emphasis on the school-aged child, with particular attention to conceptual development, orientation skills, pre-cane skills, personal safety, and independent ambulation, including an introduction to long-cane techniques.

523a-523b. Tactile Communication (3-3) For a description of course topics see 423a. Graduate-level requirements include in-depth paper(s) on aspects of current issues and class presentations. May be convened with 423a.

524. Methods of Teaching the Visually Handicapped (3) 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, 521; CR, 593.

525. Strategies of Vocational Development and Supported Employment (3) For a description of course topics see 425. Graduate-level requirements include in-depth paper(s) on aspects of current issues in the field. P, 400/500. May be convened with 425.

526. Principles and Assessment of O & M (3) In-depth study of the principles supporting orientation and mobility instruction; assessment principles and strategies specific to O & M. P, 522a, 520 or equivalent from other universities.

527. Advanced O & M Practice and Procedures (4) Prepares 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. 2R, 8L. P, 522a, 520 or equivalent from other universities.

529. Education and Rehabilitation of Deaf and Hard of Hearing Individuals (3) For a description of course topics see 429. Graduate-level requirements include an in-depth paper and a class presentation. May be convened with 429.

530. School Psychology (3) Roles of the school psychologist; implementing programs in the public schools; legal and ethical issues in school psychology. 2R, 3L. P, consent of instructor.

531a-531b. American Sign Language (4-4) For a description of course topics see 431a-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 431a-431b. Must be taken in sequence.


533a-533b-533c-533d. Special Topics in Deaf Studies (3-3-3-3) For a description of course topics see 433a-433b-433c-433d. Graduate-level requirements include an in-depth research paper on a course-related topic and a class presentation. Classes will be offered on a rotating basis in a-b-c-d sequence; however, courses need not be taken in sequence. P, 531b or permission of department. May be convened with 433a-433b-433c-433d.

534. Language Development for the Exceptional Child (3) 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) 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, 507.

536. Teaching Bilingual Exceptional Learners (2) Instructional interventions and program development for exceptional students from culturally and linguistically diverse backgrounds. Emphasis on current intervention methods and practices. P, 508.


539a-539b-539c. Special Topics in Sign Language Studies (3-3-3) For a description of course topics see 439a-439b-439c. Graduate-level requirements include an in-depth research paper on a course-related topic and a class presentation. P, 531b or permission of department. May be convened with 439a-439b-439c.
540. Education of Gifted Children (3) For a description of course topics see 440. Graduate-level requirements include an in-depth paper(s) on a single aspect of current issues in the field. May be convened with 440.

541. Teaching the Gifted: Questioning Strategies (3) 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, 440/540.

542. Teaching the Gifted: Productive Thinking Models (3) 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, 440/540.

543. Teaching the Gifted: Hierarchical Models (3) 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, 440/540.

544a-544b-544c. ASL Discourse Processes (3-6/3-6/3-6) For a description of course topics see 444a-444b-444c. Graduate-level requirements include an in-depth paper on aspects of current issues in the field. P, 531b or permission of department. May be convened with 444a-444b-444c.

550. Introduction to Emotional or Behavioral Disorders (3) For a description of course topics see 450. Graduate-level requirements include an in-depth paper(s) on a single aspect of current issues in the field. May be convened with 450.

551. Teaching Children with Emotional or Behavioral Disorders (3) Assessment techniques, academic and behavioral intervention strategies, and classroom management with emotionally or behaviorally disordered children and youth.

555. Rehabilitation and Aging (3) For a description of course topics see 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 455.

559. Testing of Minorities (3) 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) For a description of course topics see 460. Graduate-level requirements include an in-depth paper(s) on a single aspect of current issues in the field. May be convened with 460.

561. Methods of Teaching Preschool Children with Disabilities (3) Deals with competencies required to teach all categories of disabilities found in preschool children except deaf/blind. Field trips. P, 460/560, 562, 575, CR 593.

562. Methods of Assessment for Preschool Children with Disabilities (3)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, 400/500, 575.

563. Client Assessment in Rehabilitation (3) Exploration of the world of work; critical review of vocational choice theories; experiences in the use and interpretation of individual assessment techniques. P, 565 or CR; ED P 458. Open to majors only.

565. Principles of Rehabilitation (3) Principles underlying rehabilitation programs and interdisciplinary relationships of agencies engaged in rehabilitation services. Open to majors only.

568. Transition Methods (3) For a description of course topics see 468. Graduate-level requirements include additional assignments including a term paper. May be convened with 468.

570. Administration of Special Education Programs (3) 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 director before enrolling.

571. Supervision of Special Education (3) 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, 570.

572. Policy and Program Evaluation Analysis in Special Education (3) 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] For a description of course topics see 475. P, 400/500.

578. Prevention of Addictions (3) For a description of course topics see 478. Graduate-level requirements include an in-depth research paper or other project. May be convened with 478.

580. Medical Aspects of Disability (3) 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) Exploration of the psychological, sociological and cultural aspects of disability; analysis of somatopsychology, psychometrics, and social psychology.

582. Principles and Practices of Vocational Evaluation (3) Understanding work skills and labor market conditions; process of vocational evaluation of rehabilitation clientele; collecting and synthesizing evaluation data and writing meaningful reports.

583. Counseling Theories and Practices in Rehabilitation Settings (3) Professional rehabilitation counseling practices with varied ethnic, age disability, and dependency populations. 3R, 1L. Open to majors only.

584. Problems of Drug Abuse (3) [Rpt./1] For a description of course topics see 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 484.

585. Vocational Planning and Placement (3) 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, 563, 565, 580 or CR.

586. Psychosocial Assessment of the Deaf Person (3) Selection, administration, and interpretation of various psychosocial evaluation instruments used with deaf persons. P, 674a, ED P 673.

588. Professional Problems and Ethical Concerns in Rehabilitation Psychology (3) 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) Review of principles and practices underlying applied research with exceptional learners; practice in preparation of research proposals; conduct of research emphasized.

591. Preceptorship (1-6)

593. Internship (1-12) Special sections in each concentration to be arranged in the department office.

594. Practicum
a. Communication Development for Deaf and Hard of Hearing Children (1-6)
b. Teaching the Gifted (1-6) [Rpt./9 units] CR, 440, 541, 542, 543.

595. Colloquium
b. Language Learning and Reading Disabilities (3) (Identical with LRC 595b).
c. Mental Retardation and Severe Disabilities (3) P, 400.
d. Recent Advances in Special Education and Rehabilitation (3-6)
e. Bilingual Special Education (2)
694. Practicum
b. School Psychology (1-3) [Rpt./12 units]
694. Practicum
b. School Psychology (1-3) [Rpt./12 units]

695. Colloquium
a. Issues, Trends, and Futures in Special Education: Doctoral Think Tank (3)
b. Emotional or Behavioral Disorders (3)
c. Rehabilitation Psychology (3) [Rpt./9 units]
d. Learning Disabilities (3)
e. Sensory Impaired (3)
g. Issues and Research in Educating the Gifted (3) [Rpt./9 units]
h. Rehabilitation Administration (3)
i. Diagnosis in Rehabilitation Psychology (3)

791. Preceptorship (1-6)

TEACHING & TEACHER EDUCATION (TTE)
Education Bldg., Rm. 735
The University of Arizona
PO Box 210069
Tucson, AZ 85721-0069
(520) 621-7865; Fax: (520) 621-1827
E-mail: oscs@mail.arizona.edu
http://www.ed.arizona.edu/departments/tte/
dermat/teعلاnderfen.htm

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.)
Doctor of Education (Ed.D.)
Doctor of Philosophy (Ph.D.)

Majors
Early Childhood Education (B.A.E.)
Elementary Education (B.A.E.)
B.A.E. Option: bilingual
Secondary Education:
Teaching majors*:
Chemistry (B.S.E.)
Communications (B.A.E.)
Earth Sciences (B.S.E.)
English (B.A.E.)
Extended 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.)
Language Arts/Social Studies (B.A.E.)**
Latin (B.A.E.)
Mathematics (B.S.E.)
Physical Education (B.S.)
Physics (B.S.E.)
Political Science (B.A.E.)

Russian (B.A.E.)
Social Studies (B.A.E.)**
Spanish (B.A.E.)

Teaching and Teacher Education (M.A., M.Ed., Ed.D., Ph.D.)
* Teaching majors are also available as teaching minors, unless otherwise indicated.
** Not available as a teaching minor.

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRR). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/onne/aprr.html.

For academic program requirements for graduate degrees, 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.

211. Image Processing for Scientific Discovery (3) (Identical with PTYS 211, which is home).

300. Classroom Processes and Instruction (4) Classroom observation, management, instruction, and planning processes; includes field work and laboratory experiences. P, admission to the College of Education.

302R. Educational Applications in Museum Anthropology (3) (Identical with ANTH 302R, which is home).

302L. Educational Applications in Museum Anthropology (1) [Rpt./2] (Identical with ANTH 302L, which is home).

322.* Teaching Language Arts and Communication in Elementary School (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.

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.

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.

326.* Teaching Elementary School Mathematics in a Technological Age (3) Con-
cepts, methods, and use of materials, calculators and computers in the teaching of elementary school mathematics. P, ED P 301, 7 units of mathematics including MATH 301, TTE 300, admission to the College of Education.

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.

338. The Teaching of Secondary School Subjects

b. Secondary Methods (1) Open to majors only.

394. Practicum

b. ** Social Studies (3) P, TTE 300, ED P 310.

The methods courses required for elementary certification are offered only in a block format. The courses in this block are TTE 322, 323, 324, 326, 327, and 394a.

**TTE 394b must be taken concurrently.

NOTE: Several specific method courses, or courses in the teaching of the several high school subjects, required of prospective secondary teachers, are listed under the general number 338, with letters designating the teaching areas. Other methods courses are: 408, 410, 411, 412, 414.

342. Middle School Curriculum and Teaching (3) Functions of the middle school as they pertain to curriculum organization, instructional strategies, student activities, guidance and evaluation. P, admission to teacher preparation program.


384. Records/Information Management (3) Systems of information management; creation, distribution, storage, transfer and disposition of office records; management aspects of establishing information systems and evaluating their efficiency.

394. Practicum

a. Elementary School Reading (1) P, CR, 322, 323, admission to the College of Education.

b. Secondary Methods (1) Open to majors only. P, 300, ED P 310, EDUC 350, admission to the College of Education; CR, 338h or 338u or 338y or 414 or one only 410, 411, or 412.


408. English as a Second Language in Bilingual Education (3) (Identical with ENGL 408, which is home).


410. Teaching English Composition (3) (Identical with ENGL 410, which is home).

411. Teaching of Literature (3) (Identical with ENGL 411, which is home).

412. The Teaching of English Language (3) (Identical with ENGL 412, which is home).

414. Teaching of Modern Languages (3) Specific methods, objectives, organization of subject matter and evaluation in modern languages. (Identical with FREN 414, ITAL 414, SPAN 414, and PORT 414).

493. Internship

Successful completion of professional education courses, content area courses, and the basic skills exam is 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 493a and 493b. Enrollment in these courses will not reduce the amount for which a student can otherwise enroll under the pass-fail option.

a. Student Teaching in Elementary School (3-12) Fee, P, 300, 322, 323, 324, 326, 327, ED P 301, EDUC 350, CR, TTE 496c and SER 301a, admission to the College of Education.

b. Student Teaching in Secondary School (6-12) Fee, P, 300, ED P 310, EDUC 350, LRC 425 and appropriate methods course(s), admission to the College of Education, CR, TTE 496c and SER 301b.

496. Seminar

c. Issues in Teaching (1) CR, 493a or 493b.

503. Teacher Leadership and School Change (3) 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) Examination of purposes and functions of middle level and high schools, investigation of trends, issues, and organization of curriculum and programs.

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, 324 or 338b.

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, 326 or 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, 327 or 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 in 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, 539 or CR, and EDUC 500.

530. Environmental Education Topics (3) Issues related to environmental education in
schools. Emphasis on diverse perspectives of environmental education and strategies for changing curriculum. P, 324 or 338h.


536. Alternatives in the Secondary Classroom (3) Theoretical bases, methods and strategies for delivering instruction in secondary classrooms are examined, discussed and applied.

537. Equity in Schools and Society (3) Implicit and explicit ways in which values are introduced into the classroom and school. Research on the hidden curriculum, ethnic/racial and sex equity and prejudice and methods for combating inequities.

539. Recent Research on Teaching and Schooling (3) An overview of the concepts, methodologies and findings of recent research on teaching and schooling practices.

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 r. Action Research Internship (1-3). P, 597r.

595. Colloquium e. Master's Colloquium (1-3)

597. Workshop e. Learning Through Play (3) m. Middle-Level School Development (3) p. Parents as Partners in Education (3) r. Action Research Workshop (3) w. Elementary Science Demonstrations (3). P, 324 or 338h

610. Applied Curriculum Theory (3) The theories, techniques, and organization of curriculum construction are discussed, evaluated and applied. P, 545.

612. Staff Development (3) The concept, context, content, processes and evaluation models of staff development as enacted in school settings. P, EDUC 500.


635. Policy Analysis in Teaching and Teacher Education (3) Examination of policy development and enactment related to teaching and teacher education at local, state, and national levels, as well as methods and approaches to policy analysis. P, 539 and EDUC 500.

640. Teacher/Student Cognition and Instruction (3) An examination of cognitive models related to teacher comprehension, planning, and decision making; and students' cognitive change and their interpretation of classroom events. P, 539 and 696h; and EDUC 500.

642. Middle-Level Curricular Process (3) Examination of procedures for curriculum/instructional development, implementation, improvement, and evaluation at the middle-school level. P, 542.


793. Internship a. Classroom Research (3) [Rpt./1] P, EDUC 600 or 601. b. Teacher Education Research (3) [Rpt./1] P, EDUC 600 or 601.

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**COLLEGE OF ENGINEERING & MINES**

Engineering Building, Room 200 The University of Arizona PO Box 210011 Tucson, AZ 85721-0011 Phone: (520) 621-6932; FAX: (520) 621-9995 e-mail: UA@engr.arizona.edu

http://www.engr.arizona.edu/~acadaff/

An engineering education is preparation for a professional career. While most graduates embark on careers in engineering practice, women and men with engineering majors find the baccalaureate program excellent preparation for other fields as diverse as law, medicine, business, and government. Engineering education develops analytical and quantitative thinking, a critical but optimistic approach to problem solving, and the habit of self-directed future learning. Graduates make successful transitions to a wide variety of different careers. The graduate has a thorough understanding of how materials, energy, and information can be adapted to human needs. This understanding is developed through the study of physical science, mathematics, engineering science, engineering design, humanities, social science and practice.

**Baccalaureate degrees and accreditations**

**Engineering:** Bachelor of Science in Aerospace Engineering, ABET (B.S.Ae.E.) Bachelor of Science in Agricultural & Biosystems Engineering, ABET (B.S.A.B.E.)* Bachelor of Science in Chemical Engineering, ABET (B.S.Ch.E.) Bachelor of Science in Civil Engineering, ABET (B.S.C.E.) Bachelor of Science in Computer Engineering, ABET (B.S.Co.E.) Bachelor of Science in Electrical Engineering, ABET (B.S.E.E.) Bachelor of Science in Geological Engineering, ABET (B.S.Ge.E.) Bachelor of Science in Industrial Engineering, ABET (B.S.In.E.) Bachelor of Science in Materials Science & Engineering, ABET (B.S.M.S.E.) Bachelor of Science in Mechanical Engineering, ABET (B.S.Me.E.) Bachelor of Science in Mining Engineering, ABET (B.S.Mn.E.) Bachelor of Science in Optical Engineering (B.S.Op.E.)* Bachelor of Science in Systems Engineering, ABET (B.S.Sy.E.) 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 (E.B.A.)

**Graduate degrees**

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

**Majors and degrees**

Specializations
- Computer Software Engineering
- Energy Engineering
- Environmental Engineering
- Manufacturing Systems Engineering
- Medical and Biological Engineering
- Nuclear Engineering
- Premedical

Detailed descriptions of each specialization are available in Engineering 200 or on line at http://w3.arizona.edu/~acadaff/

*Jointly administered with the College of Agriculture
**Jointly administered with the Optical, Science Center
***Jointly administered with the College of Science

Undergraduate minors
There are no minors in the College of Engineering & Mines.

Entrance Requirements
In addition to University admission requirements, applicants are required to present 1/2 unit of trigonometry. It is strongly recommended that one unit of physics and one unit of chemistry be presented. Students transferring into the college must have cumulative grade-point averages of 2.500 for all previous college work. Applicants must be ranked in the upper 25 percent of the high school graduating class; or have achieved a grade-point average of 3.0 on a 4.0 scale; or a composite score of 23 (24 for out-of-state applicants) on the ACT; or a minimum combined score of 1050 on the SAT.

Advanced Standing
Student must have been granted advanced standing to enroll in 300- or 400-level courses in the College of Engineering and Mines. The criteria for achieving advanced standing are available in Room 200 of the Engineering Bldg., in departmental offices, or on line at http://www.engr.arizona.edu/~acadaff

General education program
All undergraduate students are required to complete a 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. General education requirements for engineering students are available in Engineering 200, in departmental offices, or on line at http://w3.arizona.edu/~acadaff

Program requirements
For specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the undergraduate majors listed above are available in Engineering 200, in departmental offices, or on line at http://www.engr.arizona.edu/~acadaff/. Progress toward completion of degrees is measured each semester in the form of On Course! Student Academic Progress Reports (SAPR). SAPRs are available on line at http://w3.arizona.edu/~oncourse/whatis.html.

Because of the prerequisite content of engineering curricula, advising purposes degree requirements are presented in a semester-by-semester program that can be completed in 4 years. Four-year plans for the undergraduate degrees listed above are available in Engineering 200, in departmental offices, or on line at http://www.engr.arizona.edu/~acadaff

For academic requirements for graduate degrees consult the Graduate Catalog. Academic requirements for graduate degrees are also available in departmental offices or on line at http://www.engr.arizona.edu/~acadaff

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.

ENGINEERING & MINES (ENGR)

102. Introduction to Engineering (3) Engineering design, effective team participation and career preparation. Students are expected to participate in hands-on design projects, develop education/career plans and initiate development of the personal and management skills necessary for lifelong learning. 2ED. CR, MATH 124 or 125a.

109. Technology and Society: An Historical Perspective (3) (Identical with NEE 109, which is home).

120. Mineral Resources, Geotechnology and the Environment (3) (Identical with MNE 120, which is home).


195. Colloquium
a. Materials Science and Engineering (1) (Identical with MSE 195b, which is home).
b. Women in Science and Engineering (1) (Identical with W S 195c).

196. Honors Proseminar
a. Survey of Engineering Professions (1)
b. Planning Engineering Design (1)

249. Technology and the Growth of Civilizations (3) (Identical with ANTH 249, which is home).

251. Social Constraints on Engineering (3) (Identical with MSE 251, which is home).

257. Materials Science of Art and Archaeological Objects (3) (Identical with MSE 257, which is home).

258. Materials Science of Art and Archaeological Objects Laboratory (1) (Identical with MSE 258, which is home).

265. Engineering Economic Analysis (3) (Identical with SIE 265, which is home).

320. Introduction to Computer Aided Design (3) (Identical with ABE 320, which is home).

435. Corrosion and Degradation (3) (Identical with MSE 435, which is home).

454. Law for Engineers/Scientists (3) (Identical with CHEE 454, which is home). May be convened with 554.

479. Culture and Materials Technology (3) (Identical with ANTH 479, which is home).

485. Technological Forecasting (3) (Identical with MSE 485, which is home).

486. Technology and Society (3) (Identical with MSE 486, which is home).

488. Scanning Electron Microscopy (3) (Identical with MSE 488, which is home).

501. Planning for Discovery: Problem Solving and Proposal Preparation (3) (Identical with MSE 501, which is home).

502. Research Proposal Preparation (3) (Identical with MSE 502, which is home).

554. Law for Engineers/Scientists (3) (Identical with CHEE 554, which is home). May be convened with 454.

696. Seminar
a. Science and Social Theory (3) (Identical with SOC 696a, which is home).

AEROSPACE AND MECHANICAL ENGINEERING (A ME/NEE)

The University of Arizona
PO Box 21019
Tucson, AZ 85721-0119
(520) 621-2235; FAX (520) 621-8191
http://www.ame.arizona.edu/

Baccalaureate degrees
- Bachelor of Science in Aerospace Engineering (B.S.Ae.E.)
- Bachelor of Science in Mechanical Engineering (B.S.Me.E.)

Graduate degrees
- Master of Science (M.S.)
- Doctor of Philosophy (Ph.D.)

Majors
- Aerospace Engineering (B.S.Ae.E., M.S., Ph.D.)
- Mechanical Engineering (B.S.Me.E., M.S., Ph.D.)
- Nuclear Engineering (M.S., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.ame.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.
AEROSPACE AND MECHANICAL ENGINEERING (A ME)

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

230. Thermodynamics (3) Basic laws and examples of engineering applications of macroscopic thermodynamics; equations of state; reversible and irreversible processes. 3ES, P, MATH 223, PHYS 241.

250. Dynamics (3) Dynamics of particles and rigid bodies as applied to mechanical systems; introduction to mechanical vibrations. 3ES, P, C E 214; CR, MATH 254.

300. Instrumentation Laboratory (3) Basic principles of laboratory practice and instrumentation; statistical measurement theory including probability distributions, finite statistics, uncertainty analysis, regression analysis; dynamics of measurement systems; transducers and signal conditioning circuits. Experiments using basic laboratory instrumentation on the speed of sound, temperature measurements, and the dynamic response of first and second order systems. 2R, 3L. 2ES, P, 230, 331, ECE 207.


320. Aerodynamics (3) Basic equations and their approximation; potential flow theory; fundamentals of airfoil and wing theory; axisymmetric flows; application to aerodynamics of wings and bodies. 2ES, 1ED, P, 331; CR, 302.

321. Aircraft Performance (3) Properties of the atmosphere, concepts in airflow and propulsion, airfoils and wings, airplane performance; energy methods. 2ES, 1ED, P, 250, 331.

322. Gasdynamics (3) Homentropic flow with area changes, normal and oblique shocks, one-dimensional flows with friction and heat addition, choking, method of characteristics, applications. 2ES, 1ED, P, 230, 331, MATH 254.

330. Intermediate Thermodynamics (3) Power systems; nonreacting and reacting mixtures; heat transfer, design exercises. 2ES, 1ED, P, 230.

331. Introduction to Fluid Mechanics (3) 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 machinery, boundary layer concepts and drag. 3ES, P, 250, MATH 254.

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

400. Senior Mechanical Laboratory (2) Investigations involving thermal power and mechanical systems. 1R, 3L. 2ES, P, 300. Writing-Emphasis Course.*

401. Senior Aerospace Laboratory (1-3) Laboratory investigations involving aerodynamic, control, structural, and power systems. 1R, 3L. P, 300, 324, 420. Writing-Emphasis Course.*

410. Engineering Design (3) 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. 1ES, 2ED, P, 250, C E 217.

412a-412b. Mechanical Engineering Design (4-4) 412a: Engineering design process steps, idea generation techniques, optimal design, computer aided design, hardware issues, electro mechanical systems, fluid power systems, practical aspects of designings for manufacture and assembly, traditional and non-traditional machining, forming and fastening techniques. Major design project. 4R, 4L. 4ED. Fee, P, 230, CR, 410, 412b: Construction, testing and evaluation of prototype design; design iteration to arrive at a final working system. 4R, 4L. 4ED. P, 412a and 412b must be taken in consecutive semesters.

416. Material Selection (3) A study of failure in engineering materials, yielding, fatigue, creep, buckling; an introduction to fracture mechanics and modern fatigue models; weight and cost considerations. 1.5ES, 1.5ED, P, C E 217.

420. Aircraft Conceptual Design (3) 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, 320, 321, 323. May be convened with 520.

422. Aerospace Engineering Design (3) Application of engineering fundamentals, including structural analysis, structural vibrations, aeroelasticity and finite element methods to aerospace vehicle design project. 3ED. P, 420 or 428. May be convened with 522.

424. Introduction to Space Technologies (3) The space environment: vacuum, microgravity, radiation(s), 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, 1.5ED, P, 323. May be convened with 524.

425. Aerospace Propulsion (3) Basic laws; application to turbojets, ramjets, ramjets, turbo props and rockets; space flight. 2ES, 1ED, P, 230, 323, 331.

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

427. Stability and Control of Aerospace Vehicles (3) Static and dynamic stability of rigid and non-rigid vehicles; automatic control of aircraft, missiles and spacecraft. 2ES, 1ED, P, 321.

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


432. Heat Transfer (3) Study of conduction, convection and radiation heat transfer, with applications to engineering problems. 1ED, 2ES, P, 230, 331.


440. Energy Utilization and Management (3) Methods for evaluating the technical and economic aspects of energy conversion and usage directed toward the effective utilization of resources, including economics, HVAC systems, electric power, lighting and industrial processes. 2ES, 1ED. (Identical with NEE 440). May be convened with 540.

442. HVAC System Design (3) Computer analysis and design of air conditioning systems for commercial and industrial buildings, including equipment and component selection. Energy-efficient concepts and controls will be emphasized. 1ES, 2ED, P, 230, CR, 331. (Identical with NEE 442). May be convened with 542.


447. Direct Energy Conversion (3) Engineering requirements for achieving direct conversion of energy to electrical power; the engineering of thermoelectric and thermionic converters, fuel cells, magnetohydrodynamic, and photovoltaic systems. 1ES, 1ED, P, 230 or PHYS 142. (Identical with ECE 447). May be convened with 547.
452. Computer Aided Analysis of Mechanical Systems (3) Kinematic and dynamic analysis of mechanical systems in planar motion, numerical methods and use of computer programs in analysis. 2ES, 1ED. P, 302. May be convened with 552.

454. Optimal Control of Parametric Systems (3) Scalar minimization, vector minimization, continuous static games, matrix games, numerical techniques and applications. 2ES, 1ED. P, MATH 254. May be convened with 554.

455. Control System Design (3) 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. 2ES, 1ED. P, 250, 301; CR, 300.

456. Control of Manufacturing Process (3) 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. 1.5ES, 1.5ED. P, 250, 300, 301, 412A-412B, 455. May be convened with 556.

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

461. Finite Element Methods (3) Matrix methods for structural analysis, theory of elasticity, work and strain energy, energy theorems, the finite element, the assembled structure, programming aspects of the problem, general purpose programs, application to aerospace structures. 2ES, 1ED. P, 301, C E 217.

462. Composite Materials (3) Classification and characteristics of composite materials; mechanical behavior of composite materials, micro- and macro-mechanical behavior of laminae; mechanical behavior of laminates; mechanical behavior of short fiber composites. 3ES, P, 302, C E 217. May be convened with 562.

466. Biomechanical Engineering (3) One subject covered yearly from: biomechanical-solid mechanics (orthopedic, vascular, muscle, skin); feedback control (physiological systems); heat transfer, thermodynamics (temperature regulation exercises, hyperthermia, instrumentation). 3ES, P, 302, 330, 331, 410. May be convened with 566.

472. Reliability Engineering (3) 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. 1.5ES, 1.5ED. P, CR, 474 or SIE 408 and SIE 572. May be convened with 572.

473. Probabilistic Mechanical Design (3) Application of probability theory and statistics to mechanical and structural design; modern mechanical reliability methods; design philosophy. 1.5ES, 1.5ED. P, C E 217; CR, 410. May be convened with 573.

474. Reliability and Quality Analysis (3) Probability and statistics with applications to reliability engineering, discrete and continuous statistical models for engineering variables, fundamentals of statistics. 1.5ES, 1.5ED. P, MATH 223. May be convened with 574.

495. Colloquium s. Senior Colloquium (1)

"Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual)."

500a-500b. Advanced Engineering Analysis (3-3) 500a: Vector calculus, linear algebra; ordinary differential equations, calculus of variations. P, undergraduate mathematics equivalent to AM 301. 500b: Complex variables, partial differential equations, eigenfunction expansions and transform methods.

510. Design for Manufacturing (3) Design methodology-axiomatic, algorithmic, hybrid. Concepts of design sensitivity; applications to several manufacturing processes-metal forming, metal cutting, welding. P, 461 (All programming ability; knowledge of plasticity).

520. Aircraft Conceptual Design (3) For a description of course topics see 420. Graduate-level requirements include development of a three degree-of-freedom flight simulator with active stability augmentation. P, 320, 321, 323. May be convened with 420.


522. Aerospace Engineering Design (3) For description of course topics see 422. Graduate students will be responsible for simulation software development or laboratory tests. May be convened with 422.

523. Advanced Aerospace Propulsion (3) Interior ballistics of rocket motors; ramjets, turbojets, turbofans, scramjets; detonation wave theory; combustion chamber instability analysis; nozzle design. P, 425.

524. Introduction to Space Technologies (3) (Rpt/1) For a description of course topics see 424. Graduate-level requirements include additional term papers and extra questions on exams. May be convened with 424.


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


531. Numerical Methods in Fluid Mechanics and Heat Transfer (3) For a description of course topics see 431. Graduate-level requirements include three additional projects. P, 302. May be convened with 431.

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


534. Radiative Heat Transfer (3) 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, 432.

536a-536b. Fluids of Mechanical (3-3) 536a: Fundamental equations of motions; surface tension; kinematics of vorticity; integral solutions; irrotational flows; simple viscous flows. P, 500a. 536b: Small-disturbance inviscid theory; low Reynolds number flow; vorticity dynamics; boundary layers. P, 500b.

537. Fluid Mechanics of Viscous Flows (3) Behavior of viscous fluids over a range of Reynolds numbers; Navier-Stokes equations; boundary layer equations; slow flow; compressible boundary layers. P, 536b.

538. Nature of Turbulent Shear Flow (3) Physical phenomena in turbulent shear flows; experimental techniques; observations and physical sequences; prediction methods; recent advances. P, 500b, 536a-536b.


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

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

545. Renewable Energy Systems (3) For a description of course topics see 445. Graduate-level
requirements include an in-depth research paper. (Identical with NEE 545). May be convened with 445.

547. Direct Energy Conversion (3) For a description of course topics see 447. GraduTe-level requirements include an in-depth research paper. P, MATH 254, A ME 230 or PHYS 142. (Identical with ECE 547). May be convened with 447.


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

553. Computational Multibody Dynamics (3) Computational methods in multibody dynamics; Euler parameters; automatic generation and numerical methods in solving equations of motion; application in vehicle dynamics, spacecraft, and robotics. P, knowledge of kinematics, dynamics and numerical methods. P, 552.

554. Optimal Control of Parametric Systems (3) For a description of course topics see 454. Graduate-level requirements include a more theoretically oriented design project. P, MATH 254. May be convened with 454.

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

556. Control of Manufacturing Process (3) For a description of course topics see 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. 1.5R, 1.5L. May be convened with 456.


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

562. Composite Materials (3) For a description of course topics see 462. Graduate-level requirements include an additional project on composite materials. P, 302, C E 217. May be convened with 462.

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

566. Biomechanical Engineering (3) For a description of course topics see 466. Graduate-level requirements include a project and additional reading assignments. 3ES, P, 302, 330, 433b, 410. May be convened with 466.

Students interested in the biomedical engineering option: please see the headnotes of this department.

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

571. Reliability Engineering (3) For a description of course topics see 472. Graduate-level requirements include a special report of 30 pages on a specific reliability engineering topic. P, CR, 474 or SIE 408 and SIE 572. May be convened with 472.

573. Probabilistic Mechanical Design (3) For a description of course topics see 473. Graduate-level requirements include additional homework with focus on theoretical considerations, and a research project. P, C E 217; CR, 410. May be convened with 473.

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

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

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

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


610. History of Technology and Society (3) Significant developments in human history emphasizing the role of technology as an agent for social change; particular attention to the use of energy resources. (Identical with ENGR 109).


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

406. Nuclear Engineering Laboratory (4) Experimental techniques for determining various parameters in nuclear systems; experiments using the critical and subcritical reactors. 3R, 3L. 1ED. P, 380 or 483. Non-majors may substitute 486 for the prerequisites. Writing-Emphasis Course for nuclear engineering students. May be convened with 506.

614a, 614b. Nuclear Engineering Design (3-3) (a) 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
487a-487b. Introduction to Radioactive Waste Management (3-3) (a) Background in the technology of low level radioactive wastes from institutional, research and fuel cycle sources. 1.5ES, 1.5ED. May be convened with 587a. (b) Background in the technology of high level wastes, including reprocessing and disposal, from the fuel cycle, both national and international approaches. 1.5ES, 1.5ED. P, 487a. May be convened with 587a-587b

494. Practicum
a. Operation of The University of Arizona TRIGA Reactor (2) P, 380 or 588.

Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

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

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

540. Energy Utilization and Management (3) (Identical with A ME 540, which is home). May be convened with 580 or 583.

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

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

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

556. Engineering System Simulation (3) For a description of course topics see 456. Graduate-level requirements include an in-depth research paper. P, A ME 230 or CHEE 306a; MATH 254. May be convened with 556.

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

481. Nuclear Fuel Cycles (3) The processes, methods, and strategies of the nuclear fuel cycle. 2ES, 0.5ED. P, 482, A ME 230. May be convened with 581.

482. Contemporary Nuclear Power Systems (3) Analysis of present nuclear power plants, with emphasis on design decisions as they affect performance of individual systems; advanced design concepts; proposed standard designs; comparison of different contemporary systems. 0.5ES, 0.5ED. P, 380 or 486. May be convened with 582.

483. Reactor Dynamics and Control (3) Nuclear reactor kinetics, integral transform methods, internal feedback effects, stability and control. 2ES, 0.5ED. P, 380. Non-majors may substitute 486 for the prerequisite. May be convened with 583.

484. Radiation Effects (3) Radiation effects on solids and radiation chemistry of gases and liquids, with emphasis on effects encountered in nuclear reactor, detector, and dosimetry systems. 1.5ES, 1.5ED. P, 200, CR, MATH 331R. May be convened with 584.

485a-485b. Radiation Health Physics and Safety (3-3) (a) Study of health physics practices and safety, including instrumentation, regulations, record keeping and monitoring of facilities. 2ES, 1ED. May be convened with 585a. (b) Shielding methods, normal and off-normal working practices, national and international regulations and practices. 1.5ES, 1.5ED. P, 485a. May be convened with 585b.

486. Nuclear Energy and Power (3) Fundamentals of nuclear energy and radiation; engineering applications; the basic concepts of nuclear reactors and power systems. Designed for non-majors. 2ES, 1ED. May be convened with 586.
305. Chemical Engineering Transport Phenomena (3) Theory and calculations pertaining to fundamental transport processes. 3ES, P, 201, 402.

307. Chemical Engineering Science Laboratory (3) Practical verification of fundamental principles of thermodynamics, kinetics, and transport phenomena. 3ES, P, 201, 304, 305, 326; CR, 420.

316. General Thermodynamics (2) Properties and equations for solids, liquids, gases and vapors; first law energy balance; second law entropy balance; heat cycles, compressors, engines. 2ES, P, 201, CR, CHEM 480a.

326. Chemical and Physical Equilibrium (3) Applications of thermodynamics to equilibrium processes; chemical and physical equilibrium in multicomponent systems. 3ES, P, 316, CHEM 480a.

370. Water Supply and Wastewater Systems (3) CDT Design of water distribution and wastewater collection systems and fundamental principles of unit treatment processes. 1.5ES, 1.5ED, P, 203 or C E 321. (Identical with C E 370).

371. Water and Wastewater Treatment Process (3) Analysis of processes controlling water quality and the design of water, wastewater and recycle treatment systems. 1ES, 2ED, P, 370. (Identical with C E 371).

402. Intermediate Engineering Analysis (3) Solution of complex chemical engineering problems utilizing both analytical and numerical techniques. 1.5ES, P, MATH 254, CHEM 302, CR, 303.

413. Process Control and Simulation (3) 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. 1.5ES, 1.5ED, P, CR, 402.

418. Physiology for Engineers (4) (Identical with PSIO 418, which is home).

419. Physiology Laboratory (2) (Identical with PSIO 419, which is home).

420. Chemical Reaction Engineering (3) Application of thermodynamic and kinetic fundamentals to the analysis and design of chemical reactors. 1.5ES, 1.5ED, P, 201, 326. May be convened with 520.

421. Topics in Real-Time Computing (3) Introduction to microcomputer- and minicomputer-based real-time computing for data acquisition and process control. Includes study of various languages and operating systems. 2R, 3L, 1.5ES, 1.5ED. May be convened with 521.

422. Chemical Engineering Industrial Methods (2) Practical aspects of design and manufacturing methods in the chemical process industry; management of personnel problems. 2ED, P, 304.

435. Corrosion and Degradation (3) (Identical with MSE 435, which is home). May be convened with 535.

442. Chemical Engineering Design Principles (3) Preliminary economic, environmental, safety and design principles associated with chemical process equipment. 3ED, P, 201, 203, 303, 304, 305; CR, 420.

443. Chemical Engineering Plant Design (3) Design project from scoping and process selection, through material and energy balances, equipment design and sizing, safety and environmental considerations, to economic analysis of capital cost and operating expense. 3ED, P, 442.

451. Chemical and Physical Fundamentals of Air Pollution (3) Study of the kinetics, transport phenomena and phase equilibria of urban air pollution problems. 3ES, P, 305, 420, or consult with department. May be convened with 551.

453. Space Manufacturing (3) Basics of producing high value added materials in microgravity, as well as commodities for use in space from extraterrestrial resources. May be convened with 553.

454. Law for Engineers/Scientists (3) Topics covered in this course include patents, trade secrets, trademarks, copyrights, product liability contracts, business entities, employment relations and other legal matters important to engineers and scientists. (Identical with ENGR 454). May be convened with 554.

460. Aerosol Science and Engineering (3) Physics, chemistry, mechanics and optics of aerosol particles. Topics include formation, dynamics, nucleation and growth, coagulation, scattering and absorption of radiation, deposition and aerosol technology. (Identical with ATMO 460 and ECE 460). May be convened with 560.

478. Introduction to Hazardous Wastes (3) Management, planning, legal and engineering aspects of liquid and solid hazardous waste treatment and disposal. 2ES, 1ED, P, 370 or consult department before enrolling. (Identical with C E 478). May be convened with 578.

480. Bioseparation Techniques for Engineers (3) Methods of separation for purification of bioprocess products - amino acids, proteins, nucleic acids, carbohydrates, lipids, cells. 3ES, P, CHEM 243a-243b. May be convened with 580.

481. Bioreactor Engineering (3) Introduction to biotechnology; chemistry of microorganisms; design of bioreactors to include cellular and enzyme reactors of all types; transport phenomena and control of bioreactors; instrumentation and measurement in bioreactors. 3ES, P, MATH 254, CHEM 241a, CHEM 480a. May be convened with 581.

494. Practicum a. Senior Project (1-3)


506. Advanced Chemical Engineering Thermodynamics (3) Advanced applications of First and Second Laws, nonideal gases and liquids and their mixtures, principles of chemical equilibrium, and molecular theory. P, 326.

520. Chemical Reaction Engineering (3) For a description of course topics see 420. Graduate-level requirements include an in-depth research paper on a current topic. May be convened with 420.

521. Topics in Real-Time Computing (3) For a description of course topics see 421. Graduate-level requirements include a special project. May be convened with 421.


532. Solid-Fluid Reactions (3) Characterization of solid structural properties; principles of heterogeneous reactions involving a fluid and a reacting solid. P, 326 and 420, or MSE 450R and 412. (Identical with MSE 532).

535. Corrosion and Degradation (3) (Identical with MSE 535, which is home). May be convened with 435.

548. Combustion Generated Air Pollution (3) (Identical with A ME 548, which is home).

551. Chemical and Physical Fundamentals of Air Pollution (3) For a description of course topics see 451. Graduate-level requirements include a special project. P, 305, 420, or consult with department. May be convened with 451.

553. Space Manufacturing (3) (Identical with MSE 553, which is home). May be convened with 435.

554. Law for Engineers/Scientists (3) For a description of course topics see 454. Graduate-level requirements include an in-depth research paper on a current topic. (Identical with ENGR 554). May be convened with 454.

560. Aerosol Science and Engineering (3) For a description of course topics see 460. Graduate-level requirements include a special project. (Identical with ATMO 560 and ECE 560). May be convened with 460.

573. Biodegradation of Hazardous Organic Compounds (2-3) 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, 3L. P, 577, or consult with department. (Identical with C E 577).

574. Environmental Transport Processes (3) 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) Principles of bacterial physiology including morphology, metabolism and genetics. Applications of importance to waste treatment and environmental quality. P, 370, or consult with department. (Identical with C E 577).

578. Introduction to Hazardous Wastes (3) For a description of course topics see 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). P, 370, or consult department before enrolling. (Identical with CHEE 578). May be convened with 478.

580. Bioseparation Techniques for Engineers (3) For a description of course topics see 480. Graduate-level requirements include a special project. P, CHEM 243a-243b. May be convened with 480.

581. Bioreactor Engineering (3) For a description of course topics see 481. Graduate-level requirements include a special project. P, MATH 254, CHEM 241a, CHEM 480a. May be convened with 481.

583. Remote Sensing Instrumentation and Techniques (3) (Identical with ECE 583, which is home).


618. Water Treatment (3) Theoretical and applied principles of aerobic and anaerobic wastewater treatment systems. P, 370. (Identical with C E 675).


CIVIL ENGINEERING & ENGINEERING MECHANICS (C E/E M)
Civil Engineering Bldg., Rm. 206
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http://info-center.ccit.arizona.edu/~civil/
Baccalaureate degree
Bachelor of Science in Civil Engineering (B.S.C.E.)
Graduate degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)
Majors
Civil Engineering (B.S.C.E., M.S., Ph.D.)
B.S.C.E. Options:
- geotechnical
- hydraulics
- structural transportation
Engineering Mechanics (M.S., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/ oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

CIVIL ENGINEERING (C E)

202. Computer Programming for Civil Engineers (1) Introduction to FORTRAN programming: basic operations, subscripting, subprograms; design of problem-solving algorithms; development of programs to solve problems in civil engineering. 1R, 1L. P, ENGR 102.

210. Engineering Graphics (3) GRD Representations and analysis of systems of orthographic projection and graphical methods used in engineering design and production, correlated with technical sketching. 1R, 6L. 2ES, 1ED.

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, 214.

251. Elementary Surveying (3) 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, 210, MATH 118.

307. Contracts, Specifications and Engineering Ethics (3) Law as applied to engineering contracts and contract documents, including specifications; and ethics in engineering. Writing-Emphasis Course.*

310. Probability Statistics in Civil Engineering (3) 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) 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, 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. 3ES, P, 214, MATH 223.

322. Water Resources Engineering (3) Open-channel flow, natural streams and waterways, hydrologic analysis, fluid measurement apparatus, hydraulic models; economic aspects of water resources. 1.5ES, 1.5ED, P, 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, 217.

331. Structural Engineering II (3) Analysis of statically indeterminate beams, frames, and trusses; use of computer programs. 3ES, P, 330, CR 302.

336. Structural Design in Steel (3) 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, 330; CR 331.

337. Structural Design in Concrete (3) Introduction to reinforced concrete design. 3ED, P, 330.

340. Soil Engineering (4) Physical and mechanical properties of soils, shear strength, consolidation, settlement, lateral earth pressures, and bearing capacity. 3R, 3L. 3ES, 1ED, P, 217, CHEM 103b.

360. Transportation Engineering (3) CDT Basis for planning, design, and operation of transport facilities; transport modes discussed include mass transit, passenger cars, bicycles, and pedestrian movement. 1ES, 2ED, P, 251, SIE 265, A ME 250.

361. Highway and Airport Engineering (3) CDT Materials, construction and structural design of highways and airports. 1ES, 2ED, P, 340.

370. Water Supply and Wastewater Systems (3) (Identical with CHEE 370, which is home).

371. Water and Wastewater Treatment Process (3) (Identical with CHEE 371, which is home).

380. Materials Laboratory (2) Mechanical properties of concrete, concrete aggregates, steel, and other metals as engineering materials. 1R, 3L. 2ES, P, 217, CHEM 103b.

394. Practicum a. Junior Field Trip (1) Students are urged to take this trip in the junior year.

400. Civil Engineering Design (3) 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 four of: 322, 337, 340, 360, 370.


417. Mechanics of Materials II (3) 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, 217. May be convened with 517.

423. Hydrology (3) 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, 321. Identical with HWR 423. May be convened with 523.

424. Hydraulic Engineering Design (3) 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, 322. May be convened with 524.

426. Soil and Water Conservation Engineering (3) (Identical with ABE 426, which is home).

427. Computer Applications in Hydraulics (3) 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 527.

428. Introduction to Coastal Engineering (3) 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, 321. May be convened with 528.

432. Advanced Structural Design in Steel (3) 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, P, 336. May be convened with 532.

434. Design of Wood and Masonry Structures (3) Determination of gravity and lateral loads on structures. Design of wood structures for axial load and bending; structural wood panels, dripsprays and shear walls. Types of masonry construction. Design of masonry structures for gravity and lateral loads. 3ED, P, 331, CR 337. May be convened with 534.

437. Advanced Structural Design in Concrete (3) 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, 337. May be convened with 537.

440. Foundation Engineering (3) 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, 340. May be convened with 540.

441. Earth Structures in Geotechnical Engineering (3) 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, 340. May be convened with 541.

444. Special Topics in Geomechanics (3) Introduction to geoenvironmental engineering; physiochemical and microstructural behavior of geomaterials, effect of pollutants, design of waste disposal systems; advanced laboratory testing, geotextiles, space geomechanics, etc. P, 340 or consent of instructor. May be convened with 544.

452. Engineering Surveys (3) CDT Solar and Polaris observations; mineral, public, and private land surveys; route surveying, curves, and earthwork; triangulation, photogrammetry, and modern engineering surveys. 2R, 3L. 1.5ES, 1.5ED, P, 251. May be convened with 552.

455. Irrigation Engineering (3) (Identical with ABE 455, which is home). May be convened with 555.

458. Drainage of Irrigated Lands (3) (Identical with ABE 458, which is home). May be convened with 558.
462. Bituminous Materials (3) Manufacture and evaluation tests for the control of bituminous materials used in highway construction and maintenance. 2R, 3L. 0.5ES, 2.5ED. P, 340 or consult department before enrolling. May be convened with 562.

463. Traffic Engineering (3) Methods for the efficient and safe operation of transport facilities through analysis of capacity, safety, speed, parking, and volume data. 3ED, P, 360. May be convened with 563.

464. Airport Planning and Design (3) Location, analysis and design of airports and airport facilities, including airport characteristics, site selection, configuration, capacity, access and terminals. Field trips. 3ED, P, 360. May be convened with 564.

465. Project Planning and Modeling (3) 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. 0.5ES, 2.5ED. P, senior standing in civil engineering or consult with department. May be convened with 565.

468. Urban Transportation Planning (3) CDT Transportation planning in relation to urban development; techniques and procedures for developing long-range regional plans. 3ED, P, 360 or consult department before enrolling. (Identical with PLAN 468). May be convened with 568.

478. Introduction to Hazardous Wastes (3) (Identical with CHEE 478, which is home). May be convened with 578.

484. Fundamentals of Industrial and Environmental Health (3) (Identical with OSH 484, which is home). May be convened with 584.

487. Advanced Industrial and Environmental Health (3) (Identical with OSH 487, which is home). May be convened with 587.

497. Seminar w. Advanced Cadastral Survey (1-4) (Identical with RNR 497w, which is home). May be convened with 597w.

Writing-Emphasis Course: P, Satisfaction of the upper-division writing-proficiency requirement (see Writing-Emphasis Courses in the Academic Policies and Graduation Requirements section of this manual).


503. Subsurface Fluid Dynamics (3) (Identical with HWR 503, which is home).

504. Numerical Methods in Subsurface Hydology (4) (Identical with HWR 504, which is home).

510. Probability in Civil Engineering (3) For a description of course topics see 410. Graduate-level requirements include a project paper. May be convened with 410.

517. Mechanics of Materials II (3) For a description of course topics see 417. Graduate-level requirements include a research report on a special problem. P, 217. May be convened with 417.

523. Hydrology (3) For a description of course topics see 423. Graduate-level requirements include a project paper. P, 321. (Identical with HWR 523 and AR L 523). May be convened with 423.

524. Hydraulic Engineering Design (3) For a description of course topics see 424. Graduate-level requirements include a research paper and/or a design project. P, 322. May be convened with 424.


526. Water Quality Management (3) (Identical with HWR 526, which is home).

527. Computer Applications in Hydraulics (3) For a description of course topics see 427. Graduate-level requirements include a research paper or project. 1ES, 2ED. (Identical with HWR 527). May be convened with 427.

528. Introduction to Coastal Engineering (3) For a description of course topics see 428. Graduate-level requirements include a term paper. May be convened with 428.

532. Advanced Structural Design in Steel (3) For a description of course topics see 432. Graduate-level requirements include a comprehensive design project. P, 336. May be convened with 432.

533. Plastic Analysis and Design (3) 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, 432 or consult department before enrolling.

534. Design of Wood and Masonry Structures (3) For a description of course topics see 434. Graduate-level requirements include a comprehensive design project. P, 331, CR 337. May be convened with 434.

535. Prestressed Concrete Structures (3) Behavior, analysis, and design of statically determinate and indeterminate prestressed concrete structures. P, 337.

537. Advanced Structural Design in Concrete (3) For a description of course topics see 437. Graduate-level requirements may include a research paper or a comprehensive design project. May be convened with 437.

540. Foundation Engineering (3) For a description of course topics see 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. P, 340. May be convened with 440.

541. Earth Structures in Geotechnical Engineering (3) For a description of course topics see 441. Graduate-level requirements include a research paper and/or a comprehensive design project. P, 340. May be convened with 441.

544. Special Topics in Geomechanics (3) For a description of course topics see 444. Graduate-level requirements include a research paper and/or a comprehensive design project. May be convened with 444.

547. Seepage and Earth Dams (3) 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, 340.

548. Numerical Methods in Geotechnical Engineering (3) 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, 340, 402 or 502.


552. Engineering Surveys (3) CDT For a description of course topics see 452. Graduate-level requirements include a comprehensive surveying project. P, 251. May be convened with 452.

555. Irrigation Engineering (3) P, C E 321 or A ME 331. (Identical with ABE 555, which is home). May be convened with 455.

558. Drainage of Irrigated Lands (3) (Identical with ABE 558, which is home). May be convened with 458.

562. Bituminous Materials (3) For a description of course topics see 462. Graduate-level requirements include an in-depth research paper. P, 340, or consult department before enrolling. May be convened with 462.

563. Traffic Engineering (3) For a description of course topics see 463. Graduate-level requirements include a research paper or project. P, 360. May be convened with 463.

564. Airport Planning and Design (3) For a description of course topics see 464. Graduate-level requirements include a research paper or project. P, 360. May be convened with 464.

565. Project Planning and Modeling (3) For a description of course topics see 465. Graduate-level requirements include a research paper or project. P, senior standing in civil engineering or consult with department. (Identical with PLAN 565). May be convened with 465.

568. Urban Transportation Planning (3) CDT
For a description of course topics see 468. Graduate-level requirements include a research paper or project. P, 360 or consult department before enrolling. (Identical with PLAN 568). May be convedned with 468.

573. Biodegradation of Hazardous Organic Compounds (2-3) (Identical with CHEE 573, which is home).

574. Environmental Transport Processes (3) (Identical with CHEE 574, which is home).

577. The Physiological Bases of Microbial Treatment Processes (3) (Identical with CHEE 577, which is home).

578. Introduction to Hazardous Wastes (3) (Identical with CHEE 578, which is home). May be convened with 478.

584. Fundamentals of Industrial and Environmental Health (3) (Identical with OSH 586, which is home). May be convened with 486.

587. Advanced Industrial and Environmental Health (3) (Identical with OSH 587, which is home). May be convened with 487.

596. Seminar a. Research Topics (1) [Rpt./2] (Identical with E M 596a).

597. Seminar w. Advanced Cadastral Survey (1-4) (Identical with RNR 597w). May be convened with 497w.

621. Sediment Transportation (3) Erosion, transport and deposition of sediments by flowing water; sediment properties and their measurement; bed load and suspended load movement; river behavior and control. P, 321.


623. Flow through Hydraulic Structures (3) Subcritical and supercritical flow through culverts, bridges, spillways, stilling basins, transitions, bends; hydrologic effects on inflows; pumps and turbines. P, 322.

624. Planning and Design of Multipurpose Water Resources Projects (3) 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. Field trips. P, 321, 422 or 523.

632. Infrastructure Rehabilitation (3) 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, 331, 336, 337.

633. Reinforced Concrete Members (3) 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, 437 or departmental approval.

637. Soil-Structure Interaction (3) Definition of soil-structure interaction, static and dynamic loading, analytic and computer solutions, two and three dimensional structure foundation combinations. P, 340, 548 or consent of instructor.

640. Advanced Soil Mechanics (3) 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, 340.


645. Geoenvironmental Engineering (3) 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, 340, 544 or consent of instructor.

646. Soil Dynamics and Machine Foundations (3) 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, 640.


661. Structural Design of Flexible Pavements (3) Analysis of loads, stresses, material characteristics, and environmental factors for the theoretical and practical design, construction and maintenance of pavements. P, 340, 361.

662. Structural Design of Rigid Pavements (3) Analysis of loads, stresses, material characteristics, and environmental factors for the theoretical and practical design, construction and maintenance of these pavements. P, 340, 361.

664. Transportation Economics (3) Economic analysis of transport projects, including rural and urban roadways, control systems, and mass transit; discussion of environmental and financial factors. P, 463 or 563.

665. Quick Response Transportation Planning Methods (3) 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) Study of geometric elements of streets and highways, with emphasis on analysis and design for safety. P, 463 or 563.

667. Traffic Operations and Safety (3) Application of traffic control devices for street and highways, design of traffic control systems, analysis and management of highway traffic, evaluation of safety. P, 463 or 563.


673. Advances in Water and Waste Reclamation and Reuse (2) (Identical with CHEE 673, which is home).

675. Wastewater Treatment (3) (Identical with CHEE 675, which is home).

676. Advanced Water Treatment System Design (3) (Identical with CHEE 676, which is home).

ENGINEERING MECHANICS (E M)

502. Introduction to Finite Element Methods (3) (Identical with C E 502, which is home).

505. Continuum Mechanics (4) 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) 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, 505, or consult with department.


596. Seminar a. Research Topics (1) (Identical with C E 596a, which is home).

603. Elasticity Theory and Application (3) 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, 302.

604. Plasticity Theory and Application (3) 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) 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 ME 461.

637. Plates and Shells (3) 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 or A ME 324.


648. Constitutive Laws for Engineering Materials (3) (Identical with C E 648, which is home).

ELECTRICAL & COMPUTER ENGINEERING (ECE)

Electrical & Computer Engineering Bldg.
The University of Arizona
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Tucson, AZ 85721-0104
(520) 621-6202; FAX: (520) 621-8076
http://www.ece.arizona.edu/

Baccalaureate degrees
Bachelor of Science in Computer Engineering (B.S.Co.E.)
Bachelor of Science in Electrical Engineering (B.S.E.E.)
Bachelor of Science in Optical Engineering (B.S.Op.E.)

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

Majors
Computer Engineering (B.S.Co.E.)
Electrical Engineering (B.S.E.E., Ph.D.)
Optical Engineering (B.S.Op.E.)
Electrical & Computer Engineering (M.S., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Report (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

207. Elements of Electrical Engineering (3) CDT Introductory survey of electrical engineering, with emphasis on electric power. 3 ES. P, MATH 125a, PHYS 241.

208. Elements of Electronics (3) CDT Introductory survey of electronic principles and instrumentation. 3 ES. P, 207.

210. Geometrical Optics (3) (Identical with OPTI 210, which is home).

210L. Geometrical Optics Laboratory (3) (Identical with OPTI 210L, which is home).

220. Basic Circuits (5) CDT Elementary, transient and sinusoidal analysis of linear circuits with laboratory. 4R, 1D. 3L, 5 ES. P, PHYS 241L, CR, MATH 254. Credit will be allowed for only one of the following sequences: 220a-220b or 207-208.

226. Physical Optics (3) (Identical with OPTI 226, which is home).

226L. Physical Optics Laboratory (1) (Identical with OPTI 226L, which is home).

274. Digital Logic (3) CDT Number systems and coding, logic design, sequential systems, register transfer language. 2 ES, 1 ED. P, CR, PHYS 241.

275. Computer Programming for Engineering Applications (3) Fundamentals of C, complexity and efficiency analysis, numerical precision and representations, intro to data structures, structured program design, application to solving engineering problems.

301. Electrical Engineering Laboratory (3) 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. 3 ES. P, 220b. CR, 320, 351a.


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. 2 ES, 1 ED. P, 220b.

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 O models; system diagrams; state variable models; stability analysis and Bode plots; feedback system characteristics; discrete-time systems; and digital signal processing. 2 ES, 1 ED. P, 320.

350. Radiometry, Sources, and Detectors (3) (Identical with OPTI 350, which is home).

351a-351b. Electronic Circuits (3-3) CDT 351a: Operational amplifiers, diode circuits; PSPICE, circuit characteristics of bipolar and MOS transistors; differential amplifiers; MOS and bipolar digital circuits. 1.5 ES, 1.5 ED. P, 220b; CR, 301, 351b: Amplifiers, frequency response and feedback; output stages, analog integrated circuits; filters, signal generators. 1.5 ES, 1.5 ED. P, CR, 302.

352. Device Electronics (3) CDT Electronic properties of semiconductors; carrier transport phenomena; P-N junctions; bipolar, unipolar, microwave and photonic devices. 1.5 ES, 1.5 ED. P, 351a.


370. Lasers and Electro-Optical Devices (3) (Identical with OPTI 370, which is home).

372. Microprocessor Organization (3) Computer organization and assembly language, random access memory devices, peripherals and interface design, case studies of computer systems. 2R, 3L. 1.5 ES, 1.5 ED. P, 276.

381. Introductory Electromagnetics (3) Electrostatic and magnetostatic fields; Maxwell’s equations; introduction to plane waves, transmission lines, and sources. 2 ES, 1 ED. P, MATH 322.

412. Optical Instrumentation (3) (Identical with OPTI 412, which is home).

415. Instrumentation and Measurement (3) Basic concepts of instrumentation and measurement; principles of transducers, operational amplifiers and instrument systems, with emphasis on biomedical applications; lab, experiments with transducers, amplifiers, computers, and medical equipment. 2R, 3L. 1 ES, 2 ED. P, senior standing in engineering. May be convened with 515.

416. Optical Design, Fabrication and Testing (4) (Identical with OPTI 416, which is home).

418. Physiology for Engineers (4) (Identical with PSIO 418).

419. Physiology Laboratory (2) (Identical with PSIO 419).

422. Analog Signal Processing and Filtering (3) 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. 0.5 ES, 2.5 ED. P, 320. May be convened with 522.

425. Image Science and Engineering (3) 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. 2 ES, 1 ED. P, 340. May be convened with 525.

429. Digital Signal Processing (3) Discrete-time
signals and systems, z-transforms, discrete Fourier transform, fast Fourier transform, digital filter design. 1.5 ES, 1.5 ED. P, 340, MATH 322. May be convened with 529.

430. Optical Communication Systems (3) 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. 1 ES, 2 ED. P, SIE 305, ECE 340, 352, 381; CR, 431. May be convened with 530.

431. Principles of Communication Systems (3) Signal analysis techniques associated with modulation and demodulation in systems such as AM, FM, and PCM, with special emphasis on digital communication. 1.5 ES, 1.5 ED. P, 340, 351a.

434. Electrical and Optical Properties of Materials (3) 1993-94 (Identical with MISE 434, which is home).


436. Introduction to Coding Techniques (3) Error-correcting codes used in modern digital communications systems, with emphasis on hardware implementations and performance on real channels. 2 ES, 1 ED. P, 305.

441. Automatic Control (3) Linear control system representation in time and frequency domains, feedback control system characteristics, performance analysis and stability, design of control. 1.5 ES, 1.5 ED. P, 340.

442. Digital Control Systems (3) Modeling, analysis, and design of digital control systems; A/D and D/A conversions, Z-transforms, time and frequency domain representations, stability, microprocessor-based designs. 1.5 ES, 1.5 ED. P, 441. May be convened with 542.

447. Direct Energy Conversion (3) (Identical with A ME 447, which is home). May be convened with 547.


451. Fundamentals of Device Electronics (3) Introductory device aspects of semiconductors. Crystal structures, one-dimensional quantum theory, parabolic bands, carrier statistics, SRH centers, drift and diffusion. 2.5 ES, 0.5 ED. P, 352.


1.5 ES, 1.5 ED. P, 351a-351b, 352. May be convened with 553.

455. Elementary Digital Circuit Design (3) Emphasis on first-order analysis and design; integrated bipolar and MOS digital circuits. 0.5 ES, 2.5 ED. P, 351a-351b.

456. Optoelectronics (3) Properties and applications of optoelectronic devices and systems. Topics include radiation sources, detectors and detector circuits, fiber optics, and electro-optical components. 1.5 ES, 1.5 ED. P, 352, 381. May be convened with 556.

457. Integrated Circuit Laboratory (3) Experiments in diffusion, oxidation, processing, etc. Fabrication of an integrated circuit. P, 458 or equivalent (Identical with MISE 457). May be convened with 557.

458. Solid-State Circuits (3) 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 design techniques including subsystem design and device scaling. Fundamentals of chip layout and integrated circuit design methodology for solid state circuits. 1 ES, 2 ED. P, 352.

459. Fundamentals of Optics for Electrical Engineers (3) 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, neural nets, associative memory optical interconnects. 1.5 ES, 1.5 ED. P, 381, 352. May be convened with 559.

460. Aerosol Science and Engineering (3) 1995-96 (Identical with CHEE 460, which is home). May be convened with 560.

461. Energy Conversion (3) Principles and operating characteristics of rotating machinery and electromagnetic transducers, single-phase and polyphase transformer operation, laboratory demonstrations and tests of transformers and rotating machinery. 2 ES, 1 ED. P, 320, 381.

464. Operating System Concepts (3) Fundamental issues in the design, implementation and evaluation of operating systems. Topics include process models, concurrency control algorithms, resource management and an introduction to distributed system concepts. 1.5 ES, 1.5 ED. P, 275, 372.


470a-470b. Optics Laboratory (3-3) (Identical with OPTI 470a-470b, which is home).

471. Engineering Software Design (3) Object oriented programming languages, Scheme, C++, class library development and use, object behavior and system testing. 2R, 3L. 1.5 ES, 1.5 ED. P, 274, C SC 227.


473. Software Engineering Concepts (3) In-depth examination of each of the phases of the software project life cycle. Object-oriented design and programming. Includes a large-scale software development project involving groups of students. 2R, 3L. 1 ES, 2 ED. P, 275. May be convened with 573.

474a-474b. Computer-Aided Logic Design (3-3) 474a: Tabular minimization of single and multiple output Boolean functions, NMOS and CMOS realizations, synthesis of sequential circuits, RTL description, laboratory exercises. 1.5 ES, 1.5 ED. P, 274, 474b: Standard cell layout, gate and switch level simulation, level mode sequential circuits. VLSI testing, CAD tools, laboratory projects. 1 ES, 2 ED. (Identical with C SC 474a-474b). May be convened with 574a-574b.

475. Microcomputer-Based Design (3) Design of microprocessor-based real-time test and control systems, use of development systems and emulators. 2R, 3L. 0.5 ES, 2.5 ED. P, 372.

478. Fundamentals of Computer Networks (3) 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. 2 ES, 1 ED. P, 275, 372, SIE 305. May be convened with 578.

479. Principles of Artificial Intelligence (3) 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. 1.5 ES, 1.5 ED. P, 275, 473. May be convened with 579.

481. Microwave Measurements (3) Measurement techniques and the operation of hardware and test equipment in the modern microwave laboratory. 2R, 3L. 1.5 ES; 1.5 ED. P, 381.

482. Electromagnetics (3) Electromagnetic waves in complex media, waveguides, cavity resonators, and antennas. 1.5 ES, 1.5 ED. P, 381 or PHYS 331.

484. Antenna Theory and Design (3) Introduction to the fundamentals of radiation, antenna theory and antenna array design. Design considerations for wire, aperture, reflector and printed circuit antennas. 1.5 ES, 1.5 ED. P, 381.

485. Radio Waves and Telemetry (3) 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 construction, data synchronization, link characterization and systems considerations. 1.5 ES, 1.5 ED. P, 381. CR, 431 or 435. May be convened with 585.
486. Microwave Engineering (3) 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. 1.5 ES, 1.5 ED, P, 381.

487. Fiber Optics Laboratory (3) (Identical with OPTI 487, which is home). May be convened with 587.

493. Internship

494. Practicum
a. Senior Practicum in Design (3) CR, 495a. 0.5 ES, 2.5 ED, P, 302.

495. Colloquium
a. Technical Communications (1) P, CR, 494a and senior standing. Writing-Emphasis Course. *

*Writing-Emphasis Courses, P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

501. Linear Systems Theory (3) 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) 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) For a description of course topics see 422. Graduate-level requirements include additional homework and a term project. May be convened with 422.

527. Holography (3) (Identical with OPTI 527, which is home).


529. Digital Signal Processing (3) For a description of course topics see 429. Graduate-level requirements include additional homework and a term project. May be convened with 429.

530. Optical Communication Systems (3) For a description of course topics see 430. Graduate-level requirements include additional homework and a term paper. P, 352, 381; CR, 431. May be convened with 430.

531. Image Processing Laboratory for Remote Sensing (3) 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) Digital image analysis, including feature extraction, boundary detection, segmentation, region analysis, mathematical morphology, stereo and optical flow. P, 340. (Identical with OPTI 552).


534. Advanced Topics in Electronic Materials (3) [Rpt. /2] (Identical with MSE 534).

537. Digital Transmission and Telephony (3) 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, 431 and SIE 305.


539. Algebraic Coding Theory (3) 1993-94 (Identical with MATH 539, which is home).


542. Digital Control Systems (3) For a description of course topics see 442. Graduate-level requirements include additional homework and a term project. May be convened with 442.


545. Decentralized Control and Large-Scale Systems (3) Introduction to large-scale systems, definitions and special problems, modeling/model reduction, structural properties, decentralization of control and information, hierarchical and multilevel controllers. P, 501.

547. Direct Energy Conversion (3) (Identical with A ME 547, which is home). May be convened with 447.


549. Continuous-System Modeling (3) For a description of course topics see 449. Graduate-level requirements include more difficult homework and separate grade normalization. (Identical with C CS 549.) May be convened with 449.


552. Solid-State Devices (3) Basic semiconductor physics and materials, PN junctions, metal semiconductor junctions/contacts, BJTs and MOSFETs, device operation, terminal behavior and frequency response, device models. P, 352, 451.

553. Design-Oriented Analysis of Electronic Circuits (3) For a description of course topics see 453. Graduate-level requirements may include additional homework, different test problems. May be convened with 453.

554. Electronic Packaging Principles (3) 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) For a description of course topics see 456. Graduate-level requirements include additional homework and a term project. May be convened with 456.

557. Integrated Circuit Laboratory (3) For a description of course topics see 457. Graduate-level requirements include additional homework and a term project. P, 458 or 540, or equivalent. (Identical with MSE 557) May be convened with 457.

558. Vacuum System Engineering (3) Rarefied gas dynamics, pumping, gauging and systems as they apply to microelectronic device and thin-film fabrication. Materials and techniques for ultraclean and ultrahigh vacuum processing. P, 557 or consult department before enrollment.

559. Fundamentals of Optics for Electrical Engineers (3) For a description of course topics see 459. Graduate-level requirements include different exam questions and/or grading. May be convened with 459!
560. Aerosol Science and Engineering (3) (Identical with CHEE 560, which is home). May be convened with 460.


563. Engineering Applications of Graphic Theory (3) Topics will emphasize engineering applications of graph theory. Terminology, algorithms and complexity analysis will be included. Application areas will include, but are not limited to, communication networks, VLSI routing and layout, analog circuits, and mapping of sequential and parallel algorithms onto computer architectures.


568. Modern Computer Architecture (3) Overview of uniprocessor architectures, introduction to parallel processing, pipelining, vector processing, multi-processing, multiprogramming, memory design for parallel computers, cache design, communication networks for parallel processing, algorithms for parallel processing. P, 369.


571a. Digital Systems Design (3) Computer organization and architecture; control unit design, microprogramming, input-output. (Identical with C SC 571a).

572. Continuous System Simulation (3) For a description of course topics see 472. Graduate-level requirements include more difficult homework and separate grade normalization. (Identical with C SC 572). May be convened with 472.

573. Software Engineering Concepts (3) For a description of course topics see 473. Graduate-level requirements include additional homework and a term project. May be convened with 473.

574a-574b. Computer-Aided Logic Design (3-3) For a description of course topics see 474a-474b. Graduate-level requirements include additional homework and term projects. (Identical with C SC 574a-574b). May be convened with 474a-474b.


576. Engineering of Computer-Based Systems (3) Provides methods and techniques for engineering and design of systems that comprise heterogeneous, 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, 471, 479, or consent of instructor.


578. Fundamentals of Computer Networks (3) For a description of course topics see 478. Graduate-level requirements include additional homework and assignments. May be convened with 478.

579. Principles of Artificial Intelligence (3) For description of course topics see 479. Graduate-level requirements include additional homework and a term project. May be convened with 479.

581a-581b. Electromagnetic Field Theory (3-3) 581a: Time-harmonic fields; fundamental theorems and concepts; rectangular and circular waveguides and resonators; apertures in ground planes, cylinders, and wedges; scattering by cylinders and wedges. P, 502 or MATH 422b; 482 or PHY 332. 581b: Spherical geometries: interface problems; perturbational techniques; integral equations; asymptotic techniques; introduction to transient fields.

583. Remote Sensing Instrumentation and Techniques (3) Development of instrumentation, measurement and signal processing techniques required for electromagnetic remote sensing applications with emphasis on atmospheric remote sensing. P, 482. (Identical with ATM 583).

584. Advanced Antenna Theory and Design (3) Electromagnetic radiation and diffraction; dipoles, slots, open wave guides, and horns; apertures, reflectors, and arrays; mechanical and electronic scanning; applications to practical radar and communications problems. P, 581a.

585. Radio Waves and Telemetry (3) For a description of course topics see 485. Graduate-level requirements include a research report on a topic selected by the instructor from the course material. P, 482. May be convened with 485.

587. Fiber Optics Laboratory (3) (Identical with OPTI 587, which is home). May be convened with 487.

589. Atmospheric Electricity (3) (Identical with ATM 589, which is home).

631. Neural Networks (3) Theory and application of parallel distributed computation via element processing elements; PE models and neural analogies; statistical classification, supervised/unsupervised; neural net models; associative memories; training algorithms.

636. Information Theory (3) 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, 503. (Identical with MATH 636).


652. Advanced Solid-State Devices (3) Analysis and design of devices including BJTs, MOSFETS, MESFETs, MODFETs, microwave devices, and photonic devices. P, 552.


659. Advanced Topics in Microelectronics and Solid-State Devices (3) (Rpt. /9 units) Specialized topics, as announced, such as submicron MOSFETS, radiation effects on devices, yield analysis, advanced semiconductor processing technologies, and contamination control; P, consult department before enrolling.

672. Computer-Aided Design Algorithms and Techniques for VLSI (3) Introduction to VLSI design, combinational and sequential logic synthesis, layout generation and optimization, logic and timing simulation, design styles. P, 474/574.


678. Integrated Telecommunication Networks (3) Analysis and design of integrated voice, data, and image networks for integrated telecommunication applications. Protocols for LANs, ISDNs, WANs, MANs and interoperable networks. ISO-based network software design for applications. P, 566, 673.
107a. Introduction to Global Change (4) 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). 3R, 3L. 107a is not prerequisite to 107b. For nonmajors only. (Identical with GEOS 107b).

195. Colloquium

205R. Principles of Hydrology (2) 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. CR, 250LR.

205L. Principles of Hydrology Laboratory (1) Laboratory techniques complementary to the basic principles of hydrology. Field trips. Fee. CR, 250LR.

407. Subsurface Hydrology (3) Introduction to groundwater flow through saturated and unsaturated soils and rocks and transport governing equations; flow nets; single and multiple borehole hydraulic tests; stream-aquifer interaction. Field methods. Fee. P, PHYS 241; MATH 125b, C E 321 or A ME 331.

408. Vadose Zone Monitoring (2) Laboratory and field methods for characterizing water flow and contaminant transport through unsaturated geologic media. 6L. P, 407. May be convened with 508.

414. Field Hydrology (Surface Water) (1) Field methods of collection, compilation, and interpretation of data in surface water. Stream gaging, 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. Fee. P, 250 or 423 or 440. May be convened with 514.

415. Introduction to Water Resources Policy (3) Water resources policy including the identification of regional problems of water use, the elements of water planning, water rights, and a consideration of institutional structures and processes. P, MATH 125a. (Identical with GEOG 415). May be convened with 515. Writing-English Course.*

423. Hydrology (3) (Identical with C E 423, which is home). May be convened with 523.

427. Computer Applications in Hydraulics (3) (Identical with C E 427, which is home). May be convened with 527.


440. Advanced Surface Water Hydrology (3-4) Theory and selected design problems from fluvial dynamics, flood hydrology, flood routing, and water supply hydrology. 3R, 1D. Discussion section is mandatory for undergraduates. Field trip.

P, 250R and 250L or 423, C E 321. May be convened with 540.

443. Environmental Risk and Economic Analysis in Water Resources (3) 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 543.

445. Statistical Hydrology (3) 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 545.

450a-450b. Environmental Hydrology (3) Chemistry of surface and subsurface water, the predominant chemical processes affecting composition in relation to human use; classification, identification, and mobility of contaminants; introduction to chemical and transport modeling. 450a (spring semester) focuses on inorganic chemistry. 450b (fall semester) focuses on organic aquatic chemistry. P, 250R and 250L, CHEM 103a-103b, MATH 125b, knowledge of computer language. CR, 450a, 451; concurrent registration with 451 is not required for 450b. May be convened with 550a-550b.

451. Environmental Hydrology Laboratory (1) Laboratory procedures related to chemistry of surface and subsurface water. P or CR, 450a or equivalent. Fee. May be convened with 551.

460. Watershed Hydrology (4) (Identical with WS M 460, which is home). May be convened with 560.

461. Environmental and Resource Geography (3) (Identical with GEOG 461, which is home).

466. Soil and Groundwater Restoration (3) (Identical with SWM 466, which is home). May be convened with 566.

476. Environmental Law and Economics (3) (Identical with AREC 476, which is home).

478. Global Change (3) (Identical with GEOS 478, which is home). May be convened with 578.

481. Environmental Policy (3) (Identical with POL 481, which is home). May be convened with 581.

482. Applied Groundwater Modeling (3) Introduction to groundwater flow and transport modeling, with emphasis on model construction and simulation. 2R, 3L. May be convened with 582.

483. Physical Oceanology and Limnology for Hydrologists (2) Origin, distribution, and characteristics of oceanic water; advective and convective processes; estuarine and shoreline processes; effect on coastal aquifers; classification and hydrologic regimes of lakes. P, MATH 125b. May be convened with 583.

490. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 490, which is home). May be convened with 590.

496. Proseminar
a. Hydrology (1) [Rpt/1]
**Writing-Emphasis Courses.** P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

500. Ecosystemology for Urban Planning (3) 
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 (EIS). Water resource planning and impact on regional ecosystems; technical, legal, ethical dimensions of water transfer. (Identical with PLAN 500).

503. Subsurface Fluid Dynamics (3) 
Dynamics of immiscible ﬂuids in porous and fractured media; anisotropy and scale; advective solute transport; consolidation and land subsidence; multiphase systems; free surface ﬂow and salt water/fresh water interfaces. P, MATH 223 or (preferably) 322 or 422 or 422b, C E 321 or A ME 331. (Identical with C E 503).

504. Numerical Methods in Subsurface Hydrology (4) 
Finite difference, element and boundary integral methods for subsurface ﬂuid ﬂow and mass transport; applications to aquifers, unsaturated soils, earth structures. P, MATH 422a or consult department before enrolling. (Identical with C E 504).

505. Vadose Zone Hydrology (3) 
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, 407 or 503 or 518.

506. Water Quality Dynamics (3) 
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, 517R/L.

508. Vadose Zone Monitoring (2) 
For a description of course topics see 408. Graduate-level requirements include in-depth laboratory reports. P, 407 or 503 or 505 or 518. May be convened with 408.

513. Environmental Risk Analysis (3) 

514. Field Hydrology (Surface Water) (1) 
For a description of course topics see 414. Graduate-level requirements include an in-depth report on one aspect of the field work or participation and assistance in the preparation and conduction of a field project. Daily ﬁeld work. Fee. P, 519. May be convened with 414.

515. Introduction to Water Resources Policy (3) 
For a description of course topics see 415. Graduate-level requirements include an in-depth term paper. P, MATH 125a. (Identical with GEOG 515). May be convened with 415.

516. Hydrologic Transport Processes (3) 
Development and application of equations describing mass and energy transport in the subsurface environment. P, 503 or 535, SIE 270.

517. Fundamentals of Water Quality (3) 
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. 517R may be taken in conjunction with or independent of 517L; however, 517R is prerequisite to 517L. P, CHEM 103b, PHYS 241, and MATH 125b; CR or P, MATH 254.

517L. Fundamentals of Water Quality Laboratory (1) 
Field and laboratory methods in water quality sampling and analysis. Includes both wet chemical and instrumental methods of analysis. Fee. P, CR, 517R.

518. Survey of Subsurface Hydrology (3) 
Survey of physical, mathematical, geologic, and engineering concepts fundamental to subsurface hydrologic processes. P, CR, A ME 331 or C E 321; MATH 254; P, GEOS 101.

519. Survey of Surface Water Hydrology (3) 

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) 
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) 
(Identical with G EN 522, which is home).

523. Hydrology (3) 
(Identical with C E 523, which is home). May be convened with 423.

524. Hydroclimatology (3) 
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. P, non-majors should consult department before enrolling. (Identical with ATM O 524).

525. Water Quality Modeling (3) 
(Identical with C E 525, which is home).

526. Water Quality Management (3) 
Optimization and systems analysis techniques used in modeling; current models used in formulation and implementation of water quality policy. P, 525. (Identical with C E 526).

527. Computer Applications in Hydraulics (3) 
(Identical with C E 527, which is home). May be convened with 427.

531. Hydrogeology (4) 
For a description of course topics see 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 431.

535. Advanced Subsurface Hydrology (3) 
Advanced aquifer and well hydrogeology; heterogeneity, unsaturated flow; natural and artificial recharge; ground-water and surface-water interaction; mass and heat transport. P, MATH 223 or 322 or 422a or 422b. (Identical with GEOS 535).

536. Ground-Water Resource Evaluation (3) 
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, ﬁeld trips. Fee. (Identical with GEOS 536).

540. Advanced Surface Water Hydrology (3-4) 
For a description of course topics see 440. Graduate-level requirements include an in-depth paper or project. 3R, 1D. Discussion section is optional for graduate students. Field trip. P, 519 or 523. May be convened with 440.

543. Environmental Risk and Economic Analysis in Water Resources (3) 
For a description of course topics see 443. Graduate-level requirements include a research paper on an applied aspect of the course. P, MATH 125a. May be convened with 443.

545. Statistical Hydrology (3) 
For a description of course topics see 445. Graduate-level requirements include an in-depth simulation project. P, knowledge of computer language; SIE 305 or MATH 160. May be convened with 445.

550a-550b. Environmental Hydrology (3) 
For a description of course topics see 450a-450b. Graduate-level requirements include an in-depth research paper. P, CHEM 103a-103b, MATH 125b, knowledge of computer language. May be convened with 450a-450b.

551. Environmental Hydrology Laboratory (1) 
For a description of course topics see 451. Fee. P, CR, 550a or equivalent. May be convened with 451.

560. Watershed Hydrology (4) 
(Identical with WS M 560, which is home). May be convened with 460.

563. Isotope Hydrology (3) 
(Identical with GEOS 563, which is home).

566. Soil and Groundwater Restoration (3) 
(Identical with SWES 566, which is home). May be convened with 466.

569. Spatial Analysis for Hydrology and Watershed Management (2) 
(Identical with WS M 569, which is home).

570. Computer Simulation of Hydrochemical Processes (3) 
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. P, CR, 506 (recommended) or 517R/L.

572. Global Biogeochemical Cycles (3) (Identical with GC 572, which is home).

576. Advanced Natural Resource Economics (3) (Identical with AREC 576, which is home).

577. Advanced Topics in the Economics of Environmental Regulation (3) (Identical with AREC 577, which is home).

578. Global Change (3) (Identical with GEOS 576, which is home). May be convened with 478.

581. Environmental Policy (3) (Identical with POL 581, which is home). May be convened with 481.

582. Applied Groundwater Modeling (3) For a description of course topics see 482. Graduate-level requirements include an in-depth research paper and/or project. May be convened with 482.

583. Physical Oceanography and Limnology for Hydrologists (2) For a description of course topics see 483. Graduate-level requirements include an in-depth research report. P, MATH 125b. May be convened with 483.

584. Advanced Applied Groundwater Modeling (3) Advanced applied ground-water flow and transport modeling for saturated and unsaturated media using variety of current software packages. 2R, 1L, P, 482 or 582 or equivalent course.

590. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 590, which is home). May be convened with 490.

595. Colloquium b. Global Climate Change (2) [Rpt./1] (Identical with ATM 595b, which is home).

c. General Circulation Observations and Modeling (1-3) (Identical with ATM 595c, which is home).

596. Seminar k. Risk and Society (3) [Rpt./1] (Identical with GEOG 596k, which is home).


603. Advanced Topics in Subsurface Hydrology (2) 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, 503 or 535.

605. Soil Water Dynamics (3) (Identical with SWES 605, which is home).

624. Analysis of Hydrologic Systems (3) 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) Applications of mathematical programming to the analysis of interactions of hydrology, engineering, economics, and socio-institutional environment in regional water resources systems. P, 521 or consult department before enrolling.


655. Stochastic Hydrology (3) Advanced application of statistics and probability to hydrology; multivariate regression, Bayesian techniques, stochastic processes, time series and frequency analysis. P, MATH or basic statistics and hydrology.

659. Colloquium a. Hydrology and Water Resources (1-3) [Rpt./1] For HWR majors, research presentation only; consult department before enrolling.

696. Seminar a. Advanced Topics in Groundwater Hydrology (1-3) [Rpt./1]

b. Advanced Topics in Vadose Zone Hydrology (1-3)

c. Advanced Topics in Subsurface Modeling (1-3) [Rpt./1]

e. Pollutants in the Hydrologic Environment (1-3) [Rpt./1]

f. Advanced Hydrologic Modeling (1-3) [Rpt./1]
g. Interstate Conflict Resolution (3) [Rpt./1] (Identical with SIE 690g, which is home). P, consent of instructor.

i. International Water Resource Management (1-3) [Rpt./2] (Identical with POL 696i and NES 696i).

b. Science and Technology of Radioactive Waste Management (1-3) [Rpt./1]

q. Advanced Methods in Hydrometeorology/Hydroclimatology (1-3) [Rpt./1]

MATERIALS SCIENCE & ENGINEERING (MSE)

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(520) 621-6071; FAX: (520) 621-8059
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Baccalaureate degree

BACHELOR OF SCIENCE IN MATERIALS SCIENCE & ENGINEERING (B.S.M.S.E.)

Graduate degrees

MASTER OF SCIENCE (M.S.)

DOCTOR OF PHILOSOPHY (Ph.D.)

Program Requirements

For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major(s) listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/ oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

110. Solid State Chemistry (4) Fundamental principles of the chemistry of condensed states of matter including metals, polymers, molecular solids and ceramics. 4ES. P, CHEM 103a.

195. Colloquium

b. Materials Science and Engineering (1) (Identical with ENGR 195b).

207. Material Culture Studies (3) (Identical with ANTH 207, which is home).

222. Introduction to Materials Science (3) Introduction to the structure of materials and how structure influences properties. Elementary crystallography, crystal chemistry, and microstructure effects are covered. Examples are taken from all classes of materials: metals, semiconductors, ceramics, polymers, glasses, and composites. 3ES. P, 110 or CHEM 103b, and MATH 125b; or consult department before enrolling.

244. Materials and Energy Balances in Materials Processing (3) 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 new materials. 3ED. Field trips. P, CHEM 103b or MSE 110; ENGR 102.

240. Thermodynamics of Materials (4) 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 Civilization (3) (Identical with ANTH 249, which is home).

251. Social Constraints on Engineering (3) 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 and ENGR 251).

257. Materials Science of Art and Archaeological Objects (3) 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 and ENGR 257).
258. Materials Science of Art and Archaeological Objects Laboratory (1) Laboratory exercises involving the materials science of art and archaeological objects. 1ES. (Identical with ANTH 258 and ENGR 258).


331R. Fundamentals of Materials for Engineers (3) Scientific principles which underlie and relate the behavior and properties of materials to their engineering applications. 3ES, P, PHYS 103; CHEM 103a or CR.

331L. Engineering Materials Laboratory (1) Fundamental laboratory techniques for the evaluation of properties and behavior of materials for engineering applications. 1R, 2L. IES. P, 331R or CR.


360. Materials Laboratory (1) Laboratory experiments on physical, electrical and optical properties of materials. 1ES, P, CR, 360R.


405. Advanced Extractive Metallurgy (3) Hydrometallurgy: physical chemistry and kinetics of hydrometallurgical processes including leaching, solvent extraction and metal recovery; flowsheet design and op-timization. Pyrometallurgy: analysis, control and optimization of pyrometallurgical processes. 3ED. Field trip P, 380. May be convened with 505.

409. Transport Phenomena (3) Principles of momentum, energy and mass transport, as applied to materials processing. 3ES, P, 240, MATH 254. May be convened with 509.

411. Mineral Processing (3) (Identical with MN E 411, which is home). May be convened with 511.

412. Physical Chemistry of Materials (3) Physical and chemical topics of interest to material scientists including surface chemistry, electrochemistry and chemical kinetics. 3ES. P, 240. May be convened with 512.

423. Electrochemistry in Materials Science (3) Principles and applications of electrochemistry in materials science with emphasis on charge-transfer reactions at electrode-solution interfaces; including electrodeposition, electroforming, electroless plating. 2.5ES, 0.5ED. P, 240. May be convened with 523.

424. Physics and Chemistry of Ceramic Materials (3) Ceramic crystal structures, crystal chemistry, phase equilibria and sintering theory. 3ES. P, 260 or consult department before enrolling. May be convened with 524.


435. Corrosion and Degradation (3) The science of corrosion and degradation reactions and its application to engineering problems. 2ES, IED. P, 331R; 412 or CHEM 480b or CR. (Identical with CHEE 435 and ENGR 435). May be convened with 535.

440. Thermodynamics of Condensed Phases (3) Advanced treatment of the principles of thermodynamics with application to electronic and optical materials; emphasis on solutions, defect chemistry and modeling of multicomponent systems. 3ES. P, 240. May be convened with 540.


444. Design Competition (3) Students utilize their undergraduate experience in formulating and developing a materials design project which they present and defend before a review panel. 3ED. P, 442a. May be convened with 544.

452. Nondestructive Evaluation of Materials (3) 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, IED. P, 331R or 360, or CR. May be convened with 552.

455. Physical Metallurgy and Process of Steel (3) 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. 1ES, 2ED. P, 331R or 380; 409 or A ME 442. May be convened with 555.

457. Integrated Circuit Laboratory (3) (Identical with ECE 457, which is home). May be convened with 557.

460. Materials Science of Polymers (3) Introduction to physical properties of polymers. Microstructure, crystallization, rheology, relaxation and mechanical properties. 1ES, 1.5ED. P, 331R or 360R. May be convened with 560.

461. Biological and Synthetic Materials (3) Discussion of structure and properties of biological materials and composites, such as bone, teeth and elastin. Synthetic materials as substitutes for biological materials, biocompatibility. 1ES, 1.5ED. P, CHEM 103a. May be convened with 561.

462. Structure and Properties of Polymers (3) Topics of intensive current development in polymer science. In each case, the relation between molecular structure, morphology and properties will be explored. Shows how polymers can be designed and tuned to have the properties needed to fulfill specialized functions. Topics include high modulus fibers, nonlinear optical properties, conducting polymers and resins for composite materials. 1.5ED, 1.5ES. P, 460. May be convened with 562.

465. Microelectronic Packaging Materials (3) Design of microelectronic packaging systems based on the electrical, thermal and mechanical properties of materials. Chip, chip package, circuit board and system designs are considered. 3ED. (Identical with ECE 465). May be convened with 565.

470. Technology of Polymers and Ceramics (3) Processing and properties of polymers and ceramics in a wide range of technological applications. Discussion of patent literature. 3ED. P, 260 or 331R. May be convened with 570.

471. The Formation and Structure of Glass (3) The glass transition, Kauzmann’s paradox, kinetic theory of glass formation, physics and chemistry of glass making, glass structure, thermal properties. 3ES. P, 260. May be convened with 571.

478. Design, Production and Performance of Ceramics and Metals (3) How design procedures and outcomes for materials and material processing depend on social and cultural compromises among performance characteristics. (Identical with ANTH 478) May be convened with 578.

479. Culture and Materials Technology (3) (Identical with ANTH 479, which is home). May be convened with 579.

480. Experimental Methods for Microstructural Analysis (3) An introduction, through a combination of lectures and laboratory experiences, to both established and new techniques for microstructural characterization of materials. 3ES. May be convened with 580.

485. Technological Forecasting (3) Introduction to basic forecasting technologies which include causal models, trend extrapolation, growth curves, relevance trees and other models. 2ES, 1ED. P, MATH 125b or knowledge of calculus. (Identical with ENGR 485). May be convened with 585.

486. Technology and Society (3) 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 586.


489. Transmission Electron Microscopy of Materials (3) Transmission electron microscopy in
materials characterization. Specimen preparation; instrumental techniques; interpretation of micrographs and diffraction patterns, micro- and nanophotography in transmission electron microscopy. 2R, 3L, 3ES. P, 480 or consult department before enrolling. May be convened with 589.


505. Advanced Extractive Metallurgy (3) For a description of course topics see 405. Graduate-level requirements include a mathematical model. Field trip. P, 380. May be convened with 405.

509. Transport Phenomena (3) For a description of course topics see 409. Graduate-level requirements include either a term paper or computer model. P, 240, MATH 254. May be convened with 409.


511. Mineral Processing (3) (Identical with MNE 511, which is home). May be convened with 411.

512. Physical Chemistry of Materials (3) For a description of course topics see 412. Graduate-level requirements include a research paper or project. May be convened with 412.

523. Electrochemistry in Materials Science (3) For a description of course topics see 423. Graduate-level requirements include a special project. P, 240. May be convened with 423.

524. Physics and Chemistry of Ceramic Materials (3) For a description of course topics see 424. Graduate-level requirements include an advanced topic term paper. P, 260 or consult department before enrolling. May be convened with 424.

532. Solid-Fluid Reactions (3) (Identical with CHEE 532, which is home).


534. Advanced Topics in Electronic Materials (3) [Rpt./2] Topics to be selected from ferroelectrics, optoelectronics, wave guides, and semiconductor materials. (Identical with ECE 534 and OPTI 534).

535. Corrosion and Degradation (3) For a description of course topics see 435. Graduate-level requirements include a term paper. P, 331R; 412 or CHEM 480 or CR. (Identical with CHEE 535). May be convened with 435.


540. Thermodynamics of Condensed Phases (3) For a description of course topics see 440. Graduate-level requirements include a term paper. P, 240. May be convened with 440.

542a-542b. Materials Engineering Design (2-2) For a description of course topics see 442a-442b. Graduate-level requirements include defense of the design project before the student's research committee. May be convened with 442a-442b.

544. Design Competition (3) Students utilize their research experience in formulating and developing a materials design project which they present and defend before a review panel. Team design and research is emphasized. Graduate-level requirements include defense of the design project before the student's research committee. May be convened with 444.

551. Atomic Computational Techniques in Materials Science (3) 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) For a description of course topics see 452. Graduate-level requirements include a term paper. P, 331R or 360, or CR. May be convened with 452.

554. Electronic Packaging Principles (3) (Identical with ECE 554, which is home).

555. Physical Metallurgy and Processing of Steel (3) For a description of course topics see 455. Graduate-level requirements include a research term paper or computer model. 2R, 3L, P, 33R or 380; 409 or AME 442. May be convened with 455.

557. Integrated Circuit Laboratory (3) (Identical with ECE 557, which is home). May be convened with 457.

560. Materials Science of Polymers (3) For a description of course topics see 460. Graduate-level requirements include additional computational and written exercises. May be convened with 460.

561. Biological and Synthetic Materials (3) For a description of course topics see 461. Graduate-level requirements include additional computational and written exercises. May be convened with 461.

562. Structure and Properties of Polymers (3) For a description of course topics see 462. Graduate-level requirements include additional computational and written exercises. May be convened with 462.

565. Microelectronic Packaging Materials (3) For a description of course topics see 465. Graduate-level requirements include an additional term paper. (Identical with ECE 565). May be convened with 465.

570. Technology of Polymers and Ceramics (3) For a description of course topics see 470. Graduate-level requirements include the writing and presentation of an additional term paper. May be convened with 470.

571. The Formation and Structure of Glass (3) For a description of course topics see 471. Graduate-level requirements include a research paper or project. May be convened with 471.


578. Design, Production and Performance of Ceramics and Metals (3) For a description of course topics see 478. Graduate-level requirements include a term-long design project or design analysis. (Identical with ANTH 578). May be convened with 478.

579. Culture and Materials Technology (3) (Identical with ANTH 579, which is home). May be convened with 479.

580. Experimental Methods for Microstructural Analysis (3) For a description of course topics see 480. Graduate-level requirements include an additional term paper. May be convened with 480.

585. Technological Forecasting (3) For a description of course topics see 485. Graduate-level requirements include an additional term paper. May be convened with 485.

586. Technology and Society (3) For a description of course topics see 486. Graduate-level requirements include an additional term paper. May be convened with 486.

588. Scanning Electron Microscopy (3) For a description of course topics see 488. Graduate-level requirements include additional lab work. Consult department before enrolling. May be convened with 488.

589. Transmission Electron Microscopy of Materials (3) For a description of course topics see 489. Graduate-level requirements include an additional term paper and presentation. P, 480 or 580, or consult department before enrolling. May be convened with 489.

589. Colloquium
a. Materials (1) [Rpt./5]
MINING & GEOLOGICAL ENGINEERING (G EN/MN E)
Mines and Metallurgy Bldg., Rm. 229
The University of Arizona
PO Box 210012
Tucson, AZ 85721-0012
(520) 621-6063; FAX: (520) 621-8330
e-mail: elsie@mge.arizona.edu
http://w3.arizona.edu/~mge/

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
Geological Engineering (B.S.Ge.E.)
Geological & Geophysical Engineering (M.S., Ph.D.)
Mining Engineering (B.S.Mn.E., M.S., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/appr.html.

For academic program requirements for graduate degrees, 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.

GEOLOGICAL ENGINEERING (G EN)

120. Mineral Resources, Geotechnology and the Environment (3) (Identical with MN E 120, which is home).

219. Mineralogy and Petrology for Engineers (3) Introduction to crystal groups, mineral chemistry, mineral recognition, genesis, classification and identification of rocks and their recognition in hand specimens and in the field. 2R, 3L, P, CHEM 103a-103b, 104a-104b, GEOS 101, 103. (Identical with MN E 219).

330. Introduction to Remote Sensing (3) (Identical with GEOG 330, which is home).


407. Photogeology (3) Use of aerial photographs in geologic mapping. 1R, 6L, 1.5ES, 1.5ED. P, GEOS 321. (Identical with GEOS 407). May be convened with 507.

415. Rock Excavation (3) (Identical with MN E 415, which is home). May be convened with 515.

416. Field Studies in Geophysics (3) Seismic, magnetic, electrical, and gravity exploration techniques. Field trips. 3ED, P, 448 or 548. (Identical with GEOS 416). May be convened with 516.

425. Geotechnical Investigations (3) 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 525.

426. Health and Safety in Mining (1) (Identical with MN E 426, which is home). May be convened with 526.

427. Geomechanics (3-4) (Identical with MN E 427, which is home). May be convened with 527.

445. Fundamentals of Geostatistics (3) [Rpt./6 units] (Identical with MN E 445, which is home). May be convened with 545.

448. Geophysical Exploration and Engineering (3) 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, 241, MATH 223. (Identical with GEOS 448). May be convened with 548.


470. Computer Methods in Geological Engineering (3) Use of computers to solve problems in geological engineering, including data bases, computer contouring, map filtering and enhancement, and multivariate analysis of geologic data. 3ED, P, introductory courses in computer programming, math, and earth science. May be convened with 570.

490. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 490, which is home). May be convened with 590.


503. Rock Mass Joint Geometry Modeling (3) [Rpt./1] Sampling techniques; statistical homogeneity; delineation of joint sets; corrections for sampling biases of joint parameters; inference of statistical distributions for orientation, spacing, intensity and size; joint systems modeling and validation. 2R, 3L, P, 402, SIE 270.


507. Photogeology (3) For a description of course topics see 407. Graduate-level requirements include completion of an advanced project involving photo interpretation and field mapping. P, GEOS 321. (Identical with GEOS 507). May be convened with 407.

515. Rock Excavation (3) (Identical with MN E 515, which is home). May be convened with 415.

516. Field Studies in Geophysics (3) For a description of course topics see 416. Graduate-level requirements include additional project work requiring a more in-depth analysis. Field trips. P, 448 or 548. (Identical with GEOS 516). May be convened with 416.

522. Well Logging Interpretation (3) 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 and HRW 522).

524. Fundamentals of Geotechnics (3) For a description of course topics see 424. Graduate-level requirements include an in-depth research paper on an assigned topic. P, C E 340. May be convened with 424.

525. Geotechnical Investigations (3) For a description of course topics see 425. Graduate-level requirements include a research project. May be convened with 425.

526. Health and Safety in Mining (1) (Identical with MN E 526, which is home). May be convened with 426.

527. Geomechanics (3-4) (Identical with MN E 527, which is home). May be convened with 427.

529. Rock Slope Analyses and Design (3) (Identical with MN E 529, which is home).

537. Developments in Rock Mechanics (2) (Identical with MN E 537, which is home).

545. Fundamentals of Geostatistics (3) [Rpt./6 units] (Identical with MN E 545, which is home). May be convened with 445.

548. Geophysical Exploration and Engineering (3) For a description of course topics see 448. Graduate-level requirements include a special research project collecting and interpreting geophysical field data. P, PHYS 141, 241, MATH 223. (Identical with GEOS 548). May be convened with 448.

549. Mineral Exploration (3) For a description of course topics see 449. Graduate-level require-
ments include a research report. P, GEOS 209. (Identical with GEOS 549 and MN E 549). May be convened with 449.  

550. Earthquake Engineering (3) Applied course in earthquake causes and effects, integrating the fields of seismology, engineering, and seismic geology. P, MATH 254.  

551. Probabilistic Methods in Geotechnical Engineering (3) (Identical with C E 551, which is home).  

557. Fundamentals of Geomechanics (4) (Identical with MN E 557, which is home).  


570. Computer Methods in Geological Engineering (3) For a description of course topics see 470. Graduate-level requirements include an additional advanced research project. P, introductory courses in computer programming, math, and earth science. May be convened with 470.  

580: The Mechanics of Fracture in Rock and Other Brittle Materials (3) (Identical with MN E 580, which is home).  


696. Seminar  
a. Research (1-3) [Rpt.] (Identical with MN E 696a).  

MINING ENGINEERING (MN E)  

120. Mineral Resources, Geotechnology and the Environment (3) The history and recent advances in locating and extracting earth’s mineral resources; the principles of developing and managing earth’s resources and hazards; environmental concerns such as acid rain and hazardous waste. 2R, 3L. (Identical with ENGR 120 and G EN 120).  

219. Mineralogy and Petrology for Engineers (3) (Identical with G EN 219, which is home).  

220. Mining Methods (3) Introduction to the techniques, unit operations, and systems involved in underground and surface mining of minerals and coal. Field trips. 2R, 3L. 2ES, 1ED. P, MN E 120.  

401. Analysis of Mine Operations (3) Use of operations research principles and techniques to analyze various problems in mine operations. 2ES, 1ED. May be convened with 501.  

402. Probability and Statistical Concepts in Geologic Media (3) (Identical with G EN 402, which is home). May be convened with 502.  


410. Mine Surveying (1) Mine surveying problems and practices; closed traverse of underground mine; shaft plumbing, stope and raise surveying. 1ES, P, 120, C E 251.  

411. Mineral Processing (3) 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. 2ES, 1ED. (Identical with MSE 411). May be convened with 511.  

415. Rock Excavation (3) Methods of excavation of rock in surface and underground mines and construction, ranging from the empiricism of conventional blasting practice to the application of the fundamental mechanics of rock fracture. 2R, 3L. 1.5ES, 1.5ED. Field trips. P, C E 217. (Identical with G EN 415). May be convened with 515. Writing-Emphasis Course.*  

426. Health and Safety in Mining (1) 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. 1ES. (Identical with G EN 426). May be convened with 526.  

427. Geomechanics (3-4) 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. 2R, 3L. 1.5ES, 1.5ED. P, C E 217. (Identical with G EN 427). May be convened with 527.  

430. Mine Examination and Valuation (3) Principles and procedures in mineral property valuation, geostatistical ore reserve estimation, engineering, economy, investment analysis; use of a microcomputer. 1ES, 2ED. P, 402, 220. May be convened with 530.  

433. Elements of Coal Mining (3) 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. 2ED, 1ES, P, 220, 406, ECE 207. May be convened with 533.  

435. Mine Design (3) Computer-aided design of a modern mine; feasibility study, pit limit design, mining sequence development and short-term mine planning. 2R, 3L. 3ED. P or CR, 430, 440. May be convened with 535.  

436. Subsurface Environmental Engineering (3) Analysis of sources of heat, humidity, gases and dust in mines and other subsurface facilities. Design of engineering systems to control these pollutants. 1.5ES, 1.5ED. P, 406 or consult with department before enrolling. May be convened with 536.  

440. Materials Handling (3) Surface and underground material handling methods: Performance analysis and selection of the following haulage equipment: trucks, shovels, draglines, shuttle cars, locomotives, hoists, conveyors, hydraulic and pneumatic transport systems. Computer applications. 2R, 3L. 1ES, 2ED. Field trips. P, C E 214. May be convened with 540.  


449. Mineral Exploration (3) (Identical with G EN 449, which is home). May be convened with 549.  

490. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 490, which is home). May be convened with 590.  

494. Practicum  

501. Analysis of Mine Operations (3) For a description of course topics see 401. Graduate-level requirements include a project using MIS software. May be convened with 401.  

502. Probability and Statistical Concepts in Geologic Media (3) (Identical with G EN 502, which is home). May be convened with 402.  

503. Analysis of Mining Decisions (3) Use of geostatistics, system simulation languages and computers to analyze various mining decisions related to reserve estimation and mine planning. P, 401, 402, 430.  

506. Fundamentals of Mine Ventilation (3) For a description of course topics see 406. Graduate-level requirements include a simulation project on design of an airflow system for an underground mine. May be convened with 406.  

511. Mineral Processing (3) For a description of course topics see 411. Graduate-level requirements include an advanced research project. (Identical with MSE 511). May be convened with 411.
515. Rock Excavation (3) For a description of course topics see 415. Graduate-level requirements include a research project. Field trips. P, C E 217. (Identical with G EN 515). May be convened with 415.

526. Health and Safety in Mining (1) For a description of course topics see 426. Graduate-level requirements include a term paper. (Identical with G EN 526). May be convened with 426.

527. Geomechanics (3-4) For a description of course topics see 427. Graduate-level requirements include either a research project or a research paper at the discretion of the instructor. P, C E 217. (Identical with G EN 527). May be convened with 427.

529. Rock Slope Analyses and Design (3) Geologic and engineering considerations in design of optimum rock slope angles; constitutive models for intact rock and joints; theoretical stability analysis, monitoring and control of existing slopes. Field trip. P. 427. (Identical with G EN 529).

530. Mine Examination and Valuation (3) For a description of course topics see 430. Graduate-level requirements include either a research project or a research paper at the discretion of the instructor. P, 220, 402. May be convened with 430.

533. Elements of Coal Mining (3) For a description of course topics see 433. Graduate-level requirements include a research project. May be convened with 433.

535. Mine Design (3) For a description of course topics see 435. Graduate-level requirements include either a research project or a research paper at the discretion of the instructor. P or CR, 430, 440. May be convened with 435.

536. Subsurface Environmental Engineering (3) For a description of course topics see 436. Graduate-level requirements include a simulation project on the problem of heat and humidity in a subsurface facility. P, 406 or contact department before enrolling. May be convened with 436.

537. Developments in Rock Mechanics (2) Discussion of new developments in rock mechanics and of areas of interest for future research. Field trips. P, 427 or 527. (Identical with G EN 537).

540. Materials Handling (3) For a description of course topics see 440. Graduate-level requirements include a research project. Field trips. P, C E 214. May be convened with 440.

545. Fundamentals of Geostatistics (3) [Rpt/6 units]. For a description of course topics see 445. Graduate-level requirements include an additional class project. P, integral and differential calculus. (Identical with G EN 545). May be convened with 445.

547. Underground Construction Geomechanics (2-3) For a description of course topics see 447. Graduate-level requirements include an independent design/analysis project. All-day field trip. P, 427 or 527. May be convened with 447.

549. Mineral Exploration (3) (Identical with G EN 549, which is home). May be convened with 449.

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.

370. Design of Computer Systems (4) Algebraic, 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, 3ED, P, ENGR 102, ECE 207.

377. Software for Engineers (3) Programming in C. Modular program design and verification, pointers and structures, data structures and algorithms including: lists, trees, graphs, searching and sorting. Credit is allowed for this course or C SC 342, but not for both. 1.5ES, 1.5ED. P, 170.

383. Integrated Manufacturing Systems (3) 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. 2ES, 1ED. P, 260, MSE 331.

406. Quality Engineering (3) Methods for quality planning, improvement and control with applications in manufacturing and service, emphasizing both on-line and off-line methods. Topics include modern quality philosophies and methods, control charts, process capability studies, loss functions and acceptance sampling. 2ES, 1ED, P, 330R, 330L. May be conveined with 506.

408. Reliability Engineering (3) Time-to-failure, failure-rate, and reliability determination for early, useful and wear-out lives; equipment reliability predictions; spare parts provisioning; reliability growth; reliability allocation. Credit for this course or A ME 472. P, 330 or A ME 474, MATH 223. 1.5ES, 1.5ED. May be conveined with 506.


411. Human Interaction with Computers and Software (4) The interaction of technical requirements with the characteristics of computer users and programmers as they affect the design of software, and the physical and cognitive interfaces between people and computers. 1ES, 3ED. May be conveined with 511.

422. Engineering Decision Making Under Uncertainty (3) 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, 330R, 330L or equivalent. May be conveined with 522.


442. System Design Projects (3) 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. 3ED. P, 431. Writing-Emphasis Course.*

453. Deterministic Control Systems (3) 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, 350.

460. Production Systems Analysis (3) Production systems, quantitative methods for forecasting, aggregate planning, inventory control, materials requirement planning, production scheduling, manpower planning and facility design. 3ES. P, 340.

463. Facilities and Production Systems Design (3) 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. 3ED, CR, 462.

464. Facilities Layout and Location (3) 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, 321, 340. May be conveined with 564.

473. Concepts in Information and Communication Systems (3) Modeling and analysis of information and communication, systems/networks for applications 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, 321, 340. May be conveined with 573.

474. Decision Support Systems (3) 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 conveined with 574.

475. Computational Methods for Games, Decisions, and Artificial Intelligence (3) 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. 1.5ES, 1.5ED. May be conveined with 575.

476. Numerical Analysis (3) An intermediate-level introduction to numerical methods and error analysis for function approximation and interpolation, integration, solution of linear and nonlinear equations, and differential equations. 3ES, P, MATH 254, computer programming experience. May be conveined with 576.

485. Robotics and Automation (3) 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, 350, or equivalent. May be conveined with 585.

486. Modeling Manufacturing Processes (3) 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, 321, 340. May be conveined with 586.

495. Colloquium s. Senior (1) Open to majors only. P, senior standing.

*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

506. Quality Engineering (3) For a description of course topics see 406. Graduate-level requirements include a project report. P, 330R, 330L. May be conveined with 406.

507. Advanced Quality Engineering (3) Advanced techniques for statistical quality assurance, including multivariate control charting, principal components analysis, economic design of acceptance sampling plans and control charts, inspection errors, and select papers from the recent literature. P, 530.

508. Reliability Engineering (3) For a description of course topics see 408. Graduate-level requirements include a special report of 30 pages on a specific reliability engineering topic. Credit for this course or A ME 572. May be conveined with 408.

510. Behavioral Judgment and Decision Making (3) Models and theories of human judgment

511. Human Interaction with Computers and Software (4) For a description of course topics see 411. Graduate-level requirements include separate examinations and a major project. May be convened with 411.

513. Environmental Risk Analysis (3) (Identical with HWR 513, which is home).

518. Reliability Testing (3) Mean-time-between-failure and reliability confidence limits; sequential testing; sampling; accelerated, sudden-death, and suspended-items; non-parametric, and Bayesian testing. Credit for this course or A ME 575, P, 408, 530.


521a-521b. Systems Modeling and Simulation (3-3) (Identical with MIS 521a-521b, which is home).

522. Engineering Decision Making Under Uncertainty (3) For a description of course topics see 422. Graduate-level requirements include a semester research project. P, 330R, 330L. May be convened with 422.

525. Queuing Theory (3) Application of the theory of stochastic processes to queueing phenomena; introduction to semi-Markov processes; steady-state analysis of birth-death, Markovian, and general single- and multiple-channel queueing systems. P, 520.

528. Maintainability Engineering (3) Complex systems reliability; maintainability engineering; reliability and availability of maintained systems; operational readiness; system effectiveness; maintainability demonstration. Credit for this course or A ME 577, but not for both. P, 408, 530.


530. Engineering Statistics (3) For a description of course topics see 430. Graduate-level requirements include additionally more difficult homework assignments. P, 330R, 330L or equivalent. May be convened with 430.

531. Simulation Modeling and Analysis (3) For a description of course topics see 431. Graduate-level requirements include a library research report. May be convened with 431.

532. Statistical Models in Engineering (3) 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, 530.

536. Experiment Design and Regression (3) Planning and designing experiments with an emphasis on factorial layouts and response surface methodology. Also, includes analysis of experimental and observational data with multiple linear regression and analysis of variance. P, 530.

537. Advanced Experiment Design (3) Robust product and process design through planned experiments, emphasizing the integration of loss functions, parameter design and tolerance design. P, 536.

540. Survey of Optimization Methods (3) For a description of course topics see 440. Graduate-level requirements include additional assigned readings and a project paper. P, 340. May be convened with 440.

541. Dynamic Programming (3) Modeling of stochatic dynamic systems and the application of dynamic programming techniques to optimal decision and control problems. Topics include inventory control, admission and flow control in queueing systems, stochastic scheduling, dynamic portfolio analysis and computational methods. P, 321, 340.


545. Nonlinear Programming (3) 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, 340.

546. Algorithms, Graphs and Networks (3) 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. Credit is allowed for this course or MIS 546. P, 340.

550. Theory of Linear Systems (3) An intensive study of continuous and discrete linear systems from the state-space viewpoint, including criteria for observability, controllability, and minimal realizations; and optionally, aspects of optimal control, state feedback, and observer theory. P, 350.

551. Modeling Physiological Systems (3) Development and validation of models, sensitivity analyses, and applications of systems engineering techniques to physiological systems.


554. Concurrent Engineering and System Design (3) Process and tools for systems engineering of large-scale, complex systems: requirements, performance measures, concept exploration, life cycle, function decomposition, system coupling, quality function deployment, multi-objective trade-off analysis, system modeling, design for X, teamwork, project management, ISO 9000 and documentation.

558. Fuzzy Sets in Systems Analysis and Decision Making (3) Fuzzy numbers' definition, operations; fuzzy regression, interpolation and reliability, fuzzy logic, optimization and control; fuzzy events and decision-making applications in areas such as systems, civil, industrial, electrical, computer engineering and water management.


562. Advanced Production Control (3) Quantitative models in the planning, analysis and control of production systems. Topics include aggregate planning, multi-level production systems, inventory control, capacitated and uncapacitated lot-sizing, Just-in-time systems and scheduling. P, 540 or 544.

564. Facilities Layout and Location (3) For a description of course topics see 464. Graduate-level requirements include additional assigned readings and an in-depth research paper on a course topic. P, 340, 462. May be convened with 464.

573. Concepts in Information and Communication Systems (3) For a description of course topics see 473. Graduate-level requirements include a course project in the subject area. P, 321, 340. May be convened with 473.

574. Decision Support Systems (3) For a description of course topics see 474. Graduate-level requirements include a strong testing and validation study of student's expert system. P, familiarity with computers. May be convened with 474.

575. Computational Methods for Games, Decisions, and Artificial Intelligence (3) For a description of course topics see 475. Graduate-level requirements include a comprehensive and intensive programming project. P, 270 or C SC 227. May be convened with 475.

576. Numerical Analysis (3) For a description of course topics see 476. Graduate-level requirements include extra reading assignments and more sophisticated programming assignments. P, ENGR 102, MATH 254, computer programming experience. May be convened with 476.

583. Computer Integrated Manufacturing Systems (3) Modern manufacturing systems with emphasis on information requirements and data management. Includes CAD, CAM, CAPP, real time scheduling, networking and system justification.

584. Manufacturing Automation (3) Current topics in hardware for automation, selecting and
implementing robots, part orientation, computer vision, automated warehousing and material handling, programmable controllers, NC machining, on-line computer control. Laboratory projects.

585. Robotics and Automation (3) For a description of course topics see 485. Graduate-level requirements include two research projects. P, 350. May be convened with 485.

586. Modeling Manufacturing Systems (3) For a description of course topics see 486. Graduate-level requirements include additional assigned readings from the current literature and an in-depth paper on recent research on a course topic. P, 321, 340. May be convened with 486.

608. Selected Topics in Reliability (3) In-depth analysis of selected advanced topics in reliability engineering from the recent archival literature. Project required. P, 530, A ME 577.


631. Digital Systems Simulation (3) Emphasis on current research problems including random variate generation, modeling, language development and statistical analysis of output. P, 431 or MIS 521a or 521b.

640. Topics of Optimization (3) [Rpt./2] Convexity, optimality conditions, duality, and topics related to the instructor's research interests; e.g., stochastic programming, nonsmooth optimization, interior point methods. P, 544 or 540.

645. Large-Scale Optimization (3) Decomposition-coordination algorithms for large-scale mathematical programming. Methods include generalized Benders decomposition, resource and price directive methods, subgradient optimization, and descent methods of nondifferentiable optimization. Application of these methods to stochastic programming will be emphasized. P, 544.

646. Integer and Combinatorial Optimization (3) Modeling and solving problems where the decisions form a discrete set. Topics include model development, branch and bound methods, cutting plane methods, relaxations, computational complexity, and solving well-structured problems. P, 544.

654. Model-Based System Design (3) Development of the system design requirements: input/output, technology, performance, cost tradeoff and system test. Defining and specifying the system and model requirements. Study of various systems design tools. P, 554.


685. Advanced Topics in Robotics and Automation (3) Selected topics covering recent advances in robotics and automation, to be chosen from a list including applications, kinematics, dynamics, tactile sensing, vision and intelligent systems. P, 585.

686. Advanced Manufacturing System Modeling (3) Current topics in design and analysis of manufacturing systems. Topics include serial processing lines, queuing networks and FMS. Student projects. P, 562 or 586.

695. Colloquium a. Doctoral (1-3) [Rpt./12 units] Consult department before enrolling.

696. Seminar g. Interstate Conflict Resolution (3) [Identical with AREC 696 and HWR 696g].
307. Western Civilization and the Arts: Paleolithic Through Renaissance (3) 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) The arts as an interdisciplinary framework of human heritage from which connections are made to historical issues in ethics, philosophy, science, law, and politics.

ART (ART/ARE/ARH)
Art Bldg., Rm.108
The University of Arizona
PO Box 210002
Tucson, AZ 85721-0002
(520) 621-7570; FAX: (520) 621-2955
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
Art (M.F.A.)
Art History (B.A., M.A.)
Art Education (B.F.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 academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs).
APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/appr.html.

For academic program requirements for graduate degrees, 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.

STUDIO (ART)

101. Drawing (3) Visual perception and the principles of composition presented through various drawing problems and materials. 6S. Fee.

102. Color and Design (3) Elements and principles of two-dimensional composition, with emphasis on color mixing, interaction and control. 6S. Fee.

104. Three-Dimensional Design (3) Study of volume, mass, and space relationships through modeling, casting, carving, and construction. 6S. Fee.

205. Figure Drawing I (3) Drawing from the model and other subjects to develop pictorial and perceptual skills. 6S. Fee. P, 101.

223. New Genre I (3) Video created creatively to work through ideas in an improvisational manner. In-class, collaborative projects combine video with creative writing, performance art and audio experiments.

241. Beginning Photography (3) [Rpt./2] Familiarization with basic photographic processes and aesthetics. 2R, 2S. Field trips. Fee. (Identical with M AR 241, which is home).

250. Relief Printmaking I (3) Introductory course in the fundamental techniques and aesthetics of relief printmaking. 6S. Fee. P, 101, 102.

251. Intaglio (3) Introductory course in the fundamental techniques and aesthetics of intaglio printmaking with emphasis on etching. 6S. Fee. P, 101, 102, or consent of department.

253. Alternative Methods in Printmaking I (3) Introductory course in the nontraditional approaches to printmaking. Montotype, industrial techniques, and handmade paper. 6S. Fee. P, 101, 102, or consent of department.

255. Lithography I (3) Introductory course in the fundamental techniques and aesthetics of black and white, and color lithography. Stone and metal plate processes are covered. 6S. Fee. P, 101, 102, or permission of department.


266. Beginning Illustration (3) Exploration of techniques, styles and media for illustration. 6S. Fee. P, 102, 205, 265.

271. Beginning Jewelry and Metalsmithing (3) Introduction to the fundamentals of jewelry and metalwork processes. 6S. Fee. P, 104.

273. Beginning Art Practices in Ceramics (3) Introduction to clay as a fine art medium with 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. Fee. P, 101, 104, or consent of ceramic faculty.

276. Beginning Fibers (3) Structural development of fibers into woven forms, using the frame loom; fiber as a fine arts medium. 6S. Fee. P, 104.

280. Painting I (3) Elementary course in the methods and techniques of painting with oils and/or acrylics. 6S. Fee. P, 101, 102, 205.


287. Beginning Sculpture (3) Introduction to fundamentals of sculpture process through carving, fabrication and casting, to develop personal approaches to dimensional composition. 6S. Fee. P, 104.

289. Beginning Modeling Emphasizing the Figure (3) Beginning modeling techniques in clay emphasizing the figure. Scale, composition, gesture, surface and anatomical structure will be studied to develop creative solutions. Fee. P, 104.


305. Figure Drawing II (3) [Rpt./2] Intermediate course in drawing problems using the model. 6S. Fee. P, 205.

312. Video Art in America (3) (Identical with M AR 312, which is home).

322. New Genre Studio and Theory (3) Exploration of a range of contemporary art practice and theory. Projects in a variety of media including performance, installation, and in-class video work.

329. Art History of the Cinema (3) (Identical with CLAS 329, which is home).

341a-341b-341c-341d. Intermediate Photography (3-3-3-3) Principles and processes of photography. 341a: Introduction for artists to the principles and nature of black-and-white documentary photography. 341b: Creating untrue narratives, students are challenged to deconstruct the familiar photo essay and create new ways of storytelling. 341c: Introduction to principles of synchronized color slide-audio tape production for artists. 341d: 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 photo. 341a is not prerequisite to 341b, etc. 2R, 2S. Fee. P, 241, acceptance by portfolio.

341e. Intermediate Photography: The Self Portrait (3) [Rpt./6 units] Explores a variety of approaches and modes of the photographic self-portrait as an expressive process. 2R, 2S. Fee. P, acceptance by portfolio.

342. Photography Since 1950 (3) Slide presentations and discussions of major photographers since 1950.

343a-343b. Photographic Techniques (3-3) 343a: Fundamentals of exposure and development control, print control, studio and portrait lighting, slide copying and view camera operation. 343b: Manipulation and extension of boundaries of traditional photography using polarization, appropriation, montage, toning and bleaching. 343a is not prerequisite to 343b. 2R, 2S. Fee. P, 241.


349. Intermediate Artists' Video (3) 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. 2R, 2S. Portfolio review and M AR 200 and 314. (Identical with M AR 349).

350. Relief Printmaking II (3) Intermediate course in the techniques and aesthetics of relief printmaking. Continuation of 250. 6S. Fee. P, 250.


355. Lithography II (3) Intermediate course in stone and metal plate lithography. Continuation of 255. 6S. Open to majors only. Fee. P, 255.

356. Intermediate Printmaking (3) [Rpt./6 units] Intermediate course in printmaking with emphasis on format aesthetics and personal expression. 6S. Open to majors only. Fee. P, 250, 251, 253, or 255.

363. Typography (3) GRD The study of letterforms and their appropriate and effective use in visual communications from a historic as well as from a contemporary perspective. 6S. Fee. P, 265, acceptance of portfolio.

364. Production Problems in Graphic Design (3) [Rpt./1] Preparation of visual material for reproduction by various printing processes. 6S. Fee. P, 265, 266, and acceptance of portfolio.

365. Intermediate Graphic Design (3) [Rpt./1] Further exploration of design as a communications tool. Solutions to realistic promotional programs are executed from rough to comprehensive stage. 6S. Fee. P, 102, 205, 265, acceptance of portfolio.

366. Rendering Techniques (3) [Rpt./1] Drawing and rendering techniques with various media in the creation of editorial and advertising illustration. 6S. Fee. P, 265, 266, acceptance of portfolio.


372. Intermediate Jewelry and Metalsmithing II (3) [Rpt./2] Emphasis on surface enrichment through stone setting, reticulation, enameling, mokume, etc. 6S. Fee. P, 271.

373a. Art Practices in Handbuilding (3) [Rpt./4] 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. 2R, 4S. Fee. P, 273 or permission of ceramic faculty.

373b. Art Practices in Wheel Throwing (3) [Rpt./4] 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. 2R, 4S. Fee. P, 273 or permission of ceramic faculty.

374. Ceramic Surface and Color (3) [Rpt./6 units] 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 exploration of ceramic materials such as commercial ceramic pigments, metallic oxides, fluxes, clays, organic additives, and diverse firing methods. 6S. Fee. Field trips. P, 273.

375. Intermediate Fibers I (3) [Rpt./3] 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. 6S. P, 276.


380. Painting II (3) [Rpt./2] Intermediate course in developing expressive and pictorial skills in oil and/or acrylic media. 6S. Fee. P, 280.


387b. Intermediate Sculpture/Metal and Wood Fabrication (3) In-depth exploration of the media and concepts of sculpture through metal and wood fabrication processes. 6S. Fee. P, 287.

387c. Intermediate Sculpture/Carving (3) In-depth exploration of the subtractive process with direct carving versus specific imagery. 6S. Fee. P, 287.

387d. Intermediate Sculpture/Experimental and Combined Media (3) [Rpt./2] In-depth exploration of the techniques and concepts of experimental and combined media as applied to individual directions. 6S. P, 287.

387g. Intermediate Sculpture/Kinetic (3) [Rpt./2] In-depth exploration of the techniques and concepts of kinetic sculpture and applied to individual directions. 6S. P, 287.

389. Intermediate Modeling Emphasizing the Figure (3) Intermediate modeling techniques in clay emphasizing the figure. Scale, composition, gesture, surface and anatomical structure will be studied to develop creative solutions. Fee. P, 104.

405. Figure Drawing III (3) [Rpt./5] Advanced drawing with emphasis on personal expressive development. 6S. Fee. P, 6 units of 305.

409. Drawing Critique (3) [Rpt./5] Individual exploration and development of visual concepts through drawing, accompanied by individual and class critiques. P, 6 units of 405.


422. Performance: Live/Photo/Video (3) An overview of diverse approaches within performance art in an interdisciplinary context. Combines live performance with video and photography. 6S. May be convened with 522.

423. New Genre Concept Development (3) [Rpt./1] Studio course to assist students with defining intentions, refining project ideas and clarifying the content of their artmaking. Open to students working in any medium. May be convened with 523.


446. Experimental Color Photography (3) [Rpt./1] 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 personal vision encouraged. 2R, 2S. Fee. P, 241; 341a, 341b or 341c; 346, acceptance by portfolio. May be convened with 546.

447. Mixed Media Book (3) [Rpt./1] Investigation of the book as a format for presenting visual material; the process of making simple books. Contemporary bookmakers will be presented. 2R, 2S. Field trips. P, 12 units of upper-division studio art courses. May be convened with 547.

449. Video for Artists (3) Seniors and graduate students utilize small format video camera and editing to extend/amplify concepts that have developed in their artistic inquiry. 2R, 2S. Field trips. P, admission by portfolio. May be convened with 548.

449. Advanced Artists' Video (3) [Rpt./1] 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, portfolio review and ART 349 or M AR 314. (Identical with M AR 449). May be convened with 549.


469. Portfolio Preparation (3) [Rpt. /1] 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. Fee. P, 9 units of graphic design courses and approval of portfolio. May be convened with 569.


473. Advanced Practices in Ceramics (3) [Rpt. /5] Individual studio research and instruction with emphasis on personal creative development. 1R, 4S. Fee. P, 373, acceptance of portfolio by ceramic faculty. May be convened with 573.

474. Ceramic Surface and Color (3) [Rpt. /6 units] Higher 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. Fee. P, 373 and portfolio or consent of instructor. May be convened with 574.

475. Ceramics Within a Public Art Context (3) [Rpt.] For students who are interested in exploring original ceramic art work in a public art context. Students will be expected to work individually 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. Fee. P. Field trips. P, ART 373a-373b and consent of instructor/portfolio review. May be convened with 575.

476. Advanced Fibers (3) [Rpt. /5] Individual interpretations of concept into finished fiber works. P, 9 units of fibers courses.


483. Combining Media (3) [Rpt.] Individual and group projects, including collages, constructions, image sequences, and elements from other art forms (sound, language, movement, etc.). Fee. May be convened with 583.


487f. Advanced Sculpture/Specific Concepts (3) [Rpt. /2] The exploration and research of specific sites and the ramifications of sculptural placements within these sites. Models will be constructed. Fee. P, 387.


489. Advanced Modeling with Emphasis on the Figure (3) [Rpt. /3] Advanced modeling techniques in clay and casting 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. Fee. P, 101, 102, 104, 287, 289, and 389. May be convened with 589.

496. Seminar a. Senior Seminar for Artists (3) f. Critical Issues in Design (3) [Rpt. /6 units] P, senior or graduate standing, portfolio review or consent of instructor. May be convened with 596f.

497. Workshop a. Gallery Management (1-3) [Rpt.] P, 12 units of studio or art history. May be convened with 597a.

501. Drawing: Non Figurative Approach (3) GRD For a description of course topics see 401.

505. Graduate Figure Drawing (3) [Rpt. /5] Special problems in drawing, using the classroom model and outside sources as references for personal expression. Fee. P, 305.

516. Eighteenth Century Art 1 (3) Survey of the art and architecture of 18th century England and Italy within the context of the grand tour.

522. Performance: Live/Photo/Video (3) For a description of course topics see 422.

523. New Genre Concept Development (3) [Rpt. /1] For a description of course topics see 423.

537. Art Therapy Techniques 1 (3)
requirements include an in-depth research project on a single aspect of a current scholarly interest. Field trips. P, 12 units of upper-division studio art courses. May be convened with 447.

548. Video for Artists (3) For a description of course topics see 448. Graduate-level requirements include an in-depth research project on a single aspect of a current scholarly interest. Field trips. P, admission by portfolio. May be convened with 446.

549. Advanced Artists’ Video (3) [Rpt./1] For a description of course topics see 449. Graduate-level requirements include projects that demonstrate conceptual and technical accomplishment. May be convened with 449.

550. Graduate Relief Printmaking (3) Relief printmaking with emphasis on individual research, personal direction and professional standards. 6S. Fee.

551. Graduate Intaglio (3) Intaglio printmaking with emphasis on individual research, personal direction and professional standards. 6S. Fee.

553. Graduate Alternative Methods in Printmaking (3) Nontraditional approaches to printmaking with emphasis on individual research, personal direction and professional standards. 6S. Fee.

555. Graduate Lithography (3) Lithography with emphasis on individual research, personal aesthetic, and professional standards. 6S. Fee.

556. Graduate Graphic Design Problems (3) [Rpt./1] Two- and three-dimensional design considerations with emphasis on conceptualization and presentation. 6S. Field trips. Fee. P, acceptance of portfolio.

557. Graduate Illustration (3) [Rpt./1] For a description of course topics see 466. Graduate-level requirements include an in-depth research project on a single aspect of a current scholarly interest. Fee. P, 9 units of illustration courses and approval of portfolio. May be convened with 466.

559. Portfolio Preparation (3) [Rpt./1] For a description of course topics see 469. Graduate-level requirements include an in-depth research project on a single aspect of a current scholarly interest. Fee. P, 9 units of graphic design courses and approval of portfolio by Portfolio Committee. May be convened with 469.

571. Advanced Jewelry and Metalsmithing I (3) [Rpt./4] For a description of course topics see 471. Graduate-level requirements include an in-depth studio research project. Fee. P, 9 units of metalwork. May be convened with 471.

572. Advanced Jewelry and Metalsmithing II (3) [Rpt./1] For a description of course topics see 472. Graduate-level requirements include an in-depth studio research project. Fee. P, 471. May be convened with 472.

573. Advanced Ceramics (3) [Rpt./5] For a description of course topics see 473. Graduate-level requirements include an in-depth studio research project. Fee. P, 373. May be convened with 473.

574. Ceramics Surface and Color (3) [Rpt./6 units] 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, 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. 6S. Fee. Field trips. P, 373 and portfolio or permission of instructor. May be convened with 474.

575. Ceramics Within a Public Art Context (3) [Rpt.] For description of course topics see 475. Graduate-level requirements include one more public art proposal or intern in a ceramic public art project. A higher level of professionalism and sophistication will be expected. 6S. Field trips. May be convened with 475. Chabot

576. Advanced Fibers (3) [Rpt./5] For a description of course topics see 476. Graduate-level requirements include an in-depth studio research project. P, 276, 9 units of intermediate fibers. May be convened with 476.

578. Graduate Two-Dimensional Fiber Techniques (3) Advanced fiber technique course for graduate students who wish to develop further their strengths in special technical areas. Stresses two-dimensional work. 6S. P, consult department before enrolling.

579. Graduate Three-Dimensional Fiber Technique (3) Advanced fiber technique course for graduate students who wish to develop further their strengths in special technical areas. Stresses three-dimensional work. 6S. P, consult department before enrolling.

580. Graduate Painting (3) [Rpt./5] Graduate study in painting with an emphasis on the development of a personal imagery and body of work. Fee. 6S.

583. Combining Media (3) [Rpt.] For a description of course topics see 483. Graduate-level requirements include an in-depth studio research project. Fee. May be convened with 483.

585. Graduate Watercolor Painting (3) [Rpt./5] High level experimentation in personal expression with watercolor and related media. Demonstration and critique.

587a. Sculpture/Casting Materials (3) [Rpt./3] An in-depth exploration of the techniques and concepts of casting. Advanced process of mold making as applied to individual directions. 6S. Fee.

587b. Sculpture Materials/Metal and Wood Fabrication (3) [Rpt./3] An in-depth exploration of advanced processes and concepts of sculpture through metal and wood fabrication. 6S. Fee.

587c. Sculpture Materials/Carving (3) [Rpt./3] Advanced processes of subtractive thinking through direct carving versus specific imagery. 6S. Fee.

587d. Sculpture Materials/Glass Casting and Slumping (3) [Rpt./3] Advanced research and studio work in materials and processing of glass casting and slumping. 6S. Fee.

588. Sculpture Materials/Experimental and Combined Media (3) [Rpt./3] In-depth advanced-level exploration of concepts, processes and personal direction through combining media and experimental sculpture processes. 6S. Fee.

587f. Sculpture Materials/Project Specific Concepts (3) [Rpt./3] The development and research of specific sites and the ramifications of sculptural placements within these sites. Students will develop plans and models that reflect individual concepts. 6S. Fee.

587g. Sculpture/Kinetic Materials (3) [Rpt./3] An in-depth exploration of the techniques and concepts of kinetic sculpture as applied to individual directions. 6S. Fee.

589. Advanced Modeling with Emphasis on the Figure (3) [Rpt./3] For a description of course topics see 489. Graduate-level requirements include work which exemplifies graduate-level, knowledge, background, and skills. Life-size figures for the final project also required. Fee. P, 101, 102, 104, 287, 289, and 389. May be convened with 489.

590. Workshop f. Critical Issues in Design (3) [Rpt./6 units] P, senior or graduate standing, portfolio review or consent of instructor. May be convened with 496f.

591. Writing Art Criticism (3) [Rpt./6 units] Field trips. May be convened with 496j.

s. 3-D Concepts (3) [Rpt./3]

597. Workshop a. Gallery Management (1-3) P, 12 units of studio or art history. May be convened with 497a.

b. Professional Experiences in Art (1-3) [Rpt./9 units] P, 12 units of studio or art history. May be convened with 497b.

600. Painting Concepts (3) [Rpt./2] Presentation of one’s painting concepts and the concepts of others, citing parallel influences, research, related ideas and implications for highly concentrated student and faculty discussion.

642. Studio Photography Critique (3) [Rpt./5] Investigation of practical methods of critique and their influence on an artist’s developing body of work. Limited to art majors with photography concentration.

656. Graduate Printmaking (3) [Rpt./18 units] Printmaking with emphasis on aesthetics, conceptualization, technical competency, artistic literacy, and personal direction. 6S. Fee. P, consult department before enrolling.

671. Graduate Jewelry and Metalsmithing (1-6) [Rpt./6] Graduate study in all phases of jewelry and metalwork. 3-18S.

673. Graduate Studio in Ceramics (3-10) [Rpt./6] Studio research and instruction with emphasis on personal creative development. 12 to 20S. Field trips. Fee. P, 473.
Graduate experimentation in all aspects of fiber work, with emphasis on the development of a personal style within the medium. 12 to 20S.

Graduate Studio (3-10) [Rpt./6] P, 12 units of graduate credit in art.

Graduate Problems in Sculpture (3) [Rpt./4] Emphasis on aesthetics, conceptualization, technical competency, artistic literacy, and personal direction. 6S. Fee. P, consult department before enrolling.

ART EDUCATION (ARE)

130. Appreciating the Visual Arts (3) Introduction to techniques for describing and analyzing works of art utilizing relevant material from history and aesthetics. 2R, 2S.


338L. Secondary School Art (3) Carries credit in education only. (Identical with TTE 338L, which is home).

361. Creative Arts Methods (3) 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, 130.

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 500.


434. Cross-Cultural Issues in Art Education (3) Multicultural and cross-cultural issues within visual arts education (e.g., in studio art, art criticism, art history, and aesthetics). May be convened with 534.

496. Seminar h. Current Issues in Art Education Theory and Practice (3) [Rpt./12 units] May be convened with 496h.

630. History and Philosophy in Art Education (3) [Rpt./9 units with consent of instructor] Critical analysis of objectives, current theories, and texts that are shaped by the visual arts, history, philosophy, aesthetics and the behavioral sciences.

633. Issues and Recent Research in Art Education (3) [Rpt./9 units with consent of instructor] The identification of problems in art education at various curricular levels; examination of related research with possible implications for practice.

ART HISTORY (ARH)

110. Art in Society (3) Introduction to social, cultural, and political themes in the history of world art. Intended for non-majors only.


117. Survey of World Art, Prehistoric-Gothic (3) The art and architecture of Western civilizations through the Gothic era, and of world prehistoric and primitive cultures.

118. Survey of World Art, Renaissance-20th Century (3) The art and architecture of Western civilization, Renaissance through the 20th century.

312. Survey of Medieval Art (3) Survey of medieval art production and its circumstance from its inception in the catacombs of Rome to the spread of Gothic art across Europe.

315. Survey of Baroque and Rococo Art (3) Survey of the major European Monumental painting, printmaking, architecture, and sculpture from 1600 to 1750.

319. Introduction to American Art (3) Survey of American architecture, painting, sculpture, photography, and the decorative arts from colonial times to present.

320. Introduction to European Modern Art (3) Painting and sculpture in Europe from about 1886 to recent times.

321. Introduction to Contemporary Art (3) Survey of contemporary art in the United States and Europe since the 1960s. P, 118.

322. Introduction to Prehispanic, Hispanic, and Chicano Art (3) Survey of the native, prehispanic arts of Meso, Central and South America; art since the conquest of Mexico, Central and South America; and Hispanic Arts of the Southwest and contemporay Chicano art. (Identical with LA S 322).

329. Art History of the Cinema (3) (Identical with CLAS 329, which is home).

334. Art and Archaeology of Ancient Egypt (3) (Identical with CLAS 334, which is home).


340a-340b. Introduction to Classical Art and Archaeology (3-3) (Identical with CLAS 340a-340b, which is home).

344. Art and Architecture of the Islamic World (3) (Identical with ARCH and NES 344, which is home).

412a-412b-412c-412d. Medieval Art (3-3-3-3) The history of art and architecture in Western Europe and Byzantium between ca. 300 and ca. 1300. 412a: Early Christian and Byzantine Art. 412b: Early Medieval Art. 412c: Romanesque Art. 412d: Gothic Art. 412a is not prerequisite to 412b, etc. May be convened with 512a-512b-512c-512d.

413b-413c. Renaissance Art in Italy (3-3) Painting, sculpture and architecture in Italy. 413b: 15th century. 413c: 16th century. 413b is not prerequisite to 413c. May be convened with 513b-513c.

414a-414b. Northern Renaissance Art (3-3) 414a: German, French and Netherlandish painting during the late 14th through the 15th centuries. 414b: 16th century art production in Germany, France, England and the Netherlands. P, 6 units of history or art history. 414a is not prerequisite to 414b. May be convened with 514a-514b.

415. Southern Baroque Art (3) The painting, sculpture, and architecture of 17th century Italy and Spain. May be convened with 515.
416a. Eighteenth Century Art (3) Survey of art and architecture of 18th-century England and Italy within the context of the grand tour. May be convened with 516a.

416b. Eighteenth Century Art II: France and Germany (3) Course will examine the art and architecture of 18th-century France and Germany. May be convened with 516b.

417. 19th-Century European Art (3) Painting and sculpture from the French Revolution through Impressionism. P, 6 units of history or art history. May be convened with 517.

418a-418b. 20th-Century Art (3-3) Painting and sculpture in Europe. 418a: 1886 to World War I. 418b: Between the World Wars. P, 6 units of history or art history. 418a is not prerequisite to 418b. May be convened with 518a-518b.

422a-422b-422c. Pre-Hispanic Art (3-3-3) 422a: Art of the high cultures of Mesoamerica, with the focus on architecture, sculpture, painting, and crafts prior to European contact. 422b: Pre-Columbian art of Central and South America with particular attention to the Andean area. 422c: Social history of art in prehispanic Mesoamerica from the preclassic through the post-classic period. 422a is not prerequisite to 422b, etc. (Identical with ANTH 422a-422b-422c and LA S 422a-422b-422c). May be convened with 522a-522b-522c.

423a-423b. The Art of Mexico (3-3) 423a: 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. 423b: 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. 423a is not prerequisite to 423b. May be convened with 523a-523b.

424a-424b. History of Photography (3-3) 424a: From its invention to 1895; impact of photography on the art and culture of the 19th century. 424b: As an art medium from 1895 to 1965. P, 6 units of art history. 424a is not prerequisite to 424b. May be convened with 524a-524b.

429a-429b-429c-429d. American Art (3-3-3-3) Art in the United States. 429a: Colonial art. 429b: 19th-century art. 429c: From 1900 through 1940. 429d: Twentieth-century American art from the 1930s to recent times. May be taken in any order. P, 6 units of history or art history. May be convened with 529a-529b-529c-529d.

431. Studio Introduction to Contemporary Art (3) Introduction to contemporary art, theory, criticism, and cultural politics circa 1945 to the present. Emphasis on movements and themes. Lecture with discussion. May be convened with 531.

434. History of the American House (3) (Identical with ARCH 434, which is home). May be convened with 534.

435. History of Prints (3) The technique and functions of the printmaking media from their inception in the 15th century to the 19th century. P, 117 or 118. May be convened with 535.


439b. African Art (3) African art in context through chronological, interdisciplinary focus; the main traditions of the Southern Savannah, Equatorial Africa and the Eastern Sudan. Field trip. 439b is not prerequisite to 439b-539b. P, 339. May be convened with 539b.

452. Etruscan Art and Archaeology (3) (Identical with CLAS 452, which is home). May be convened with 552.

454. Greek and Roman Sculpture (3) (Identical with CLAS 454, which is home). May be convened with 554.

456. Greek and Roman Painting (3) (Identical with CLAS 456, which is home). May be convened with 556.

457. Greek Architecture (3) (Identical with CLAS 457, which is home). May be convened with 557.

461. Greek Pottery 1200-400 B.C. (3) (Identical with CLAS 461, which is home). May be convened with 561.

464. Women in American Architecture (3) (Identical with ARCH 464, which is home). May be convened with 564.

466. Art and Architecture of LeCorbusier (3) (Identical with ARCH 466, which is home). May be convened with 566.

481. Contemporary Theory and Criticism (3) Discussion of the theory and criticism of contemporary art since 1960 based on assigned readings and slide presentations. Field trips. May be convened with 581.


511. Methods of Art History (3) Major intellectual approaches to the visual arts developed within the past 150 years. Field trips.

512a-512b-512c-512d. Medieval Art (3-3-3-3) For a description of course topics see 412a-412b-412c-412d. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. P, 6 units of history or art history. May be convened with 412a-412b-412c-412d.

513b-513c. Renaissance Art in Italy (3-3) For a description of course topics see 413b-413c. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. May be convened with 413b-413c.

514a-514b. Northern Renaissance Art (3-3) For a description of course topics see 414a-414b. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. P, 6 units of history or art history. May be convened with 414a-414b.

515. Southern Baroque Art (3) For a description of course topics see 415. Graduate level requirements include supplemental readings, additional assignments, and an oral presentation. May be convened with 415.

516a. Eighteenth Century Art I (3) For a description of course topics see 416a. Graduate-level requirements include supplemental reading, discussion; additional writing assignments and oral presentations. May be convened with 416a.

516b. Eighteenth Century Art II: France and Germany (3) For a description of course topics see 416b. Graduate students will do supplemental reading, discussion; additional writing assignments and oral presentations. May be convened with 416b.

517. 19th-Century European Art (3-3) For a description of course topics see 417. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. P, 6 units of history or art history. May be convened with 417.

518a-518b. 20th-Century Art (3-3) For a description of course topics see 418a-418b. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. P, 6 units of history or art history. May be convened with 418a-418b.

522a-522b-522c. Pre-Hispanic Art (3-3-3) For a description of course topics see 422a-422b-422c. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. 522a is not prerequisite to 522b, etc. (Identical with ANTH 522a-522b-522c and LA S 522a-522b-522c). May be convened with 422a-422b-422c.

523a-523b. The Art of Mexico (3-3) For a description of course topics see 423a-423b. Graduate-level requirements include a critical bibliography as well as a research paper. 523a is not prerequisite to 523b. May be convened with 423a-423b.

524a. History of Photography (3-3) For a description of course topics see 424a-424b. Graduate-level requirements include an in-depth research paper on a single aspect of current scholarly interest. P, 6 units of history or art history. 524a is not prerequisite to 524b. May be convened with 424a-424b.

529a-529b-529c-529d. American Art (3-3-3-3) For a description of course topics see 429a-429b-429c-429d. Graduate-level requirements include an in-depth research paper on a single aspect of
current scholarly interest. May be taken in any order. P, 6 units of history or art history. May be
convened with 429a-429b-429c-429d.

531. Studio Introduction to Contemporary Art
(3) For description of course topics see 431. Gradu-
ate students will lead discussions, write two art-
ist’s statements, have a critique with the profes-
sor, as well as midterm, final and an extended pa-
per. May be convened with 431.

534. History of the American House (3) (Ident-
ical with ARCH 534, which is home). May be con-
vened with 434.

535. History of Prints (3) For description of course
topics see 435. Graduate students will have addi-
tional reading assignments and must submit a pa-
per of at least 10 pages, the topic of which must
first be cleared with the instructor. P, 117 or 118.
May be convened with 435.

539a. African Art (3) For description of course
topics see 439a. Graduate-level requirements in-
clude a research paper on approved topic. Field
trip, P, 339. May be convened with 439a.

539b. African Art (3) For description of course
topics see 439b. Graduate-level requirements in-
clude a critical review/report from a primary source
book on library reserve. Field trip 439b is not pre-
requisite to 439b/539b. P, 339. May be convened
with 439b.

552. Etruscan Art and Archaeology (3) (Ident-
ical with CLAS 552, which is home). May be con-
vened with 452.

554. Greek and Roman Sculpture (3) (Identical
with CLAS 554, which is home). May be convened
with 454.

556. Greek and Roman Painting (3) (Identical
with CLAS 556, which is home). May be convened
with 456.

557. Greek Architecture (3) (Identical with CLAS
557, which is home). May be convened with 457.

561. Greek Pottery 1200-400 B.C. (3) (Identical
with CLAS 561, which is home). May be convened
with 461.

564. Women in American Architecture (3) (Ident-
ical with ARCH 564, which is home). May be con-
vened with 464.

688. Roman Art and Architecture (3) (Identical
with CLAS 584, which is home). May be convened
with 484.

96. Seminar
b. Problems in Renaissance-Baroque (3) [Rpt/2]
c. Studies in Medieval Art (3) [Rpt./2]
d. Topics in Early Modern European Art (3) [Rpt./
2]

308. Survey of Media Law and Regulation (3) 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) Function and qualities of light: typical application in photography, television, motion pictures, architecture, and interior design. P, 200.

312. Video Art in America (3) Investigation of artist-produced video from 1960s to the present. Screenings, critical readings and projects. (Identical with ART 312).

314. Intermediate Video Production (3) 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, 200, 304, and acceptance of portfolio by Portfolio Committee.

315. Intermediate Film Production (3) 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, 304, MAR advanced standing.

316. Radio Production (3) Analysis and production of selected radio programs with emphasis on complex radio formats and production techniques. 2R, 3L, P, 304 or 305.

318. Personal Diary Film and Video (3) 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) (Identical with GER 325, which is home).

326. History of Japanese Film (3) 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).

349. Intermediate Artists' Video (3) (Identical with ART 349, which is home).

350. Professional Media Interviewing (3) The interview process and specific interview formats, including survey research, journalistic, and panel formats. Interviewer performance is stressed; practice provided.


371. Film/Video Production Finacing (3) 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, 304 or 305.

372. Exhibition Management (3) 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) 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) Advanced work in the writing of news and public affairs programs for radio, television, cable, and other electronic media with emphasis on news program and documentary formats. P, MAR advanced standing. Writing-Emphasis Course.*


400. Themes in Literature and Film (3) (Rpt.) (Identical with ENGL 400).

401. Advanced Pre-Production (3) Development of scripts or proposals, completion of pre-production for capstone projects. P, MAR advanced standing.

406. Multimedia (3) Principles and processes of multimedia assembly with an emphasis on interactive skills. 2R, 2S. Fee. P, Media Arts advanced standing. May be convened with 506.

410. Cultural Theory and Criticism of Media (3) Critical and cultural theories and their application to media arts, including mass culture, empiricism, technoculture, political economy. P, 200, MAR advanced standing. May be convened with 521.

421. Conducting Media Campaigns (3) Analysis of the development and distribution of information through the media. Press releases, fact sheets, public service announcements, interviews, press conferences, and public hearings are studied. P, 350 or 376.

424. Film Theory and Criticism (3) 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 524.

426. Sexuality in Media Narratives (3) Analysis of sexual representation in popular and underground film, music video and avant-garde video art. May be convened with 526.

427. Feminist Media Theory (3) Includes psychoanalysis, semiotics, materialism, race and class analysis, and feminist media production. P, 200, MAR advanced standing. May be convened with 527.

431. Commercial Intertextuality (3) Analysis of industrial contradictions on the production and circulation of media texts with emphasis on intertextual references. P, media arts advanced standing.

434. Media Industries (3) Examination of a specific topic in media industries: ownership and concentration; media markets and industrial integration. P, Media Arts advanced standing. May be convened with 534.


437. Ethnographic Film and Video (3) Survey of ethnographic film and video from 1895 to the present. Examines representative films and tapes in terms of media and anthropological theories. P, media arts majors, advanced standing. P, anthropology majors, junior standing. (Identical with ANTH 437).

449. Advanced Artists' Video (3) (Rpt./1) (Identical with ART 449, which is home).

450. Conducting Media Campaigns (3) Analysis of the development and distribution of information through the media. Press releases, fact sheets, public service announcements, interviews, press conferences, and public hearings are studied. P, 350 or 376.


462. Advanced Writing for Media (3) Advanced dramatic/narrative screenplay writing. Practice experience in the creative process leading to a complete screenplay. P, 362.

470. The Press and Society (3) (Identical with JOUR 470, which is home).


473. Media Management Practices (3) Modern media management issues. Students will read cur-
rent literature, lead discussions, write analyses, and complete a final project. Writing and speaking emphasized. P, advanced standing in media arts.

476. Broadcast and Cable Programming (3) Investigation of principles, techniques, and current issues in programming for radio and television stations (commercial and public) and cable systems. P, 101. May be convened with 576.

478. Creative Media Advertising (3) Study of and practice in the creative aspects of advertising, including idea origination, media selection, and construction and evaluation of projects. P, M AR advanced standing.

480. Reporting for Broadcast News (3) Advanced procedures and techniques utilized in news gathering, writing and production of newscasts with emphasis on events coverage, newsroom organization. Performance practice is emphasized in laboratory exercises. 2R, 3L. Fee. P, 304, 380, M AR advanced standing. (Identical with JOUR 480). Writing-Emphasis Course.*

497. Workshop a. Community Audio-Video Production (1-3) [Rpt./6 units] P, 304 or 305 (depending on production assignment and acceptance of portfolio by Portfolio Committee). c. Electronic Journalism (4) [Rpt./1] Fee. P, 381. e. News Production (3) [Rpt./1] P, 214. g. Editing (1-6) [Rpt./20 units] Fee


*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

500. Graduate Study in Media Arts (1) Responsibilities of graduate students, forms and procedures, campus resources, research tools, writing standards, and Media Arts content areas in approaches.

506. Multimedia (3) For a description of course topics see 406. Graduate-level requirements include a research paper as basis for their final project. Fee. May be convened with 406.

521. Cultural Theory and Criticism of Media (3) For description of course topics see 421. Graduate-level requirements include an additional paper and additional reading. May be convened with 421.

523. Representation of Gender in the Media (3) For a description of course topics see 423. Graduate-level requirements include an in-depth research paper on gender and media. Fee. May be convened with 423.

524. Film Theory and Criticism (3) For a description of course topics see 424. Graduate-level requirements include additional readings and an in-depth research paper on issues in film theory. May be convened with 424.

526. Sexuality in Media Narratives (3) For a description of course topics see 426. Graduate-level requirements include additional reading and writing assignments and different examinations. May be convened with 426.

527. Feminist Media Theory (3) For description of course topics see 427. Graduate-level requirements include an additional paper and additional reading. May be convened with 427.


532. Media Political Economy (3) Theories and analytic techniques of political economy approaches to media arts through history of telecommunications, broadcasting, film, recorded music and cable television.

534. Media Industries (3) For a description of course topics see 434. Graduate-level requirements include a research paper and presentation. May be convened with 434.

535. Hollywood Film and Television (3) For a description of course topics see 435. Graduate-level requirements include additional papers. May be convened with 435.

576. Broadcast and Cable Programming (3) For a description of course topics see 476. Graduate-level requirements include an in-depth research paper on an issue related to contemporary media programming. May be convened with 476.

639. Methods of Media History (3) Analysis of methods used in film and broadcast histories; theories of media history; empirical evidence and interpretation; approaches to placing a media text within its industrial and social context.

696. * Seminars a. Theory and Criticism (3) [Rpt./6 units] (Identical with CCLS 696a). b. Media Arts History (3) [Rpt./6] c. Readings in Media Arts (3) [Rpt./9]

*Students may earn a maximum of 9 units in M AR 696, of which a maximum of 6 units may be earned in 696a or 696b.

THEATRE ARTS (T AR)
Drama Bldg., Rm. 239
The University of Arizona
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(520) 621-7008; FAX: (520) 621-2412
e-mail: theatre@ccit.arizona.edu
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.)


Theatre Arts Education (B.F.A.)
Theatre Production (B.F.A.)

B.F.A. Options: acting/directing design/technical production

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office.

For academic program requirements for graduate degrees, 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.

100. Acting for General College Students (3) The craft of acting with emphasis on body, voice and mind. Theoretical background and practical experience, including in-class performances of selected scenes. Open to non-majors only.

103. Theatre Appreciation (3) An introduction to the art used in producing the play: directing, acting, technical production. Open to non-majors only.

111. Stagecraft (3) Basic principles of the scenic process: construction and use of materials, shop techniques and practices. 2R, 1L. Fee.

113. Stagecraft Crew (1) [Rpt./2] Performance support crew for scenery and properties areas in department productions. P, CR, 111 for department majors.

115. Makeup (1) 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) Basic principles of construction process and techniques. Use of materials for stage costumes. 2R, 3L. Fee.

118. Stage Costume Crew (1) [Rpt./2 units] Performance support crew for wardrobe and costume areas for department productions. P, CR, 116 for department majors.

121. Introduction to Design: Stage Costume and Scenery (2) 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 (3-3) 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. 140A is not prerequisite to 140B. Open to non-majors.

149. Acting I (3) 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. Concurrent registration required in 111 and 113, or 116a-116b and 118. Open to theatre arts majors only.

151. Acting II (3) Intensive study of text analysis and the actor's approach to characterization as it pertains to modern realism. 2R, 2S. Concurrent registration required in 145, 111 and 113, or 116a-116b and 118. P, 149.

194. Practicum
a. Performance (1-2) [Rpt./4 units].
b. Studio (1-4) [Rpt./1-4 units].

c. Reading (0-2) [Rpt./0-2 units].

203. Voice and Movement for the Actor I (2) [Rpt./1] Beginning voice and movement skills for the actor including the Linklater approach, phonetics, physical isolation and awareness exercises. 4S. Open to acting majors only. P, 151, audition.

204. Voice and Movement for the Actor II (2) [Rpt./1] Continued voice and movement skills for the actor. 4S. Open to acting majors only. P, 203, 250, audition.

205. Musical Theatre (2) [Rpt./1] American musical theatre: its origins, development and influences. Practical applications. 1R, 2S. Open to majors only.

220. Stage Lighting (3) Studies in stage lighting equipment, procedures, design techniques, and shop practices. 2R, 1L, P, 120.


225. Scene Design I (1) [Rpt./2 units] Basic principles of research, analysis and visualization for stage design. Strong emphasis on model building. 2R, 1L, P, CR 297a for department majors.

229. Costume Design I (3) Basic principles of costume design process and aesthetics. Includes work in research, interpretation of plays and figure drawings. P, 121.

236. Modern Drama Through Performance (3) 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) 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 MA 239).

250. Acting III (3) Intensive work in expanding the versatility of the actor's instrument. Improvisation, class exercises and scene work. 2R, 2S, P, 151, audition. CR, 203.

251. Acting IV (3) Nonrealistic styles, including expressionism, absurdism and the contemporary avant-garde; with work in select exercises in both representational and presentation modes. Analytical skills, scene performance and critique. 2R, 2S, P, 203, 250, audition. CR, 204.

297. Workshop
a. Theatrical Production (1-2) [Rpt./4 units] P, 111, 118.

300. Plays for K-12 Settings (1) 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] Intermediate voice and movement skills for the actor including standard stage speech and period manners and movement; emphasis on Shakespearean style. 4S. Open to majors only. P, 204, 251, audition.

306. Voice and Movement for the Actor IV (2) [Rpt./1] 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. Open to majors only. P, 305.

319. Sound for the Theatre (3) Basic technical and aesthetic principles of theatrical sound production. 2R, 2S. Fee.

336. Introduction to Shakespeare through Performance (3) 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.

338. Teaching of Theatre Arts (3) Carries credit in education only. (Identical with TTE 338t, which is home).

340a-340b. History of the Theatre (3-3) 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. For majors only. P, 145 and satisfaction of the upper-division writing-proficiency requirement. Writing Emphasis Courses*

367. English Phonetics (3) Scientific study of the sounds of speech; emphasis on laws and principles determining articulatory features, dialect variation, sound change, and sound as communication context.

396H. Honors Proseminar (3)

397. Workshop
a. Writing and the Arts (3) P, ENGL 101, 102.

401. Advanced Construction Techniques (3) 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. Fee.

P, 111 and 116. May be convened with 501.

402. Combat for the Stage (1) [Rpt./1] 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 502.

403. Musical Theatre II (3) 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. Open to majors only. 2L, 2S, P, 205 and audition. May be convened with 503.

404. Musical Theatre III (3) Intensive scene study and exploration of the major historical styles and genres of the American musical theatre. 2R, 2S. Open to majors only. P, 403 and audition. May be convened with 504.

405. Theatrical Engineering and Management (3) Advanced studies in technical theatre, theatrical engineering, structures and motion-control systems for the stage. P, 111. May be convened with 505.

410. Methods of Teaching Creative Drama (3) 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 510.

414. Advanced Make-up (2) [Rpt./2] History and practical application of theatrical make-up. Design and construct such items as masks, prosthetic pieces, wigs and beards. P, 115. May be convened with 514.


418. Digital Imaging for the Theatre (3) [Rpt./6 units] Intensive studio work on Macintosh-based graphics programs for theatrical designers. P, 224. May be convened with 518.

419. Sound Design (3) Advanced study in theatrical sound, production and design. P, 319. May be convened with 519.


423. Scene Painting I (3) Techniques and methods of scenic painting. Fee. May be convened with 523.

425. Costume and Scenic Design II (3) Advanced instruction and practice in theatrical costume and scenic design with an emphasis on rendering. P, 225, 229. May be convened with 525.


430. Stage Management (3) Principles and techniques of stage management, practical applications, problems and analysis of stage managing. P, 111, 151. May be convened with 530.

431. Audience Development (3) Publicity, press releases, sales, advertising, display techniques, subscription procedures. P, 12 units of theatre arts or related arts fields. May be convened with 532.

432. Theatre Management (3) Amateur, educational and professional theatre organization and management; theatrical contracts, professional unions and representative organizations. P, 12 units of theatre arts or related arts fields. May be convened with 532.

440. History of the Modern Theatre (3) Major movements, plays, and theories in theatrical art from 1915 to the present. P. 145. For majors only.

442. Advanced Stage Lighting II (3) An advanced study of lighting design; theoretical (light plots) and practical (light lab) projects. P, 420/520. May be convened with 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, one theatre history or criticism (majors) course; others, consent of instructor. May be convened with 545.

448a–448b. Period Styles (3-3) Chronological survey of the history of architecture, costume, decorative arts and furniture as it applies to the theatre production. May be convened with 548a-548b.

449. Acting V (3) Intensive study of classical acting styles with emphasis on Shakespeare. Individual and group performance. 2R, 2S, P, 251 and audition. May be convened with 549.


452. Acting VII (3) [Rpt./1] Audition material, techniques and research into problems of a professional career in the theatre, television, motion pictures and related fields. 2R, 2S, P, 305, 449, audition. May be convened with 552.

453. Acting VIII (3) Advanced stage combat. Intensive scene study incorporating the techniques of stage combat. Survey 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/combatant. 2R, 2S, P, 402, audition. May be convened with 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, open to majors only or by permission if instructor. May be convened with 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, 455. May be convened with 556.

460a–460b. Writing for Stage and Screen (3-3) Preparation and analysis of short scripts for stage and motion pictures. Recommended for senior-level students only. Writing-Emphasis course* for cinema option (General Fine Arts Studies Major). May be convened with 560a-560b.

461. Artist Collaboration (2) [Rpt./2] The development and communication of a visual idea for performance art; exploring all mediums of visual and aural communication. May be convened with 561.

468. Dialects in Performance (3) 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 in International Phonetic Alphabet (IPA). May be convened with 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, 151, audition. May be convened with 575.

495. Colloquium a. Teaching Methods for Dance (3) (Identical with DNC 495a, which is home).

497. Workshop a. Technical Production (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 597a. b. Costume Production (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 597b. c. Lighting Production (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 597c. d. Sound Production (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 597d. e. Scenic Production (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 597e. f. Performance (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 597f. g. Workshop Management (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 597m.

501. Advanced Construction Techniques (3) For a description of course topics see 401. Graduate-level requirements include an additional creative and/or research project. Fee. P, graduate standing. May be convened with 401.

502. Combat for the Stage (1) [Rpt./1] For a description of course topics see 402. Graduate-level requirements include an additional performance and/or research project. Open to majors only. May be convened with 402.

503. Musical Theatre II (3) For a description of course topics see 403. Graduate-level requirements include an additional creative and/or research project. Open to majors only. P, audition. May be convened with 403.

504. Musical Theatre III (3) For a description of course topics see 404. Graduate-level requirements include an additional performance and/or research project. Open to majors only. P, 304 and audition. May be convened with 404.

505. Theatrical Engineering and Management (3) For a description of course topics see 405. Graduate-level requirements include in-depth class presentations. Open to majors only. May be convened with 405.

510. Methods of Teaching Creative Drama (3) For a description of course topics see 410. Graduate-level requirements include an additional creative and/or research paper. May be convened with 410.

514. Advanced Make-up (2) [Rpt./2] For a description of course topics see 414. Graduate-level requirements include an additional creative and/or research paper. P, 115. May be convened with 414.

515. Advanced Scenic Drafting (3) For a description of course topics see 415. Graduate-level requirements include an additional creative and/or research project. P, 120. May be convened with 415.

516. Advanced Rendering (3) [Rpt./3] For a description of course topics see 416. Graduate-level requirements include an additional creative and/or research project. P, 224. May be convened with 416.

518. Digital Imaging for the Theatre (3) [Rpt./6 units] For a description of course topics see 418. Graduate-level requirements include more complex designs of multiple views and lighting situations. Fee. May be convened with 418.

519. Sound Design (3) For a description of course topics see 419. Graduate-level requirements include an additional creative and/or research project. P, 215 or consult department before enrolling. May be convened with 419.

520. Advanced Lighting Design I (3) For a description of course topics see 420. Graduate-level requirements include an additional creative and/or research project. Fee. P, 220. May be convened with 420.

523. Scene Painting I (3) For a description of course topics see 423. Graduate-level requirements include an additional creative and/or research project. Fee. May be convened with 423.
525. Costume and Scenic Design II (3) For a description of course topics see 425. Graduate-level requirements include more complex projects. May be convened with 425.

527. Advanced Stage Costume Construction I (3) For a description of course topics see 427. Graduate-level requirements include an additional creative and/or research project. Fee. P, 116. May be convened with 427.

528. Advanced Stage Costume Construction II (3) For a description of course topics see 428. Graduate-level requirements include additional projects. Fee. May be convened with 428.

530. Stage Management (3) For a description of course topics see 430. Graduate-level requirements include an additional creative and/or research project. P, 111, 151. May be convened with 430.

531. Audience Development (3) For a description of course topics see 431. Graduate-level requirements include an in-depth research paper or project. P, 12 units of theatre arts or related arts fields. May be convened with 431.

532. Theatre Management (3) For a description of course topics see 432. Graduate-level requirements include an in-depth research paper or project. P, 12 units of theatre arts or related arts fields. May be convened with 432.

541. Scenography (3) The integration of scenery, costume, make-up, light and sound into a total production design.

542. Advanced Stage Lighting II (3) For a description of course topics see 442. Graduate-level requirements include an additional creative and/or research project. P, 420/520. May be convened with 442.

545. Dramaturgy (3) For a description of course topics see 445. Graduate-level requirements include an in-depth research paper, more extensive in-class contribution. May be convened with 445.

546. Dance Program Administration (3) (Identical with DNC 546, which is home).

548a-548b. Period Styles (3-3) For a description of course topics see 448a-448b. Graduate-level requirements include additional research papers and an oral presentation. May be convened with 448a-448b.

549. Acting V (3) For a description of course topics see 449. Graduate-level requirements include an additional performance and/or research project. P, 251 and audition. May be convened with 449.

550. Literary Resources for Choreography (3) [Rpt.1] (Identical with DNC 550, which is home).

551. Acting VI (3) For a description of course topics see 451. Graduate-level requirements include an additional performance and/or research project. P, 305, 449, audition. May be convened with 451.

552. Acting VII (3) [Rpt.1] For a description of course topics see 452. Graduate-level requirements include an additional performance and/or research project. P, 305, 449, audition. May be convened with 452.

553. Acting VIII (3) For a description of course topics see 453. Graduate-level requirements include an additional performance and/or research project. May be convened with 553.

555. Directing I (3) For a description of course topics see 455. Graduate-level requirements include an additional performance and/or research project. P, open to majors only or by permission of instructor. May be convened with 455.

556. Directing II (3) For a description of course topics see 456. Graduate-level requirements include an additional performance and/or research project. P, 455. May be convened with 456.

560a-560b. Writing for Stage and Screen (3-3) For a description of course topics see 460a-460b. Graduate-level requirements include the preparation of full-length scripts for stage and motion pictures. May be convened with 460a-460b.

561. Artist Collaboration (2) [Rpt.2] For a description of course topics see 461. Graduate-level requirements include an additional creative and/or research project. May be convened with 461.

568. Dialects in Performance (3) For a description of course topics see 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. P, ability to do close transcription in International Phonetic Alphabet (IPA). May be convened with 468.

575. Screen Acting Techniques (3) For a description of course topics see 475. Graduate-level requirements include an additional performance and/or research project. P, 151, audition. May be convened with 475.

580. Graduate Production Study (1) [Rpt./3 units] Advanced graduate seminar and studio to examine the production process for designers, directors, dramaturgs and technicians.

595. Colloquium a. Teaching Methods for Dance (3) (Identical with DNC 595a, which is home).

597. Workshop a. Technical Production (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 497a. b. Costume Production (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 497b. c. Lighting Production (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 497c. d. Sound Production (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 497d. e. Scenic Production (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 497e. f. Performance (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 497f. g. Workshop Management (1-3) [Rpt./20 units] P, consent of instructor. May be convened with 497g.

600. Introduction to Graduate Study of Drama (3) 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] 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, J.A., and Neutral Mask. 6S. P, audition.

606. Advanced Voice and Movement for the Actor II (3) [Rpt./1] Continued advanced study and exercise in voice and movement for the actor: standard stage speech, stage dialects, period customs, manners and movement. 6S. P, audition.

636. Shakespearean Production (3) Advanced readings and discussion in theory and criticism, analysis of filmed and video Shakespeare, and directorial approaches to Shakespeare in performance history.

640. Dramatic Criticism: Genres (3) Comparative analysis of tragedy and comedy and theories of genres from antiquity to the present for stage and screen; writing of critical papers.

642. Advanced Studies in Theatre History (3) [Rpt./1] Concentrated study in theatre history, with major emphasis on the physical theatre, standard scholarly works, and source materials.

644. American Theatre and Drama (3) Studies in the American theatre and drama. Directed and individual projects will be assigned.

646. Theories of the Theatre (3) Concentrated study of select topics in dramatic and performance theory, with special emphasis on modern and contemporary eras.


655. Advanced Directing I (3) 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) Techniques of analyzing and staging classical texts for a contemporary audience; use of directorial style and the adaptation of directorial philosophies with an emphasis on staging the plays of Shakespeare. 2R, 2S, P, 449, 655.

696. Seminar a. Contemporary Trends (1-3) [Rpt./6 units] b. Special Topics in Acting (1-3) [Rpt./6 units] c. Special Topics in Directing (1-3) [Rpt./6 units] d. Musical Theatre Production (1-3) [Rpt./6 units] e. Special Topics in Playwriting (3) [Rpt./6 units] P, permission of instructor. f. Special Topics in Stage Costume Construction (1-3) [Rpt./6 units] i. Period Design Style (1-3) [Rpt./6 units] l. Special Topics in Costume Design (2-3) [Rpt./6 units] P, 429. m. Special Topics in Design (2) [Rpt./6 units] P, 401/501. Students may earn a maximum of 9 units in T AR 696, with a maximum of 6 units in any one area.
SCHOOL OF MUSIC AND DANCE
Music Building, Rm. 109
The University of Arizona
PO Box 210004
Tucson, AZ 85721-0004
Phone: (520) 621-1655; FAX: (520) 621-8118
http://arts.music.arizona.edu/

The School of Music and Dance, a division of the College of Fine Arts, prepares students for careers as professional performers, creative artists and educators. The school is a member of the National Association of Schools of Music and the National Association of Schools of Dance; entrance and graduation requirements meet the published standards of the associations.

Admissions Requirements
Entrance examinations in musicianship and performance are required. Students must audition for placement in music and dance technique courses. Admission to all Bachelor of Music programs requires a formal application process, including an audition. In general, students should have at least five years of experience before they enter a music or dance major. For more information about entrance requirements and auditions, contact the school at the address above.

Undergraduate minors
The Bachelor of Arts degree in music requires a minor, which is chosen in consultation with the major advisor.

For specific information on undergraduate majors, minors and options available, see the department sections of the manual. For more information about graduate degree programs please consult the Graduate Catalog.

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.

DANCE (DNC)
Gittings Bldg., Rm. 121
The University of Arizona
PO Box 210004
Tucson, AZ 85721-0004
(520) 621-4698; FAX: (520) 621-6981
http://arts.music.arizona.edu/

Baccalaureate degree
Bachelor of Fine Arts (B.F.A.)

Graduate degree
Master of Fine Arts (M.F.A.) *

Major
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 academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

100. Looking at Dance (3) 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.

112. Ballet
a. Introduction to Ballet (1)
c. Intermediate Ballet (2)

143. Improvisation (1) Improvisation for non-majors and those students in education desiring certification for teaching dance K-12.

144. Jazz Dance
a. Introduction to Jazz Dance (1) [Rpt.]
b. Jazz Dance for Beginners with Limited Experience (1) [Rpt.]
c. Intermediate Jazz Dance (2) [Rpt.]

145. Beginning Improvisation for Dance Majors (1) [Rpt.] Introduction to principles of improvisation, utilizing basic elements of movement, movement qualities, spatial awareness, vocabulary development and spontaneous creative decision making. Enrollment by audition only.

152. Modern Dance
a. Beginning Modern Dance (1)
b. Modern Dance for Beginners with Limited Experience (1) P, 152a.
c. 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) [Rpt./3 units]

176b. Tap Dance for Beginners with Limited Experience (1) [Rpt./2 units] Tap dance basic skills and new rhythmic challenges incorporated to advance the beginner to a higher performance level. Explores a variety of musical styles. P, 176a or by audition.

200. History of Dance (3) History of dance in western civilization from ancient Egypt to the present.

201a. Beginning Alignment-Floor Barre (1) [Rpt./3]

239a-239b. Beginning Ballet Pionsete (1-1) [Rpt./1] Strength, stretch, and placement techniques for the beginning student on pointe; barre and center practice. 2S. P, by audition only, CR, 240a-240b or higher lever ballet technique.

240a-240b. Ballet Technique I (2-2) [Rpt.] P, CR, 201. By audition only. 240a is prerequisite to 240b.

241a-241b. Modern Dance Technique I (2-2) [Rpt.] Foundational studies of human movement as an art form, with focus on developing strength, flexibility and coordination. By audition only.

243. Creating with Movement and Rhythms (2) Develops analytical and technical skills that support the student in becoming an interpreter of movement and its relationships to sound. P, 145; 240a or 241a or 244a.

244a-244b. Jazz Dance Technique I (2-2) [Rpt.] By audition only.

245a-245b. Basic Choreography (2-2) Study of the elements of time, space, and energy; basic concepts of phrasing and structure leading to dance composition. 4S, P, 143.

276a-276b. Intermediate Tap Dance (2-2) [Rpt.] 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. Enrollment by audition only.

291. Preceptorship
Dance Production (1-3) [Rpt./3]


341a-341b. Modern Dance Technique II (2-2) [Rpt./2] P, 241b. By audition only.

343. Dance Ensemble (1-3) [Rpt./7] Production preparation, rehearsal methods, repertorial development, and performance of dance, with particular emphasis on ensemble. Enrollment by audition only.

344a-344b. Jazz Dance Technique II (2-2) [Rpt.] Continued development of jazz dance technique emphasizing stylistic diversity, including contemporary, lyrical, funky and classical jazz. Enrollment by audition only.

376. Advanced Tap Dance Technique (2) [Rpt./8 units] Advanced tap technique is structured with the knowledge of basic tap vocabulary and then expanded to include varied rhythm and advanced technique skills. Explores a wide variety of musical styles. P, 276 or by audition.

394. Practicum
a. Dance Project (1) 3L.
b. Production Project (1) 3L. P, 445.
400. Human Movement in the Arts (3) Hieratic gestures and anatomical foundations of human movement from the viewpoint of the performing and visual arts. Historical development and stylistic treatment of the human figure in action.

401. Advanced Floor Barre (1) [Rpt./4 units] Develops deep strength, flexibility and alignment specific to all forms of dance. Building on the concepts presented in 201, this course is geared to the more advanced student, presenting exercises that are more rigorous and complex in nature. 2S, P, 201. May be convened with 501.

439a-439b. Advanced Pointe Technique (1-1) [Rpt./4 units] 439a: 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. 439b: Continuation of 439a with increasing difficulty and complexity in the enchainments. 2S, P, audition. May be convened with 539a-539b.

440a-440b. Ballet Technique III (2-2) [Rpt./3] P, 340b. By audition only. May be convened with 540a-540b.

441a-441b. Modern Dance Technique III (2-2) [Rpt./3] Only. May be convened with 541a-541b.

444a-444b. Jazz Dance Technique III (2-2) [Rpt./3] Continued development of jazz dance technique emphasizing stylistic diversity and technical proficiency including contemporary, lyric, funky and classical jazz styles. P, 244a-244b, 344a-344b or by audition. May be convened with 544a-544b.

445a-455b. Advanced Choreography (2-2) 445a: Movement, motif development for solo and group composition. 445b: Balancing the intuitive and intellectual components of the creative process to create meaningful and well-crafted dances. 4S, P, 245b. May be convened with 545a-545b.

446. Careers in Dance (3) Develops knowledge and skills for management, and pursuit of professional careers in dance. P, consent of instructor for non-majors.

448. Dynamics of Movement (3) [Rpt./1] 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 548.

451b. Ballet Repertoire (2) [Rpt./12 units] Repertoire from romantic, classical and contemporary ballets including works by Bournonville, Petipa, Ashton, Balanchine, Christensen and others. 1R, 3S, P, 340 or by audition. May be convened with 551b.

455. Biomechanics for Dancers (3) 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, 145, 241a.


496. Seminar b. Critical Issues (2) [Rpt./1] P, junior standing. May be convened with 596b.

501. Advanced Floor Barre (1) [Rpt./4 units] For a description of course topics see 401. Graduate-level requirements include additional written assignments. 2S, P, 201. May be convened with 401.

539a-539b. Advanced Pointe Technique (1-1) [Rpt./4 units] For a description of course topics see 439a. Graduate-level requirements include completion of additional exercises. P, audition. May be convened with 439a-439b.

540a-540b. Ballet Technique III (2-2) [Rpt./3] Graduate-level requirements include an additional creative and/or research project. P, 340b. By audition only. May be convened with 440a-440b.

541a-541b. Modern Dance Technique III (2-2) [Rpt.] Graduate-level requirements include an additional creative and/or research project. By audition only. May be convened with 441a-441b.

543. Dance Ensemble (1-3) [Rpt./5] Rehearsal methods, repertorial development, and performance of dance with particular emphasis on ensemble. 4S, P, repertory audition; intermediate level in modern and ballet (340a-b, 341a-b).

544a-544b. Jazz Dance Technique III (2-2) For a description of course topics see 444a-444b. Graduate-level requirements include more stringent grading criteria and periodic seminars in critical issues in advanced jazz. May be convened with 444a-444b.

545a-545b. Advanced Choreography (2-2) For a description of course topics see 445a-445b. Graduate-level requirements include completion of a full-scale group composition, which will be evaluated by the dance faculty. May be convened with 445a-445b.

546. Careers in Dance (3) Knowledge and skills to manage and pursue professional careers in dance. (Identical with T AR 546).

548. Dynamics of Movement (3) [Rpt./1] For a description of course topics see 448. Graduate-level requirements include additional outside class reading and written assignments. May be convened with 448.

550. Literary Resources for Choreography (3) [Rpt./1] Studies in primary world literature, in drama, and in psychology of personages as sources for choreographic themes; presentation of motifs and scenario. 6S, P, 445. (Identical with T AR 550).

551a-551b. Ballet Repertoire (2-2) [Rpt./12 units] For a description of course topics see 451b. Graduate-level requirements include performance of classical repertoire at the professional level. P, 340 or by audition. May be convened with 451b.


596. Seminar b. Critical Issues (2) [Rpt./1] Graduate-level requirements include presentation of selected seminar sessions. P, junior standing. May be convened with 496b.

694. Workshop a. Concert Production and Choreography (3) [Rpt./12 units]

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**MUSIC (MUS/MUSI)**

Music Bldg., Rm. 109
The University of Arizona
PO Box 210004
Tucson, AZ 85721-0004
(520) 621-6155; FAX: (520) 621-8118
email: showell@u.arizona.edu
http://arts.music.arizona.edu/

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**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**

Composition (B.M., M.M., D.M.A.)
Conducting (D.M.A.)
Jazz Studies (B.M.)
Music (B.A.)
Music Education (B.M., M.M., Ph.D.)
Options: instrumental vocal

**Music Theory (M.M., Ph.D.)
Musicology (M.M.)

**Program Requirements**

For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available...
on-line at http://www.arizona.edu/academic/onecourse/aprr.html.

For academic program requirements for graduate degrees, 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.

MUSIC (MUS)

100. Basic musicianship (3) CDT Introduction to the rudiments of musical notation, harmony, rhythm, and melody.

101a-101b. Exploring Music through Piano for General Students (3-1) 101a: 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 repertoire. 101b: [Rpt./2] Studying piano pieces and music basics. P, 101a or by audition, interview.

102a-102b. Class Guitar for General College Students (1-1) 102a: Introduction to basic guitar playing techniques for the general college student, with emphasis on literature and styles of playing of current interest to students. 102b: 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) [Rpt.] Practical training in singing, with emphasis on basic skills of breathing, tone and diction; repertoire to include folk, current, and classic songs in English.

105L. Operatic Stage Training (1) [Rpt./2] 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) Development of listening skills through introductory study of Western art music, world music, and jazz. 1R, 1D, 2S.

108. Survey of Music II (3) Continuation of 107, with emphasis on Western art music, particularly that of the Medieval through the Baroque era, and the music of other cultures. 107 is not prerequisite to 108.

110a-110b. Piano Class (1-1) Introductory development of basic keyboard musicianship and technique through activities including playing by ear, improvising, harmonizing, transposing. Open to music majors and minors only. P, CR, 120a-120b.

111. Voice Class (1) [Rpt.] 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.


130a-130b. Introduction to Music Literature (2-2) CDT Survey of music literature, with emphasis on structure, period, and style. Open to music majors and minors only. P, CR, 120a-120b.

153. Percussion Instruments Class (1) Class instruction in all percussion instruments, including materials and procedures for teaching these instruments in the schools. For music education majors only.

200. Large Conducted Ensembles (1) All courses listed below may be repeated during each semester of registration. Prerequisite for entrance to all ensembles is by audition.

b. Marching Band
c. Campus Band
d. Wind Symphony
e. Wind Ensemble
f. Summer Chorus
i. Symphonic Choir
j. University Singers
k. University-Community Chorus
l. Chamber Choir
m. Choraliers
n. Symphony Orchestra
o. Collegium Musicum
q. Jazz Ensemble
s. Honor Choir
t. Mariachi Arizona

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 (1-1) Continuation of 110b, with additional sight-reading, score-reading, and accompanying. Open to MUS majors and minors only. P, 110b.

211a-211b. Diction for Singers (2-2) Training in diction for singers in English, French, German, Italian, Spanish and ecclesiastical Latin.

220a-220b. Musical Skills and Structure II (3-3) CDT Continuation of 120a-120b, dealing with music from the late medieval period through early 20th-century art music in chronological order. 2R, 3L, P, 120b.

231. Jazz History (3) 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. (Identical with LA S 237).

240. Introduction to Composition (3) [Rpt./1] Introduction to the basics of music composition, stressing fundamental forms, techniques and procedures. P, 120b or consent of instructor.

250. Introduction to Music Education (3) Observation of and practical field experience in public schools; video-taped class presentations. Field trips. Open to music majors only.

302. Recording Studio Production (3) Recording studio procedures including the recording chain and pre-post and actual recording production techniques. P, with permission of the School of Music and Dance. (Identical with MAR 302).

310a-310b. Functional Piano for Music Education Majors (1-1) 310a: Development of functional piano skills needed for public-school music teaching, with emphasis on improvising, harmonizing, transposing, and accompanying. 310b: Continuation of 310a with materials of increasing difficulty; open-score part-reading and rehearsal techniques. P, 210b.

320. Form and Structure in 20th-Century Music (3) Intensive analysis of post tonal music, beginning with serial works of Schoenberg through very recent compositions by major composers. Open to music majors and minors only. P, 220b.

321a-321b. Jazz Improvisation (2-2) CDT 321a: Background for the art of improvising jazz. Audition required. P, 201. 321b: Continuation and refinement of the techniques studied in 321a.

330a-330b. History of Western Music (3-3) CDT Detailed study of the history of music in Western civilization from its origins to modern times; its relationship to general cultural development. P, 220b. Writing-Emphasis Course.*

338m. The Teaching of Secondary School Music (3) Open only to students admitted to teacher education. (Identical with TTE 338m).

340. Composition (3) [Rpt./1] 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 units of 240 or consent of instructor.

350a-350b. Woodwind Techniques and Materials (1-1) CDT 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) Class instruction on trumpet, trombone, horn and other 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) Class instruction on violin, viola, cello and bass, including materials and procedures 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 Pre-adolescent Child (3) 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, 360.

370. Introduction to Conducting (2) Conducting choral as well as instrumental ensembles; includes basic beat patterns, transpositions and clefs, and introduction to score study. P, CR, 220a.

371. Intermediate Instrumental and Choral Conducting (2) Conducting techniques for instrumental ensembles of varying sizes; instrumental rehearsal techniques, score reading, and score study. P, 370.

396L. Honors Proseminar (3)

405L. 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. P, 2 units of 205.

410a-410b. Pedagogy (2-2) Study of methods and repertory suitable for studio teaching. Open to music majors in their major performance area only. May be convened with 510a-510b.

420a-420b. Counterpoint (3-3) Practical study of the counterpoint of the 16th (in 420a) and 18th (in 420b) centuries. P, 220b. May be convened with 520a-520b.

421. Orchestration (3) CDT Instruments of the orchestra together with practical study of the art of symphonic scoring; original work and transcriptions. P, 220b.

422. Jazz Arranging (2) Class instruction and practice in arranging for small jazz combos, rock groups, stage bands, and pop-vocal combinations; detailed study of jazz instrumental practices and problems. Open to majors only or consult department prior to enrolling. P, 200c, 201, 220b.

424. History and Literature of Guitar (3) In-depth study of the evolution of the guitar, lute, and vihuela, including repertoire, style periods, and composers. Open to majors only. May be convened with 524.


426a-426b. Piano Literature (3-3) Historical and stylistic study of keyboard literature, instruments and performance practices. 426a: Baroque through the early Romantic periods. 426b: Mid-Romantic through the Contemporary periods. P, MUSI 285P. 426a is not prerequisite to 426b. May be convened with 526a-526b.

428. American Pop Music: Sinatra Era (3) American popular music associated with Tin Pan Alley and the American musical theater through the recordings and interpretations of Frank Sinatra.

434. Music in World Cultures (3) CDT Overview of nonwestern musics in selected world cultures.


440. Compositional Techniques (3) [Rpt./15 units] 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 340 or permission of the School of Music.

441. Electro-Acoustic Music (3) Comprehensive study of electronic music. Introduction to the electronic music studio, tape composition, acoustics, music synthesis and sound processing, with actual lab applications. May be convened with 541. Consent of instructor required.

442. Electro-Acoustic Studio Resources (3) Advanced techniques: synthesis, processing, synthesizer programming, sampling, MIDI, computer-assisted techniques, sequencing and notation. May be convened with 542. Consent of instructor required.

444. Arab and Asian Music (3) Exploration of the structure and utility of music in Indian, Arab, Chinese, Japanese, and Indonesian cultures.

450. Teaching Music in the Elementary School (3) 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) 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.

455. Music and German Literature (3) (Identical with GER 455, which is home). May be convened with 555.

497. Workshop o. Level I Orff Schulwerk (2) May be convened with 597o.

Writing-Emphasis Courses. P, Satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

500. Large Conducted Ensembles (1)

b. Marching Band
c. Campus Band
d. Symphonic Band
e. Wind Symphony
h. Summer Chorus
i. Symphonic Choir
j. University Singers
k. University-Community Chorus
l. Chamber Choir
m. Choraliers
o. Symphony Orchestra
q. Collegium Musicum
r. Jazz Ensemble
t. Mariachi Arizona

510a-510b. Pedagogy (2-2) For a description of course topics see 410a-410b. Graduate-level requirements include a major research project in pedagogy. May be convened with 410a-410b.

520a-520b. Counterpoint (3-3) For a description of course topics see 420a-420b. Graduate-level requirements include an additional project. May be convened with 420a-420b.

521. Introduction to Graduate Music Theory (3) Introduction to graduate analysis with emphasis on the survey of analytical systems as applied to a number of stylistic periods. Both cognitive and aural procedures will be investigated. This course may not be used to fulfill doctoral requirements in music. Open to majors only.

522a-522b. Art Song Repertory (2-2) Class performance of representative selections from the standard repertory of German, Italian, French, Russian and English language art songs; problems of accompaniment, interpretation, style and ensemble. Registration restricted to singers and pianists. Open to majors only.

523-523b. History of the Opera (3-3) Detailed study of the course of opera from its inception by the Florentine Camerata through Berg, Menotti, Stravinsky, Ginastera, Penderecki, Britten and others. Open to majors only.

524. History and Literature of Guitar (3) For a description of course topics see 424. Graduate-level requirements include a major research project.

525. History and Literature of the Wind Band (3) A research-oriented study of wind band history and literature from the Renaissance to the present.

526a-526b. Piano Literature (3-3) For a description of course topics see 426a-426b. Graduate-level requirements include a major research paper and a special class presentation. P, MUSI 285P. P 526a is not prerequisite to 526b. May be convened with 426a-426b.

530. Music in the Renaissance (3) Vocal and instrumental genres from Dufay through Palestrina. Open to majors only.

531. Music in the Baroque (3) The age of the basso-continuo; instrumental and vocal genres from Monteverdi through J. S. Bach. Open to majors only.

532. Music in the Classical Period (3) The Viennese classical tradition from its origins to Beethoven. Open to majors only.

533. Music of the Twentieth Century (3) Contemporary idioms in music; study of genres, styles, and techniques from post-Romanticism to the present. Open to majors only.

534. Music Since 1950 (3) [Rpt./1] Analysis of major works of the last half of the 20th century. P, 533 and 623, or by permission of instructor. Open to majors only.


537. Survey of Early Music (3) Intensive survey of music history from Gregorian chant to the late Baroque. This course may not be used to fulfill doctoral requirements in music. Open to majors only.

541. Electro-Acoustic Music (3) For a description of course topics see 441. Graduate-level requirements include a major research paper and special class presentation. May be convened with 441. P, consent of instructor.

542. Electro-Acoustic Studio Resources (3) For a description of course topics see 442. Graduate-level requirements include a major research paper and special class presentation. May be convened with 442. P, consent of instructor.


551. Behavioral Research in the Arts (3) 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 Language (3) (Identical with GER 555, which is home). May be convened with 455.

560. Aesthetics of Music (3) Exploration of the problems of musical meaning, including a panoramic examination of what philosophers, philosophic musicians and artists, and others of critical intelligence have contributed to comprehensive theory.

570. Advanced Conducting (3) [Rpt.] 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.

597. Workshop
a. Level Orff Schulwerk (2) May be convened with 4970.

600. Introduction to Graduate Study in Music (3) Bibliographical materials; research resources, techniques, and problems directed toward graduate study in music. Required of all doctoral candidates in music. (Identical with LI S 600).

620L. 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. May also include opera staging techniques. P, 4 units of 405, or consent of instructor.

620a-620b. History of Speculative Theory (3-3) Survey of speculative theory in music, classical Greeks to present.

621a-621b. Analysis of Music of the 18th and 19th Centuries (3-3) Intensive analysis of works written in the larger forms. 621a: 18th century. 621b: 19th century. Open to majors only. 621a is not prerequisite to 621b.

622. Theory Pedagogy (3) Study of the philosophies, procedures, techniques, and materials used in teaching theory at the college level.


630. The Music of Bach (3)

631. The Music of Mozart (3)

635. Choral Literature and Techniques (3) [Rpt./5] A research-oriented study of choral literature from all stylistic periods and genre from the Renaissance to the present, together with appropriate conducting techniques. 2R, 3L. Open to majors only. P, graduate standing in choral conducting or choral music education. No more than 18 units of this course may be applied to a graduate degree program.

640. Advanced Composition (2-6) [Rpt.] Individual projects in composition. Open to theory and composition majors only.

650. Foundations and Principles of Music Education (3) 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) Principles and techniques of curriculum construction applied to the field of music.

652. Management Techniques in Music (3) The management of music at all levels of education, industry, and performance.

654. Psychology of Music (3) 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) Contemporary practices in planning, organizing, and evaluating learning experiences in music for college and university students. Open to music majors only.

696. Seminar
a. Music Education (1-6) [Rpt./9 units]
   b. Musicology (1-6) [Rpt./9 units]
   c. Music Theory (1-6) [Rpt./5]
   d. Composition (2) [Rpt./8 units] Open to majors only.
   e. Keyboard Studies (2)
   f. Ethnomusicology (3) P, graduate standing or consent of instructor.

PERFORMANCE STUDIES: INDIVIDUAL AND GROUP INSTRUCTION (MUSI)

For information regarding prerequisites for MUSI 180, 181 and 285, please see "ENTRANCE REQUIREMENTS" defined for the School of Music and Dance. Fee for MUSI Performance Studies.

180-A. (1-2) Oboe
180-B. (1-2) Bassoon
180-C. (1-2) Clarinet
180-D. (1-2) Horn
180-E. (1-2) Euphonium
180-F. (1-2) Flute
180-K. (1-2) Violin
180-L. (1-2) Viola
180-M. (1-2) Cello
180-N. (1-2) String Bass
180-P. (1-2) Piano
180-R. (1-2) Trombone
180-S. (1-2) Saxophone
180-T. (1-2) Trumpet
180-V. (1-2) Voice
180-Y. (1-2) Tuba
180-Z. (1-2) Percussion
181-A. (1-2) Oboe
181-B. (1-2) Bassoon
181-C. (1-2) Clarinet
181-D. (1-2) Horn
181-E. (1-2) Euphonium
181-F. (1-2) Flute
181-G. (1-2) Guitar
181-H. (1-2) Harp
181-I. (1-2) Harpsichord
181-K. (1-2) Violin
181-L. (1-2) Viola
181-M. (1-2) Cello
181-N. (1-2) String Bass
181-O. (1-2) Organ
181-P. (1-2) Piano
181-R. (1-2) Trombone
181-S. (1-2) Saxophone
181-T. (1-2) Trumpet
181-V. (1-2) Voice
181-Y. (1-2) Tuba
181-Z. (1-2) Percussion
182-A. (1-2) Oboe
182-B. (1-2) Bassoon
182-C. (1-2) Clarinet
182-D. (1-2) Horn
182-E. (1-2) Euphonium
182-F. (1-2) Flute
182-G. (1-2) Guitar
182-H. (1-2) Harp
182-I. (1-2) Harpsichord
182-K. (1-2) Violin
182-L. (1-2) Viola
182-M. (1-2) Cello
182-N. (1-2) String Bass
182-O. (1-2) Organ
182-P. (1-2) Piano
182-R. (1-2) Trombone
182-S. (1-2) Saxophone
182-T. (1-2) Trumpet
182-V. (1-2) Voice
182-Y. (1-2) Tuba
182-Z. (1-2) Percussion
185-A. (1-4) Oboe
185-B. (1-4) Bassoon
185-C. (1-4) Clarinet
185-D. (1-4) Horn
185-E. (1-4) Euphonium
185-F. (1-4) Flute
185-G. (1-4) Guitar
185-H. (1-4) Harp
185-I. (1-4) Harpsichord
185-K. (1-4) Violin
185-L. (1-4) Viola
185-M. (1-4) Cello
185-N. (1-4) String Bass
185-O. (1-4) Organ
Undergraduate minors
A minor is required in the Bachelor of Arts degree programs.

For more information on undergraduate majors, minors and options, see the department sections of this manual. For more information about undergraduate degree programs please consult the Graduate Catalog.

General education program
All undergraduate students are required to complete a common 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 specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the undergraduate majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic requirements for graduate degrees 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)
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e-mail: jkunnie@u.arizona.edu
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http://www.coh.arizona.edu/coh/aas/aas.html

Minor
A minor only is offered.

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).

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.


160. Minority Relations and Urban Society (3) (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).


222. African American Studies: A History of Ideas (3) 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 and PHIL 222).


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

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

300. Historical Overview of African Cinema and Filmmaking (3) 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) Research methodologies and theoretical framework pertinent to the diverse disciplines of African American Studies.


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

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

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

342. Writers, Women and the Gods: The Caribbean Novel (3) 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 and W S 342).


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

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

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

384. Topics in African History (3) (Identical with HIST 384, which is home).

396H. Honors Proseminar (4)

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

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

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

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

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

469. Government and Politics of Africa (3) (Identical with POL 469, which is home).

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

487a-487b. Race and Public Policy (3) (Identical with POL 487a-487b, which is home).

495. Colloquium
   a. Studies in Black America (3) (Identical with HIST 495a, which is home).

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

596. Seminar
   a. Issues in African Art History (3) [Rpt./12 units] (Identical with ARH 596a, which is home).

CLASSICS (CLAS/GRK/LAT)
Modern Languages Bldg., Rm. 371
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PO Box 210067
Tucson, AZ 85721-0067
(520) 621-1749; FAX: (520) 621-3678
http://www.coh.arizona.edu/classics/clas.html

Baccalaureate degrees
Bachelor of Arts (B.A.)

Graduate degree
Master of Arts (M.A.)
443a-443b. Archaeology of Neolithic and Bronze Age Greece (3-3) History, art and culture of prehistoric Greece through the study of archaeological excavation and artifacts. 443a: emphasizes the "Minoan" culture of Crete. 443b: emphasizes the Mycenaean culture of the Greek mainland. 443a is not prerequisite to 443b. (Identical with ANTH 443a-443b). May be convened with 543a-543b. Writing-Emphasis Course.*

452. Etruscan Art and Archaeology (3) Surveys the art and archaeology of the Etruscans between the 7th and 1st centuries B.C. P, 340b or consent of instructor. (Identical with ARH 452). May be convened with 552.

453. Research Methods in Classical Archaeology (3) [Rpt./1] 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, 340a or 340b. May be convened with 553. Writing-Emphasis Course.*


456. Greek and Roman Painting (3) 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, 340a-340b. (Identical with ARH 456). May be convened with 556.


458. Greek and Roman Provincial Archaeology (3) Survey of classical archaeology in ancient Tunisia, Cypro and Turkey. P, 340a or 340b. May be convened with 558.

461. Greek Pottery 1200-400 B.C. (3) 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 561.

463. Classical Field Archaeology (6) [Rpt./1] 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 563.

474. Archaeometry: Scientific Methods in Art and Archaeology (3) (Identical with ANTH 474, which is home). May be convened with 574.

481. Archaic Greek Sanctuaries (3) Archaeology of the sanctuary sites from the Archaic Period in Greece, both those which became panhellenic and those associated with individual states. Relationships between the polis and the local sanctuary. May be convened with 581.

484. Roman Art and Architecture (3) The origin and development of Italian art and architecture from Etruscan beginnings through the Republic to the late Empire. P, ARH 117, 118, or 6 units of ancient history. (Identical with ARH 484). May be convened with 584.

*Writing-Emphasis Courses. P, Satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

543a-543b. Archaeology of Neolithic and Bronze Age Greece (3-3) [Rpt./1] For a description of course topics see 443a-434b. Graduate-level requirements include extensive reading and an in-depth paper. 543a is not prerequisite to 543b. (Identical with ANTH 543a-543b). May be convened with 443a-443b.

552. Etruscan Art and Archaeology (3) For a description of course topics see 452. Graduate-level requirements include extensive reading and an in-depth paper. P, 340b or consent of instructor. (Identical with ARH 552). May be convened with 452.

553. Research Methods in Classical Archaeology (3) [Rpt./1] For a description of course topics see 453. Graduate-level requirements include extensive reading and an in-depth paper. P, 340a-340b. (Identical with ARH 553). May be convened with 443a-443b.

554. Greek and Roman Sculpture (3) For a description of course topics see 454. Graduate-level requirements include extensive reading and an in-depth paper. P, 340a-340b. (Identical with ARH 554). May be convened with 454.

556. Greek and Roman Painting (3) For a description of course topics see 456. Graduate-level requirements include extensive reading and an in-depth paper. P, 340a-340b. (Identical with ARH 556). May be convened with 456.

557. Greek Architecture (3) For a description of course topics see 457. Graduate-level requirements include extensive reading and an in-depth paper. P, 340a-340b. (Identical with ARH 557). May be convened with 457.

558. Greek and Roman Provincial Archaeology (3) For a description of course topics see 458. Graduate-level requirements include extensive reading and an in-depth paper. P, 340a-340b. (Identical with ARH 558). May be convened with 458.

561. Greek Pottery 1200-400 B.C. (3) For a description of course topics see 461. Graduate-level requirements include extensive readings and an in-depth paper. P, 340a or 340b. May be convened with 461.

563. Classical Field Archaeology (6) [Rpt./1] For a description of course topics see 463. Graduate-level requirements include extensive readings and an in-depth paper. May be convened with 463.

564. Topics in Ancient Mediterranean Archaeology (3) [Rpt./1] Research papers and oral presentations on different aspects of Greek and Roman art and archaeology.
man archaeology; preparation in writing scholarly articles for refereed journals. P, 340a or 340b.

574a. Archaeometry. Scientific methods in art and archaeology (3) (Identical with ANTH 574, which is home). May be convened with 474.

581. Archival Greek Sanctuaries (3) For a description of course topics see 481. Graduate-level requirements include extensive reading and an indepth paper. May be convened with 481.

584. Roman Art and Architecture (3) For a description of course topics see 484. Graduate-level requirements include extensive reading and an indepth paper. P, ARH 117, 118, or 6 units of ancient history. (Identical with ARH 584), May be convened with 484.

587. Testing and Evaluation in Foreign/Second Language Programs (3) (Identical with GER 587, which is home).

CLASSICAL LITERATURE AND CIVILIZATION (CLAS)

115. The Study of English Words (3) Vocabulary building through the systematic study of English words derived from Latin and Greek. Readings in translation.

126. Greek Mythology I (3) The myths, legends, and folktales of the Greeks and their origins. All readings in English. (Identical with RELI 126).

130. Ancient Athletics (3) Comparative study of ancient and modern athletics in their cultural contexts. Readings in English translation.

150. In the Beginnings (3) Investigations of the first 10,000 years of "Western" tradition in which the great civilizations of the Near East and North Africa produced the roots of what was to reach fruition in the Classical world.

195. Colloquium a. Encounters with Greek-Roman Antiquity (1) [Rpt./1]

204. Ancient History: Greek History (3) (Identical with HIST 204, which is home).

205. Ancient History: Roman History (3) (Identical with HIST 205, which is home).

220. Classical Tradition I (3) Surveys western civilization from the Greco-Roman perspective, beginning in the middle ages. P, 340a or 340b.

221. Classical Tradition II (3) Surveys western civilization from the Greco-Roman perspective, covering the classical period from the middle ages to the present. 220 is not prerequisite to 221.

230. Literacy and Literature in the Ancient Near East (3) Examination of the reasons for the invention of c. 3,000 B.C.; survey of the civilizations of the ancient Near East (Sumerians, Egyptians, Hebrews, etc.) in terms of their religion, law, literature, ethics, etc.

250a-250b. Classical Literature in Translation (3-3) Historical survey of the major authors and works of ancient Greece and Rome. 250a: From Homer to the Greek novel. 250b: Roman literature of the Republican period and the early Empire. 250a is not prerequisite to 250b.

260. Ancient Philosophy (3) (Identical with PHIL 260, which is home).

285. Introduction to Humanities Computing (3) (Identical with GER 285, which is home).

305. Greek and Roman Religion (3) Religious beliefs and cult practices in ancient Greece and Rome. All readings in English. (Identical with RELI 305).

306. The Transformation of a Society: Christianity in the Greco-Roman World (3) 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.


335. Roman Empire: Rulers and Ruled (3) Topics in multiculturalism: transformation of the Roman empire by diverse individuals and peoples all over the Mediterranean basin; centered on the second C.E.

339. Beginnings of Animal Domestication (3) (Identical with ANTH 339, which is home).

342. Homer (3) A study of the Homeric poems, the Iliad and the Odyssey. All readings in English.

345. Ancient Cosmology (3) Investigation of ancient Greek concepts of the universe, with emphasis on theories regarding nature, matter, and the soul. All readings in English.

346. Classical Greek Tragedy (3) Readings in ancient Greek tragedy in translation. Writing-Emphasis Course.*

348. Myth and Archetype (3) An investigation of modern psychological theories and their relevance to ancient Greek and Roman myths. All readings in English. P, 126. (Identical with RELI 348).

396f. Honors Proseminar (3)

403a-403b. History of Greece (3-3) (Identical with HIST 403a-403b, which is home).

404a-404b. History of Rome (3-3) (Identical with HIST 404a-404b, which is home).

470. Greek Philosophy (3) [Rpt./1] (Identical with PHIL 470). May be convened with 570.

472a-472b. Ancient Philosophy (3) [Rpt.] (Identical with PHIL 472a-472b, which is home). May be convened with 572a-572b.

488. History of Byzantium (3) (Identical with HIST 488). May be convened with 588.

GREEK (GRK)

101. Elementary Classical Greek I (4) Introduction to ancient Greek for students of the Bible and of the classical authors.


103. Elementary Modern Greek I (4) Development of skills in conversation, composition, and reading with emphasis upon aural-oral practice.

104. Elementary Modern Greek II (4) Second semester modern Greek. P. 103.

201. Intermediate Classical Greek I (4) Selections from classical Greek chosen in accordance with the student's needs and interest. P. 102.


203. Intermediate Modern Greek I (4) Pronunciation, grammar, and vocabulary of modern Greek; development of skills in conversation, composition, and reading; emphasis on aural-oral skills. P. 104.


402. Greek Reading Course (3) [Rpt.] Readings in major Greek authors including Homer, Plato, and the historians and dramatists. P. 202. May be convened with 502. Writing-Emphasis Course.*

412. Readings in Greek Philosophy (3) [Rpt./1] Extensive readings in Greek philosophy in one of the following areas of Greek philosophy: the pre-Socratics, Plato's ethics and epistemology, Aristotle's Nicomachean Ethics. P. 202. (Identical with PHIL 412). May be convened with 512. Writing-Emphasis Course.*
421. Greek Lyric Poetry (3) [Rpt.] Study in Greek of the early Greek Lyric writers from Archilochus to Bacchylides, including Pindar. P, 202. May be convened with 521. Writing-Emphasis Course.

422. Readings in Greek Drama (3) [Rpt.] Close reading in Greek of either (1) tragedy-one play each by Aeschylus, Sophocles and Euripides or (2) comedy—two plays of Aristophanes, one of Menander. P, 202. May be convened with 522. Writing-Emphasis Course.


430. Readings in Greek Historians (3) [Rpt.] Selections from Herodotus and Thucydides with an introduction to the critical literature. Readings in Greek, P, 202. May be convened with 530. Writing-Emphasis Course.

431. Greek Orators (3) [Rpt.] Readings in Greek from Lysias, Isocrates and Demosthenes as sources for ancient rhetoric, politics, and private life. P, 202. May be convened with 531. Writing-Emphasis Course.


*Writing-Emphasis Courses. P, Satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

502. Greek Reading Course (3) [Rpt.] For a description of course topics see 402. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Greek. May be convened with 402.

512. Greek Lyric Poetry (3) [Rpt./1] For a description of course topics see 421. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Greek. (Identical with PHIL 512). May be convened with 412.

521. Greek Lyric Poetry (3) [Rpt./1] For a description of course topics see 421. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Greek. May be convened with 421.

522. Readings in Greek Drama (3) [Rpt./1] For a description of course topics see 422. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Greek. May be convened with 422.

524. Homer (3) [Rpt./1] For a description of course topics see 424. Graduate-level requirements include extensive reading and an in-depth paper. May be convened with 424.

530. Readings in the Greek Historians (3) [Rpt.] For a description of course topics see 430. Graduate-level requirements include extensive readings and an in-depth paper. P, 3 units of 400-level Greek. May be convened with 430.

531. Greek Orators (3) [Rpt.] For a description of course topics see 431. Graduate-level requirements include extensive readings and an in-depth paper. P, 3 units of 400-level Greek. May be convened with 431.

532. Literature of Archaic Greece (3) [Rpt.] For a description of course topics see 432. Graduate-level requirements include extensive readings and an in-depth paper. P, 3 units of 400-level Greek. May be convened with 432.

596. Seminar in Advanced Greek Literature (3) [Rpt./30 units]

LATIN (LAT)

101. Elementary Latin I (4) An introduction to the basic grammar, syntax and vocabulary of Latin through reading and composition.


108. Latin Grammar (2) For a description of course topics see 408. Graduate-level requirements include extensive reading and an in-depth paper. P, 2 units of 400-level Latin. May be convened with 508. Writing-Emphasis Course.

109. Latin Reading Course (3) [Rpt.] For a description of course topics see 409. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Latin. May be convened with 509. Writing-Emphasis Course.

112. Accelerated Latin I (6) Equivalent of LAT 101 and 102. Covers all basic grammar and syntax. Credit is allowed for this course or for 101 and 102, but not for both. Previous language experience or departmental approval required.


212. Accelerated Latin II (6) Equivalent of LAT 201 and 202. Reading and composition, prose and poetry. Credit is allowed for this course or for 201 and 202, but not for both. P, 101 and 102 or 112.

400. Prose of the Roman Republic (3) [Rpt./6 units] Extended readings from Sallust, Cicero and Caesar with some grammatical review; development of skills in rapid readings and sight reading. P, 202.

401. Latin Reading Course (3) [Rpt./1] Readings in the one of the following: epic, lyric, drama, history, oratory, satire, epistles, novel, philosophical, technical or medieval literature. P, 400. May be convened with 501. Writing-Emphasis Course.

403. Late Antique Literature (3) [Rpt./1] Selections from genres and/or authors, both Christian and non-Christian, from the late antique period. P, 400. May be convened with 503.


413. Augustan Literature (3) [Rpt./1] Readings from the major writer or writers of the Augustan age. P, 400. May be convened with 513. Writing-Emphasis Course.

505. Latin Composition (3) [Rpt./1] For a description of course topics see 405. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Latin. May be convened with 405.

512. Greek Paleography (3) For a description of course topics see 412. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Greek. May be convened with 412.

513. Augustan Literature (3) [Rpt./1] For a description of course topics see 413. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Latin. May be convened with 413.

514. Medieval Latin (3) For a description of course topics see 414. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Latin. May be convened with 414.
515. Latin Love Elegy (3) [Rpt.] For a description of course topics see 415. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Latin. May be convened with 415.

520. Latin Paleography (3) For a description of course topics see 420. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of Latin at the 400 level. May be convened with 420.

525. Cicero (3) [Rpt.] For a description of course topics see 425. Graduate-level requirements include extensive reading and an in-depth paper. P, 3 units of 400-level Latin. May be convened with 425.

526. Roman Historians (3) [Rpt.] For a description of course topics see 426. Graduate-level requirements include extensive readings and an in-depth paper. P, 3 units of 400-level Latin. May be convened with 426.

528. Silver Age Latin (3) [Rpt.] For a description of course topics see 428. Graduate-level requirements include extensive readings and an in-depth paper. P, 3 units of 400-level Latin. May be convened with 428.

586. Issues in Latin Teaching Methodology (3) For a description of course topics see 486. Graduate-level requirements include a research paper. Open to majors only. P, 400. May be convened with 486.

596. Seminar a. Topics in Latin Literature (3) [Rpt./30 units]

CRITICAL LANGUAGES PROGRAM (CRL)

1230 N. Park Ave., Suite 214
The University of Arizona
PO Box 210420
Tucson, AZ 85721-0067
(520) 621-3387; FAX: (520) 621-1149
http://www.coh.arizona.edu/crit_lang/crit.html

The critical languages program provides tape-intensive instruction in languages for formats not offered by other language departments or committees at The University of Arizona. The program offers no degrees.

For further information on available languages, contact the program at the address listed above.

101. Elementary Language Study (4) [Rpt.*] Introduction to the language with an emphasis on its spoken aspects utilizing tape-intensive preparations with biweekly tutorials. 2R, 6L. Fee. P, 102.

102. Elementary Language Study (4) [Rpt.*] Continued introduction to the language with an emphasis on its spoken aspects utilizing tape-intensive preparations with biweekly tutorials. 2R, 6L. Fee. P, 101.


201. Intermediate Language Study (4) [Rpt.*] Continuing study of the language with emphasis on its spoken aspects utilizing tape-intensive preparations with biweekly reviews. 2R, 6L. Fee. P, 102.

202. Intermediate Language Study (4) [Rpt.*] Continuing study of the language with emphasis on its spoken aspects utilizing tape-intensive preparations with biweekly reviews. 2R, 6L. Fee. P, 201.


301. Advanced Language Study (3) [Rpt.*] 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. Fee. P, proficiency at 202 level.

302. Advanced Language Study (3) [Rpt.*] 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. Fee. P, proficiency at 202 level.


* Course may be repeated if language is different each time.

EAST ASIAN STUDIES (EAS/CHN/JPN)

Franklin Bldg., Rm. 404
The University of Arizona
PO Box 210080
Tucson, AZ 85721-0080
(520) 621-7505; FAX: (520) 621-1149
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
East Asian Studies (B.A., M.A., Ph.D.)
B.A. Options: Japanese Chinese

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

EAST ASIAN STUDIES (EAS)

130. Asian Religions (3) Religions of India and the Far East. (Identical with RELI 130).

150. The Worlds of Buddhism (3) 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).

195. Colloquium a. Introduction to Studies of East Asia (1).

270. Modern East Asia (3) (Identical with HIST 270, which is home).

333. Buddhist Meditation Traditions (3). 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) Practical Hinduism through worship, rituals, and ceremonies based on Vedic, Puranic and folk traditions. (Identical with RELI 345).

350. Hindu Mythology (3) 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 and RELI 350).

396H. Honors Proseminar (3).

427a. The Prehistory of East Asia (3) (Identical with ANTH 427a, which is home). May be convened with 527a.

445. Hindu Mysticism (3) Introduction to the major concepts and practices of Hindu mysticism, including yoga techniques, rites, symbols, and myths. (Identical with RELI 445). May be convened with 545.

451. The United States and East Asia: 1840 to the Present (3) (Identical with HIST 451, which is home). May be convened with 551.

452. Hindu Literature (3) Introduces major literary works with ancient Sanskrit genres. Selections from the Vedas, epics, Puranas and other classics in English translation. May be convened with 552.

464. International Relations of East Asia (3) (Identical with POL 464, which is home). May be convened with 564.

487a-487b. History of East Asian Buddhism (3-3) Buddhism in China, Korea, and Japan with em-
phasis on the relationship between East Asian Buddhist thought and practice and the various historical contexts in which they emerged. (Identical with RELI 487a-487b). May be convened with 587a-587b.

489. Women in East Asia (3) (Identical with HIST 489, which is home). May be convened with 589.

496. Seminar
   c. Special Topics in Asian Studies (3) [Rpt./4]. May be convened with 596c.

498. Senior Capstone Experience (1) [Rpt./2 units]
   Focuses on a senior project and preparation of a portfolio reflecting the student's work in EAS. Discussion format. Two semesters required for majors. P, senior status.

518. Issues in Teaching Asian Languages (3) Issues in second language acquisition and teaching, with emphasis on teaching Asian Languages as foreign/secondary language.

527a. The Prehistory of East Asia (3) (Identical with ANTH 527a, which is home). May be convened with 427a.

545. Hindu Mysticism (3) For a description of course topics see 445. Graduate-level requirements include two research papers or reports approved by the instructor. May be convened with 445.

551. The United States and East Asia: 1840 to the Present (3) (Identical with HIST 551, which is home). May be convened with 451.

552. Hindu Literature (3) For a description of course topics see 452. Graduate-level requirements include submission of a graduate paper or presentation on a subject approved by the instructor. May be convened with 452.

564. International Relations of East Asia (3) (Identical with POL 564, which is home). May be convened with 464.

587. Testing and Evaluation in Foreign/Second Language Programs (3) (Identical with GER 587, which is home).

587a-587b. History of East Asian Buddhism (3-3)
    For a description of course topics see 487a-487b. Graduate-level requirements include assigned readings in primary Chinese or Japanese sources and in modern Chinese and/or Japanese secondary sources, together with a research paper based in part on such sources. May be convened with 487a-487b.

589. Women in East Asia (3) (Identical with HIST 589, which is home). May be convened with 489.

595. Colloquium
   a. Masters Colloquium (1)

596. Seminar
   a. Topics in East Asian Buddhism (3) P, reading knowledge of Chinese and/or Japanese, EAS 487a-487b/587a-587b or the equivalent.
   c. Special Topics in Asian Studies (3) [Rpt./4] May be convened with 496c.

695. Colloquium
   g. Advanced Studies in Asian History (3) [Rpt./3] (Identical with HIST 695g, which is home).

**CHINESE STUDIES (CHN)**

101. Elementary Chinese (5) CDT Introduction to modern spoken and written Chinese (Mandarin).


310. Taotist Traditions of China (3) Intellectual 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) Early poetry and classical prose.

375. History of China (3) Historical development of China. To 750 A.D. (Identical with HIST 375).


415-416-417-418. Advanced Modern Chinese (3-3-3-3) Study of advanced modern (Mandarin) Chinese through (415) readings in social science texts, (416) composition, (417) readings in modern literature, and (418) conversation. P, 402 or consent of instructor. May be convened with 515, 516, 517, and 518, respectively.

419. Linguistic Structure of Modern Chinese (3) 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 519.

420. Linguistic Structure of Modern Chinese (3) Linguistic study of the phonological, morphological, and syntactic systems of modern Chinese, with particular attention to linguistic analysis. P, 419. (Identical with LING 420). May be convened with 520.


427b. The Archaeology of Pre-Han China (3) (Identical with ANTH 427b, which is home). May be convened with 527b.


430. Law in Traditional China (3) 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 530.

440. Chinese Calligraphy (2) [Rpt.] Theory, practice, and aesthetics of Chinese brush writing, with emphasis on individual training and development. May be convened with 540.


460. Modern Chinese Foreign Relations (3) (Identical with POL 460). May be convened with 560.

468. Women in China (3) Analysis of the role of women in Chinese society with equal emphasis on traditional and modern periods. (Identical with W S 468, which is home). May be convened with 568. Writing-Emphasis Course.*


476. Modern China (3) (Identical with HIST 476). May be convened with 576.

482. Social History of China (3) 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. (Identical with HIST 482). May be convened with 582. Writing-Emphasis Course.*


484. Confucianism: The Neo-Confucian Tradition (3) (Identical with RELI 484). May be convened with 584.

495. Colloquium
519. Linguistic Structure of Modern Chinese (3) For a description of course topics see 419. Graduate-level requirements include two presentations and one term paper. (Identical with LING 519). May be convened with 419.

520. Linguistic Structure of Modern Chinese (3) For a description of course topics see 420. Graduate-level requirements include two presentations and one term paper. (Identical with LING 520). May be convened with 420.


522. Literary Chinese (3) For description of course topics see 422. Graduate-level requirements include additional assignments relating to translation skill and research methodology. P, 402. May be convened with 422.

523. Readings in Classical Chinese Philosophical Texts (3) [Rpt.] For description of course topics see 423. Graduate-level requirements include additional assignments relating to translation skill and research methodology. P, 422/522. May be convened with 423.

527b. The Archaeology of Pre-Han China (3) (Identical with ANTH 527b, which is home). May be convened with 427b.

529. Chinese-American Literature 1960 - Present (3) For a description of course topics see 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 Chinese literature, literary theory or Asian studies, as well as familiarity with the relevant research tools. (Identical with ENGL 529). May be convened with 429.

530. Law in Traditional China (3) For a description of course topics see 430. Graduate-level requirements include additional assignments relating to translation, grammar, and readings in modern Japanese. P, 402. May be convened with 415, 416, 417, and 418, respectively.


547. Readings in Classical Chinese Prose (3) [Rpt./2] 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, 422/522.

550. Studies in Modern Chinese (3) [Rpt.] For description of course topics see 450. Graduate-level requirements include an additional class presentation and a translation project of an essay of over 1500 words. May be convened with 450.

560. Modern Chinese Foreign Relations (3) (Identical with POL 560). May be convened with 460.

568. Women in China (3) For a description of course topics see 468. Graduate-level requirements include a 15-page term paper. May be convened with 468.

575a-575b-575c-575d-575e. Periods in Chinese History (3-3-3-3-3) [Rpt.] For description of course topics see 475a-475b-475c-475d-475e. Graduate-level requirements include a bibliographical survey, reports, and a term paper similar to that required in a preliminary doctoral exam. (Identical with HIST 575a-575b-575c-575d-575e). May be convened with 475a-475b-475c-475d-475e.

576. Modern China (3) (Identical with HIST 576, which is home). May be convened with 476.

582. Social History of China (3) For a description of course topics see 482. Graduate-level requirements include an extra term paper. (Identical with HIST 582). May be convened with 482.

583. Confucianism: The Classical Period (3) May be convened with 483. (Identical with RELI 583).

584. Confucianism: The Neo-Confucian Tradition (3) (Identical with RELI 584). May be convened with 484.


JAPANESE STUDIES (JPN)


144. Japanese Humanities (3) An introductory exploration of religion, literature, art and language in Japan through primary texts in translation. Enrollment limited to freshmen and sophomores.

(Identical with RELI 144).


220. Japanese Religion (3) Introduction to texts, images and activities, both historical and contemporary, that comprise Japanese religion. (Identical with RELI 220).

245. Popular Culture in Japan (3) Introduction to contemporary Japanese popular culture through study of literature, theater, entertainment, advertising, film and other fields.

272. Japanese Civilization (3) The study of the evolution of Japanese social values, aesthetic expression, religion and political institutions in order to understand Japan's cultural heritage and contemporary society. (Identical with HIST 272, which is home).

310. Japanese Literature and War (3) Experiences of Japanese men and women in the second world war as portrayed in short stories, novels, and poetry written in Japan since the end of the war. All readings done in English translation. Writing-Emphasis Course.*

336. History of Japanese Film (3) (Identical with M AR 336, which is home).


411. Introduction to Japanese Linguistics (3) Phonology, morphology, syntax, pragmatics, and sociolinguistics of the Japanese language. P, 202 or instructor's permission. (Identical with LING 411): May be convened with 511. Writing-Emphasis Course.**


421. Advanced Readings in Japanese (3) [Rpt.] Reading and discussion in Japanese of a variety of advanced-level materials, including newspaper articles, short stories, and poetry. P, 416 and consent of instructor. May be convened with 521.

422. Advanced Readings in Japanese (3) [Rpt.] Reading and discussion in Japanese of a variety of advanced-level materials, including newspaper articles, short stories, and poetry. P, 421 and consent of instructor. May be convened with 522.

423. Japanese Aesthetics (3) Literary and art theories in Japan since the 8th century. Readings in English translation.


446a-446b. Classical Japanese Literature (3-3) Survey of classical Japanese literature, with readings in English translation. 446a: Ancient and medieval, to 1600. 446b: Tokugawa and Meiji, 1600-1900. May be convened with 546a-546b. Writing-Emphasis Course.


474a-474b-474c. History of Japan (3-3-3) (Identical with HIST 474a-474b-474c, which is home). May be convened with 574a-574b-574c.

495. Colloquium b. Japan (3) [Rpt./2] May be convened with 595b.


*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

502. Gender and Language in Japan (3) For a description of course topics see 402. Graduate-level requirements include additional readings and reports. (Identical with LING 502 and W 502). May be convened with 402.

505. Classical Japanese (3) 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 416/516 or consent of instructor.

511. Introduction to Japanese Linguistics (3) For a description of course topics see 411. Graduate-level requirements include a substantial term paper and a class presentation based on that paper. (Identical with LING 511). May be convened with 411.

512. Advanced Japanese Linguistics (3) For a description of course topics see 412. Graduate-level requirements include a substantial term paper and a class presentation based on that paper. P, 411/511. (Identical with LING 512). May be convened with 412.

515. Advanced Japanese (3) For a description of course topics see 415. Graduate-level requirements include a special projects component consisting of reports on aspects of Japanese grammatical idiom. May be convened with 415.

516. Advanced Japanese (3) For a description of course topics see 416. Graduate-level requirements include a special projects component consisting of reports on aspects of Japanese grammatical idiom. May be convened with 416.

517. Business Japanese (3) For a description of course topics see 417. Graduate-level requirements include additional readings, assignments and class presentations. May be convened with 417.

521. Advanced Readings in Japanese (3) [Rpt.] For a description of course topics see 421. Graduate requirements include extra readings and an extra translation project. P, 416/516 or instructor’s permission. May be convened with 421.

522. Advanced Readings in Japanese (3) [Rpt.] For a description of course topics see 422. Graduate-level requirements include extra readings and an extra translation project. P, 421/521. May be convened with 422.

536. Japanese Sociolinguistics (3) For a description of course topics see 436. Graduate-level requirements include extra readings, class presentations, and a substantial term paper. P, 202 consent of instructor. (Identical with LING 536). May be convened with 436.

546a-546b. Classical Japanese Literature (3-3) For a description of course topics see 446a-446b. Graduate-level requirements include an extra seminar meeting a week, additional readings, and a research paper. P, 416/516 or consent of instructor. May be convened with 446a-446b.

547a-547b. Modern Japanese Literature (3-3) For a description of course topics see 447a-447b. Graduate-level requirements include additional readings and a research paper. P, 416/516 or consent of instructor. May be convened with 447a-447b.

574a-574b-574c. History of Japan (3-3-3) (Identical with HIST 574a-574b-574c, which is home). May be convened with 474a-474b-474c.

595. Colloquium b. Japan (3) [Rpt./2] May be convened with 495b.


696. Seminar r. Japanese History (3) [Rpt.] (Identical with HIST 696r, which is home).

ENGLISH (ENGL)
Modern Languages Bldg., Rm. 445
The University of Arizona
PO Box 210067
Tucson, AZ 85721-0067
(520) 621-1836; FAX: (520) 621-7397
e-mail: ckiesel@ccit.arizona.edu
http://w3.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
Creative Writing (B.A., M.F.A.)
English (B.A., M.A., Ph.D.)
B.A. Options: American literature
British literature
language & literature
literature & composition

English as a Second Language (M.A.)
Rhetoric, Composition and the Teaching of English (Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements (APRRs) for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/onclick/aprr.html.

For academic program requirements for graduate degrees, 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 Words (3) (Identical with LING 222, which is home).

230. Introduction to African Literature (3) (Identical with AFAS 230, which is home).

231. Shakespeare’s Major Plays. (3) A close reading of six to eight plays, including a comedy, a history, a tragedy, and a tragicomedy.

248a-248b. Introduction to Folklore (3-3) 248a: Forms of verbal folklore; 248b: non-verbal folklore and material culture. (Identical with AIS 248a-248b; CCLS 248a-248b; ANTH 248a-248b).

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

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-251b-251c. Western Civilization, Literary Perspectives (3-3-3) 251a: Ancient Visions. A study of man and woman and their struggle in literature to find patterns and methods for self-completion. 251b: Middle Ages through Enlightenment. Continued study of western man and woman in literature. 251c: 19th and 20th Centuries. Continued study of western man and woman in modern literature. Courses need not be taken in sequence.

255. Introduction to the English Language (3) 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) Intensive study of selected works by major British writers.

261. Modern Literature (3) Readings in modern fiction, drama, and poetry.

265. Major American Writers (3) Intensive study of selected works by major American writers.

267. Continental Literature (3) 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) 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.

277. Eroticism and Love in the Middle Ages (3) (Identical with GER 277, which is home).

278. American Indian Literature. (3) Works by and/or about American Indian Writers. (Identical with AIS 278).


285. Introduction to Humanities Computing (3) (Identical with GER 285, which is home).

290. Politics and the Novel (3) (Identical with POL 290, which is home).

295. Colloquium
- a. British Life and Culture (3).
- q. 10Q4 Creativity: A Class in Self Expression (3) GRD (Identical with HUMS 295q, which is home).

300. Literature and Film (3) Comparative study of literature and cinema as aesthetic media.

301. Creative Nonfiction Writing (3). P. 207 or 210 or 306, and consult department before enrolling.


308. Technical Writing (3) Analysis and presentation of scientific and technical information. P. 102.

309. Poetry Writing (3) Practice in writing poetry. P. 209.

310. Studies in Literary Genre (3) [Rpt./1] 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) (Identical with LING 322, which is home).

342. Writers, Women and the Gods: The Caribbean Novel (3) (Identical with AFAS 342, which is home).

355. English Sociolinguistics (3) 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. 255 or introductory course in linguistics.

370a-370b. English Literature (3-3) A survey, with emphasis on major writers in their literary and historical contexts. 370a: From Old English to Renaissance literature. 370b: From Restoration to modern literature. 370a is not prerequisite to 370b. Both 370a and 370b are offered each semester.

371a-371b. American Literature (3-3) A survey, with emphasis on writers in their literary and historical contexts. 371a: From the Revolutionary Period to 1900. 371b: From 1900 to the present.

380. Literary Analysis (3) Introduction to the various modes, techniques, and terminology of practical criticism.

397. Workshop
- a. Writing Workshop (1) [Rpt./3 units] P, for stu-
dents whose performance on the upper-division writing-proficiency examination is unsatisfactory.

b. Writing Workshop for International Students (1) [Rpt./3 units] P, for international students whose performance on the upper-division writing-proficiency examination is unsatisfactory.

400. Themes in Literature and Film (3) [Rpt.] Special topics or themes in literature and film. (Identical with M AR 400).

401. Advanced Creative Nonfiction Writing (3) [Rpt./24 units] P, 301 or 306, and consult department before enrolling. Writing-Emphasis Course for creative writing majors.* May be convened with 501.


403. History of the English Language (3) 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 503.

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, 405. May be convened with 504.

405a-405b. Advanced Composition for International Students (3-3) Advanced Composition for International Students. May be convened with TTE 405b. May be convened with 505.


413. Poetry in Forms (3) Explores prosody through discussing and writing of forms and types, research paper. P, 309. May be convened with 513.

414. Advanced Scientific Writing (3) Preparation of professional literature for publication. May be convened with 514.


416. Advanced Literary Analysis (3) What literature is and does, as exposed in theories of writing and in literary works.

418. Women and Literature (3) [Rpt./1] 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).

419a-419b. Non-fiction Prose (3-3) 419a: The essay in English. 419b: Other prose forms. P, upper-division standing.

420. Studies in the Bible as Literature (3) Both the Old and New Testaments of the Bible as literature, legendary and historical narratives, and poetry. P, upper-division standing (Identical with RELI 420).

421. American English (3) 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, 405 or introduction to linguistics. May be convened with 521.

422. Studies in Southeast Literature (3) (Identical with AIS 424). May be convened with 522.

422a-422b. Old English (3-3) 422a: Introduction to the language and literature. 422b: Beowulf. Study of the poem in the original language. P, 425a or equivalent. (Identical with GER 422a-422b). May be convened with 522a-522b.

426. Medieval English Literature (3) Survey of Old and Medieval English literature (exclusive of Chaucer), with some use of modernized or glossed versions. May be convened with 526.

427. Chaucer (3) The Canterbury Tales and other poems, read in Middle English. May be convened with 527.

429. Chinese-American Literature 1960 - Present (3) (Identical with CHN 429, which is home). May be convened with 529.

431a-431b. Shakespeare (3-3) 431a: Twelve comedies, histories and tragedies from the period 1590-1600 (including Hamlet). 431b: Ten comedies, tragedies and tragical comedies from the period 1601-1613. 431a is not prerequisite to 431b.

432. Renaissance Drama (3) Critical and historical study of Marlowe, Kyd, Jonson, Greene, Dekker, Webster, Heywood, and other contemporaries of Shakespeare.

434a-434b. Renaissance Literature (3-3) 434a: Critical and historical survey of major authors, including More, Skelton, Wyatt, Sidney, and Spenser. 434b: Bacon and Hobbes; Ben Jonson and his Tribe; Donne and the metaphysicals; Milton.

443. Mexican-American Literature in English (3) 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 standing. May be convened with 543.

444. Milton (3) Survey of Milton's English poetry, with emphasis on Paradise Lost.

445. Introduction to TESL: An Overview (2) 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 545.

446. Restoration Drama (3) Critical and historical study of major plays from Dryden to Sheridan (1660-1780).

448. The Theory and Practice of Writing (3) (Identical with FREN 448, which is home). May be convened with 548.

449. Folklore (3) Forms of verbal and non-verbal folklore and material culture. (Identical with AIS 449 and CCLS 449).


454. Irish Revolutionary Literature (3) (Identical with HUMS 454, which is home).

458a-458b. The English Novel (3-3) 458a: Defoe, Richardson, Fielding, Sterne, Burney, and Austen. 458b: Scott, the Brontes, Dickens, Thackeray, Eliot, Trollope, and Hardy.

460a-460b. Romantic Literature (3-3) 460a: Focus on the “older” Romantics: William Blake and those born in the 1770s; Wordsworth, Coleridge, Lamb, and others. 460b: Focus on the “younger” Romantics, those born in the 1780s and 90s, particularly Shelley, Keats, Byron, and others. 460a is not prerequisite to 460b.


465. Victorian Literature (3). Major poetry, non-fictional prose, and fiction.

466. Themes in Victorian Literature (3) The impact of science, the sexual revolution, art and ecology, and the Romantic heritage.

470. Literature and Major Philosophers (3) Selected works of literature in connection with particular philosophical statements or problems. An honors section is available. P, Upper-division standing.

472. Modern Fiction (3) American, British, and Continental fiction, with particular attention to the development of characteristically modern techniques.

473a-473b. Modern British Literature (3-3) 473a: Development of British fiction from the late 19th century to the present. 473b: Development of British poetry from the turn of the century to the present.
507. Modern Drama (3) Development of modern drama from 1875 to the present.


509. Literature of the Early Republic (3) Satire, drama, essays, novels, and poetry of the Revolutionary and post-Revolutionary periods; Franklin, Freneau, Crevecoeur, the Connecticut Wits; C.B. Brown, Irving, Cooper. P, upper-division standing.

510. American Romanticism (3) Prose and poetry by Hawthorne, Poe, Emerson, Whitman, Thoreau, and Melville.

511. American Realism (3) The development of realism and naturalism in American literature; Twain, James, Crane, Dreiser, and other writers.

512. Nineteenth Century: Emerson, Thoreau, Melville, others. 484b: The Twentieth Century—James, Fitzgerald, Faulkner, and others.

513. Poetry in Forms (3) [Rpt.] For a description of course topics see 413. Graduate-level requirements include a special topics paper. P, nine units of literature. May be convened with 413.

514. Advanced Scientific Writing (3) For a description of course topics see 414. Graduate-level requirements include an in-depth paper. May be convened with 414.

515. History of the German Language (3) For a description of course topics see 406. Graduate-level requirements include an in-depth research paper. (Identical with GER 505). May be convened with 405.

516. History of the English Language (3) For a description of course topics see 407. Graduate-level requirements include an in-depth research paper. (Identical with GER 525a-525b). May be convened with 425a-425b.

517. Chaucer (3) For a description of course topics see 427. Graduate-level requirements include an in-depth paper. May be convened with 427.

518. Studies in the Restoration and Eighteenth Century (3) [Rpt./1].


520. History of the German Language (3) (Identical with GER 520, which is home).

521. American English (3) For a description of course topics see 421. Graduate-level requirements include additional readings and a special topics paper. P, upper-division standing. May be convened with 421.

522. Studies in Southwest Literature (3) Graduate-level requirements include an additional term paper. (Identical with AIS 524). May be convened with 424.

523a-525b. Old English (3-3) For a description of course topics see 425a-425b. Graduate-level requirements include an in-depth paper. (Identical with GER 525a-525b).

526. Medieval English Literature (3) For a description of course topics see 426. Graduate-level requirements include an in-depth paper. May be convened with 426.

527. Chinese-American Literature 1960-Present (3) (Identical with CHN 529, which is home). May be convened with 429.

530. Advanced Studies in Shakespeare (3).

531. Studies in the Renaissance (3) [Rpt./1].

532. Advanced Studies in Milton (3).

533. Studies in the Restoration and Eighteenth Century (3) [Rpt./1].

534. Mexican-American Literature in English (3) [Rpt./1] For a description of course topics see 443. Graduate-level requirements include an extra paper and leading a class discussion. May be convened with 443.

535. Introduction to TESL: An Overview (2) For a description of course topics see 445. Graduate-level requirements include an in-depth paper. May be convened with 445.

536. Theory and Practice of Writing (3) (Identical with FREN 548). May be convened with 448.

537. Folklore (3-3) 549a: Forms of verbal folklore; 549b: non-verbal folklore and material culture (Identical with AIS 549a-549b, ANTH 549a-549b and CCLS 549a-549b).

538. Modern Theories of Cultural Studies (3) (Identical with CCLS 550, which is home).

539. Contemporary Feminist Theories (3) (Identical with W S 554, which is home).


542. Linguistics and the Study of Literature (3) For a description of course topics see 462. Graduate-level requirements include a greater number of assignments and a higher level of performance. (Identical with CCLS 562 and LING 562). May be convened with 462.

543. Studies in American Indian Literature (3) In-depth study of works by and/or about American Indian writers. (Identical with AIS 577).
585. Linguistics and Computer-Assisted Approaches to Literature (3) [Rpt./8 units] (Identical with GER 585, which is home).

587. Testing and Evaluation in Foreign/Second Language Programs (3) (Identical with GER 587, which is home).

595. Colloquium
a. Professional Studies (1-6) [Rpt./4] Designed for teaching assistants in English. May also be used, at discretion of graduate program directors in English, for other professional training.

596. Seminar
a. British Literature (3) [Rpt./8]
b. Studies in Colonial and Post-colonial Literature and Theory (3) [Rpt./3]
f. American Literature (3) [Rpt./8]
g. Comparative Literature (3) [Rpt./4] (Identical with CCLS 596g)
h. Modern Literature (3) [Rpt./24 units] Open to creative writing majors only.
j. Second Language Acquisition Research (3) [Rpt./4] P, 506
k. Methods and Materials of Literary Research (3) [Rpt./4]
l. Theories of Criticism (3) [Rpt./4]
m. Studies in the Oral Tradition (3) [Rpt./9 units] (Identical with AIS 596m)

601. Workshops
a. Southern Arizona Writing Project (3-9) [Rpt./12 units] (Identical with LRC 597b)
o. The Teaching of English (3) [Rpt./3] (Identical with LRC 597a).
r. Research and Composition (3).

604. Writing Project in Fiction (1-6) [Rpt./24 units] For M.F.A. candidates working toward book-length writing project in fiction.

609. Writing Project in Poetry (1-6) [Rpt./24 units] For M.F.A. candidates working toward book-length writing project in poetry.


613. Methods of Teaching English to Speakers of Other Languages (3) Foundations, theory, and methodology in English as a second language. (Identical with LRC 613).


615. Second Language Acquisition Theory (3) Survey of major perspectives on second language acquisition processes, including interlanguage theory, the Monitor Model, acculturation/pidginization theory, cognitive/connectionist theory, and linguistic universalism. Analysis of research from the different perspectives includes consideration of grammatical, pragmatic, and sociolinguistic dimensions of language learning. P, 506.


693. Internship

696. Seminar
b. Linguistics (2-4) (Identical with GER 696b)
d. History of Rhetoric (3) [Rpt./6]
e. Studies in Rhetoric and Composition (3) [Rpt./6].

FRENCH & ITALIAN (FREN/ITAL)
Modern Languages Bldg., Rm. 549
The University of Arizona
PO Box 210067
Tucson, AZ 85721-0067
(520) 621-7349; FAX: (520) 621-6104
http://www.cok.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
French (B.A., M.A., Ph.D.)
B.A. Options: French literature & culture business French
M.A. Options: French literature Francophone studies literature & pedagogy
Italian (B.A.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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 the French major or minor.) Also see 113, 213.

102. Elementary French II (4) CDT Listening, speaking, reading, and writing; an introduction to the basic structures and vocabulary of French, continuation. P, 101 or placement. (Does not count toward the French major or minor.) Also see 113, 213.

112. Accelerated French I (6) 112 is the equivalent of 101 and 102. Credit is allowed for this course or 101 and 102, but not for both.

113. Intensive French I (4) 113 is the equivalent of 101 and 102. Credit is allowed for this course or 101 and 102, but not both. P, knowledge of another foreign language at the 305b level, or consult department before enrolling. (Note: 113 "Intensive" covers the same materials as 112 "Accelerated," which is offered summer only.)

195. Colloquium
a. Topics in French Culture, Literature, and Language (1)

201. Intermediate French I (4) CDT Continued skill development; reinforcement of basic language skills. P, 102 or placement. (Does not count toward the French major.)

202. Intermediate French II (4) CDT Continued skill development; reinforcement of basic language skills. P, 201 or placement.

212. Accelerated French II (6) 212 is the equivalent of 201 and 202. Credit is allowed for this course or 201 and 202, but not for both.

213. Intensive French II (4) 213 is equivalent to 201 and 202. Credit is allowed for this course or 201 and 202, but not both. P, knowledge of another foreign language at the 305b level, or consult department before enrolling. (Note: 213 "Intensive" covers the same materials as 212 "Accelerated," which is offered summer only.)

245. African Literature in Translation (3) 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 and ENGL 245).

249. Images of Africa (3) 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).

277. Eroticism and Love in the Middle Ages (3) (Identical with GER 277, which is home).

280. Introduction to French Language, Linguistics and Culture (3) 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) French literature in the original and will write assignments in French. Taught in English.
283. Existentialism and the Absurd: The French Foundations (3) 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) Representative masterpieces of French theater from its origins in the Middle Ages to the contemporary. Includes medieval religious and profane 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) (Identical with GER 285, which is home).

305a-305b. Composition and Conversation (3-3) Designed for students who wish to write and speak fluently in everyday idiom; material based on practical current topics. P, 202. Both 305a and 305b are offered each semester.


355. Intensive Composition and Conversation (3) For 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). Offered in Paris program only. P, 204 or two years of college French. Under certain conditions, FREN 355 can be substituted for FREN 375a if a 375a level supplement is taken at the final exam and if a grade of B or better is obtained.


375a-375b. Advanced Composition and Conversation (3-3) Practice in formal writing and formal oral communication. P, 305b. Both 375a and 375b are offered each semester.

396H. Honors Proseminar (3)

401. French Literature of the 19th and 20th Centuries (3) Survey of French literature of the period with focus on major literary genres and intellectual currents since Romanticism. P, 350.

402. French Literature of the 17th and 18th Centuries (3) Survey of French literature of the period with selected readings of major authors, textual analysis and discussion of historical, social and cultural background. P, 350.


414. Teaching of Modern Languages (3) (Identical with TTE 414, which is home).


416. Translation (3) Theory and practice of translation (French/English; English/French). Literary and technical. P, 375b or 370b.

422. Introduction to Romance Philology (3) (Identical with SPAN 422, which is home).

425. Paris: Capsule/Capital of French Cultural History (3) 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, 202 or two years of college French.

430a-430b. French Civilization (3-3) Historical, social, economic, literary, and artistic elements in the development of the French nation. 430a is not prerequisite to 430b. P, 305b.


448. The Theory and Practice of Writing (3) 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 548.


452. French Literature of Quebec (3) Comprehensive study of the most significant literary expression in Quebec. P, 350. May be convened with 552.

453. Culture and Civilization of North Africa (3) Historical, religious, social, literary and artistic influences on the civilization of North Africa. Taught in English. (Identical with RELI 453). May be convened with 553. Does not count toward fulfillment of language requirement or the major or minor in French.


455. Introduction to Romance Philology (3) (Identical with SPAN 455, which is home).

456. Literature of Belgium (3) Historical and the cultural background followed by the literary background in the broader context of French literature. Examines the novel and its different themes, the theater (symbolist, metaphysical, political) and poetry, including the works of Simenon, the world renowned author of detective and psychological novels. Taught in French. P, 350. May be convened with 556.

470. Advanced Grammar and Usage (3) Structural analysis of spoken and written French, with emphasis on structural patterns and attention to contrasts with English. P, 305b.

495. Colloquium a. French Literature—Middle Ages and the 16th Century (3)


510. Introduction to Graduate Study in French Language and Literature (3) Problems and methods of advanced research in French language and literature. Use of specialized library resources and computerized data bases. Issues in the history, sociology, and politics of the professional practice of language and literature study in American universities. Taught in English.

511. Topics in Literary History, Criticism, and Theory (3) [Rpt./3] 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.

512. Introduction to the History of the French Language (3) Taught in English.

516. Literature of the 16th Century (3) [Rpt.] Studies in the French Renaissance, including the theater, fiction, poetry, essay. Analysis of the main literary, artistic, and socio-cultural movements in France during the 16th century—the French Renaissance. P, graduate standing.


518. Literature of the 18th Century (3) [Rpt.] Studies in the French Enlightenment, including theater, fiction; essays. Analysis of the main literary, artistic, and socio-cultural movements in France and in Europe during the 18th century—the French Enlightenment. P, graduate standing.

519. Literature of the 19th Century (3) [Rpt.] Examines various aspects of literary works ranging from poetry, the theater, the novel and critical essays. Studies in French Romanticism and Realism. P, graduate standing.

520. Literature of the 20th Century (3) [Rpt.] Studies in contemporary French literature, including theater, fiction, poetry, essays. Analysis of the main literary, artistic, and socio-cultural movements in France during the 20th century. P, graduate standing.

548. Theory and Practice of Writing (3) For description of course topics see 448. Graduate-level requirements include more theoretical reading and assignments. (Identical with ENGL 548). May be convened with 448.

550. French Literature of Black Africa and the Caribbean (3) For a description of course topics see 450. Graduate-level requirements include more demanding readings and other assignments. May be convened with 450.
552. French Literature of Quebec (3) For a description of course topics see 452. Graduate-level requirements include more demanding readings and assignments. May be convened with 452.

553. Culture and Civilization of North Africa (3) For a description of course topics see 453. Graduate-level requirements include more demanding readings and assignments. Taught in English. May be convened with 453.

554. Francophone Literature of the Maghreb and Lebanon (3) For a description of course topics see 454. Graduate-level requirements include more demanding readings and other assignments. May be convened with 454.

556. Literature of Belgium (3) For a description of course topics see 456. Graduate-level requirements include a term paper written in French. Taught in French. May be convened with 456.

579. Problems in Teaching College French (1-3) Methodology course in lower-division college pedagogy. Discussion of broader issues of language, pedagogy, academic, the history of foreign language education, college teaching as a career.

581. Technology and Foreign Language Learning (3) [Rpt./1] Use of technology to teach foreign languages or a second language. Topics include how computers fit within Second Language Acquisition theories, how to integrate computers in the curriculum, and how to design and implement computer assisted instruction materials.

585. Linguistic and Computer-Assisted Approaches to Literature (3) [Rpt./6 units] (Identical with GER 585, which is home). May be convened with 485.

587. Testing and Evaluation in Foreign/Second Language Programs (3) (Identical with GER 587, which is home).

696. Seminar a. French Language and Literature (3) [Rpt./3]

ITALIAN (ITAL)

101. Elementary Italian I (4) CDT Listening, speaking, reading, and writing; introduction to the basic structures and vocabulary of Italian. (Does not count toward the Italian major or minor.)

102. Elementary Italian II (4) CDT Listening, speaking, reading and writing; an introduction to the basic structures and vocabulary of Italian, continuation. P. 101 or placement. (Does not count toward the Italian major or minor.)

102z. Intensive Elementary Italian (4) P, language major or demonstrated language proficiency.

201. Intermediate Italian I (4) CDT Continued skill development; reinforcement of basic language skills. P, 102 or placement.

202. Intermediate Italian II (4) CDT Continued skill development; reinforcement of basic language skills. P, 201 or placement.

202z. Intensive Intermediate Italian (4) P, language major or demonstrated language proficiency.

305a-305b-305c. Advanced Italian (3-3-3) 305a: Composition and Conversation. Emphasis on improving listening, comprehension, speaking and writing. 305b: Advanced Composition and Conversation. 305c: Business Italian. P, 202 or consult department before enrolling. Counts toward the major or minor in Italian or Italian Studies. Taught in Italian.

330a-330b-330c-330d. Italian Studies (3-3-3-3) Comprehensive study of a particular aspect of Italian culture. 330a: Fascism, Resistance and Reconstruction. 330b: Italian Americana in Fiction and Film: Crossing Oceans. 330c: Italian Cinema and Literature. 330d: Women in Italian Society. 330a, 330b, 330c, 330d all count toward the major or minor in Italian or Italian Studies. Taught in Italian.

400a-400b. Main Currents of Italian Literature (3-3) 400a: The Middle Ages and Renaissance. 400b: The 17th through 20th centuries. P, 202 or consult department before enrolling. Counts toward the major or minor in Italian or Italian Studies. Taught in Italian. May be convened with 500a-500b.

414. Teaching of Modern Languages (3) (Identical with TTE 414, which is home).

420. Italian Civilization (3) Historical, geographical, social, and artistic aspects of the development of the culture of Italy. Offered only in Florence, Italy. P, 202.

430. Renaissance Studies (3) Taught in English. On-site study of the birth and development of the Italian Renaissance with emphasis on Florence. Offered only in Florence, Italy.

455. Introduction to Romance Philology (3) (Identical with SPAN 455, which is home).

500a-500b. Main Currents of Italian Literature (3-3) 500a: The Middle Ages and Renaissance. 500b: The 17th through 20th centuries. Graduate-level requirements include more demanding readings and other assignments. P, 202. May be convened with 400a-400b.

201. Beginning German I (4) CDT

202. Beginning German II (4) CDT

111. Beginning Intensive German (6) CDT


201. Beginning German III (4) CDT Speaking, understanding, writing, and reading. German. P, 102, or 111.


203. Intensive Intermediate German (8) 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 contingent upon personal interview and an exam given in the first week of class. 8R, 2L. P, honors program requirements; consult department before enrolling.

211. Intermediate Intensive German (6) CDT

272. Staging Twentieth-Century Germany (3) Explores the many changes in German society during the past century through the lens of twentieth-century German plays and theater productions.
274. Dialogue of the Sexes: Women and Men in German Society (3) 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.

275. Creative Minds: The German Classical Heritage (3) 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.

277. 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 277, FREN 277, and SPAN 277).

278. Medieval Answers to Modern Questions (3) Discussion of essential texts from the Middle Ages which offer fundamental answers to existential problems people have faced at all times.

279. Religion in German Culture (3) Introduction to expressions and practices of the religious life as found in the works of major German speaking composers, writers, artists, and thinkers. P, freshman composition, junior standing. (Identical with RELI 279).


300. Encounters in Language and Culture (6) Crossing borders and expanding horizons; geographic, thematic, cultural, and disciplinary. Advanced work on speaking, reading, writing, and understanding. P, 204 or equivalent.

301. Voices Past and Present (3) [Rpt./1] 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, 204 or equivalent.

310. Introduction to German Linguistics (3) [Rpt./1] Overview of current topics in the analysis of German, including phonetics/phonemics, morphology, syntax, the lexicon, pragmatics, and sociolinguistics.

311. Dealing with the Past (3) [Rpt./1] Examines how German writers, artists, or filmmakers have sought to come to terms with the past.

312. Tales of Love (3) [Rpt./1] Focuses on a wide range of narratives from various historical periods dealing with representations of love.

313. Studies in Genre (3) [Rpt./1] 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] Development of language and cultural proficiency skills dealing with various aspects of Germany as a world trading partner. Emphasis on practical, career-usable competence.

315. German for Business (3) [Rpt./1] 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] 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) The important films in the development of German cinema of the pre-1945 period and the cinema of the Federal Republic of Germany after 1945 to the present. (Identical with MAR 325).

375. Love, Madness and Decay in fin-de-siècle Vienna (3) 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, freshman composition, junior standing.

376. German-Jewish Writers (3) Focuses on the contributions of Jewish writers to German culture. (Identical with JUS 376).

405. History of the English Language (3) (Identical with ENGL 405). May be convened with 505.

410. The Enlightenment and its Legacies (3) [Rpt./1] 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.

425a-425b. Old English (3-3) (Identical with ENGL 425a-425b, which is home). May be convened with 525a-525b.

430. Crossing Borders/Crossing Cultures (3) [Rpt./1] 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] Ways in which Jews, Judaism, and Jewishness have been represented in German texts. (Identical with JUS 440).

450. Constructions of Identity (3) [Rpt./1] 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) The interrelationship between music and German literature from the 18th through the 20th century. Concentrates on major works of German drama, poetry and prose, and their musical settings. Lectures in English. Readings primarily in English, some German. (Identical with MUS 455). May be convened with 555.

475. Advanced German Usage (3) CDT May be convened with 575.

479. Issues in Foreign Language Teaching Acquisition and Teaching (3) Modern methods of language teaching with emphasis on German as a foreign language. May be convened with 579.

480. Applied Linguistics for German as a Foreign Language (3) Issues in and methods of applied linguistics with emphasis on Germanic languages. May be convened with 580.

494. Practicum a. German Studies (3) [Rpt./1].

496. Seminar a. Translation (3) [Rpt./2].

497. Workshop a. Literature (1-5) [Rpt./5 units]. May be convened with 597a.

500. Intensive Reading German for the Sciences and Humanities (4) 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). Credit for non-majors only. Credit is not available for German majors.

501. Appropriating and Reshaping the Past (3) 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) 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. Erzihlung and Bildung in German Culture (3) 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) (Identical with ENGL 505). May be convened with 405.
506. Representing the “Other” (3) 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) 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 (3-3) An overview of research materials, methods, theories and issues from which individual interests and concentrations in German studies can develop. Provides for the selection of faculty mentors.
509. Traditions and Modernism (3) 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) 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 Middle High and Later German Literatures (3) Explores the way German writers have dealt with basic issues of human communications.
520. History of the German Language (3) Examination of the semantic, socio-historical and structural development of German from the age of migrations to the present. P, 8 units of upper-division German. (Identical with ENGL 520).
525a-525b. Old English (3-3) (Identical with ENGL 525a-525b, which is home).
555. Music and German Literature (3) For a description of course topics see 455. Graduate-level requirements include two oral reports or lectures-recitals on a specific topic. P, 202. (Identical with MUS 555). May be convened with 455.
575. Advanced German Usage (3) CDT For a description of course topics see 475. May be convened with 475.
579. Issues in Foreign Language Acquisition and Teaching (3) For a description of course topics see 479. Graduate-level requirements include an in-depth research paper on an important issue of foreign language teaching. May be convened with 479.
580. Applied Linguistics for German as a Foreign Language (3) For a description of course topics see 480. Graduate-level requirements include an in-depth research paper on an aspect of applied linguistic research. May be convened with 480.
585. Linguistic and Computer-Assisted Approaches to Literature (3) [Rpt./6 units] For a description of course topics see 485. 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 ENGL 585, FREN 585, CLAS 585, LING 585, and RUSS 585). May be convened with 485.
587. Testing and Evaluation in Foreign/Second Language Programs (3) Introduction to fundamental concepts, principles and problems of psychometric measurement relevant to FL/L2 learning. Types of tests and their uses, test construction, analysis and interpretation of results. (Identical with CLAS 587, EAS 587, ENGL 587, FREN 587, RUSS 587, SPAN 587).
594. Practicum
a. Literature (1-5) [Rpt./5 units] P, competency at fourth year undergraduate level or pass departmental placement examination.
b. L2 Acquisition and Teaching (1-5) [Rpt./5 units]
c. Culture (1-5) [Rpt./5 units] P, competency at fourth year undergraduate level or pass departmental placement examination.
d. Linguistics (1-5) [Rpt./5 units] P, competency at fourth year undergraduate level or pass departmental placement examination.
e. Translation (1-5) [Rpt./5 units] P, competency at fourth year undergraduate level or pass departmental placement examination.
596. Seminar
a. Literature (1-5) [Rpt./5 units] P, competency at fourth year undergraduate level or pass departmental placement examination.
b. L2 Acquisition and Teaching (1-5) [Rpt./5 units]
c. Culture (1-5) [Rpt./5 units] P, competency at fourth year undergraduate level or pass departmental placement examination.
d. Linguistics (1-5) [Rpt./5 units] P, competency at fourth year undergraduate level or pass departmental placement examination.
e. Translation (1-5) [Rpt./5 units] P, competency at fourth year undergraduate level or pass departmental placement examination.
597. Workshop
a. Literature (1-5) [Rpt./5 units]. May be convened with 497a.
b. Pedagogy (1-5) [Rpt./5 units]. May be convened with 497b.
c. Culture (1-5) [Rpt./5 units]. May be convened with 497c.
d. Linguistics (1-5) [Rpt./5 units]. May be convened with 497d.
e. Translation (1-5) [Rpt./5 units]. May be convened with 497e.
598. Seminar
a. Literature (2-4) [Rpt.]
b. Linguistics (2-4) (Identical with ENGL 696b, which is home).
c. Culture (2-4) [Rpt.]
d. L2 Acquisition and Teaching (2-4) [Rpt.]
e. Translation (2-4) [Rpt.]
HUMANITIES PROGRAM (HUMS)
Harvill Bldg., Rm. 347
The University of Arizona
PO Box 210076
Tucson, AZ 85721-0076
(520) 621-3933; FAX: (520) 621-1809
e-mail: delauer@u.arizona.edu
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).
Minor
The program offers an undergraduate minor.
For further information on the humanities concentration for the IDS major or the undergraduate minor, contact a Humanities advisor at one of the addresses listed above.
195. Colloquium
a. The Human in Humanities (1) Open to freshmen and transfer students only.
b. Contemporary Nobel Laureates in Literature (1) Open to first-year and transfer students only.
c. Arts and Cultures of the American West (1) Open to first-year and transfer students only.
d. Women in Nationalistic and Political Struggles (1)
245. Race and Ethnicity in the U.S.: A Regional Perspective (3) GRD Interdisciplinary experience focused on cultural and societal diversity in the Southwest and the U.S.-Mexico borderlands. Open to students enrolled in Transfer Summer Institute.
250a-250b-250c. Introduction to Humanities (3-3-3) 250a: Major Ancient Near Eastern and Mediterranean Cultures, from the Sumerian through the early Christian, with emphasis on the Greek and Roman. P, 6 units in first-year composition or CR, ENGL 103H or 104H. 250b: European Culture, from the Medieval Period through the Enlightenment. P, 6 units in first-year composition or CR, ENGL 103H or 104H. (250a is not a prerequisite to 250b.) 250c: The Modern Western World: Eighteenth, Nineteenth and Twentieth Centuries. P, 250a or 250b; or HIST 101 and 102.
260. Intercultural Perspectives (3) Cultural, literary, and artistic expressions of Native, Hispanic, African and Asian Americans. Traces roots in the past with emphasis on modern works. Three of the four groups studied in one semester. P, 6 units in first-year composition or CR, ENGL 103H or 104H.
295. Colloquium
q. 10Q4 Creativity: A Class in Self-Expression (3) (Identical with ENGL 295q). Fee.

307. Spirituality in the Arts (3) Traditional and non-traditional concepts of spirituality are examined in Hopi, African-American, European, and American literature, philosophy, visual art and film. P, 6 units in first-year composition or CR, ENGL 103H or 104H. (Identical with RELI 307).

310. Voyage of Discovery (3) Small group (5-14) travel to cultural centers of Europe to experience major works of art and architecture studied in 250a-250b or 250c and 355. P, 6 units chosen from HUMS 250a, 250b, 250c, 355.

311. New World Voyage of Discovery (3) [Rpt./6 units] Small group travel to cultural and historic sites of the Americas to experience works of art, architecture, dance, and ritual. Study in HUMS 260. P, 260, 307, or 420.Fee.

330. Women in Antiquity (3) (Identical with CLAS 330, which is home).

340. The Humanities and Medicine: An Interdisciplinary Experience (3) 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, 250a or 250b or 250c, and 6 units of English composition.

350. Hindu Mythology (3) (Identical with EAS 350, which is home).

355. Contemporary Complexities (3) [Rpt./1] 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. Emphases vary. P, 3 units of HUMS 250a, 250b, 250c or 260. May be repeated with Humanities Program approval.


380. Nature, the Great Mother, and Woman (3) 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, 250b, 250c, or 260.

391H. Humanities Honors Preceptorship (1-3) [Rpt./6 units] Open to select upper-division Honors undergraduate students interested in gaining teaching, research and/or practical experience in Humanities.

396H. Honors Proseminar (3)

420. From Orality to Literature; Storytelling in Contemporary Literature (3) 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-250b-250c or 260.

451. Science and the Humanities (3) [Rpt./2] 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. Emphases vary. P, 3 units of HUMS 250a, 250b, or 250c. May be repeated with Humanities Program approval.

452. Ancient Egypt: Culture/Language (3) 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) Focus on aesthetic, feminist, social, and political revolution in 20th century Irish literature; complexities of Irish nationalism examined through history, art, and literature. P, 3 units of HUMS 250a, 250b, or 250c. (Identical with ENGL 454).

467. Social Psychology and the Cinema (3) (Identical with PSYC 467, which is home).

RELIGIOUS STUDIES (RELI)

Modern Languages Bldg., Rm. 371
The University of Arizona
PO Box 210067
Tucson, AZ 85721-0067
(520) 621-7416; FAX: (520) 621-3678
http://www.coah.az.edu/rel_studies/rel.html

Baccalaureate degree
Bachelor of Arts (B.A.)

Major
Religious Studies (B.A.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available online at http://www.arizona.edu/academic/oncourse/aprr.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.

120. Comparative Religions (3) An introduction to Jewish, Christian, and Islamic religious ideas and practices and belief-structures achieved by examining the social and religious institutions and individuals through which and by whom they are expressed.

122. Introduction to African/Diaspora Religion and Culture (3) (Identical with AFAS 122, which is home).

126. Greek Mythology (3) (Identical with CLAS 126, which is home).

130. Asian Religions (3) (Identical with EAS 130, which is home).

140. Middle Eastern Humanities (3) (Identical with NES 140, which is home).

142. Chinese Humanities (3) (Identical with CHN 142, which is home).

144. Japanese Humanities (3) (Identical with JPN 144, which is home).

150. The Worlds of Buddhism (3) (Identical with EAS 150, which is home).

220. Japanese Religion (3) (Identical with JPN 220, which is home).

220a-220b. Literature of the Bible. (3-3) (Identical with ENGL 220a-220b, which is home).

225. Introduction to Women and Religion (3) 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) (Identical with PHIL 233, which is home).

245. Existential Problems (3) (Identical with PHIL 245, which is home).

271. The History of Christianity (3) (Identical with HIST 271, which is home).

273. Introduction to Judaism (3) (Identical with JUS 273, which is home).

279. Religion in German Culture (3) P, freshman composition, junior standing. (Identical with GER 279, which is home).


303. Epistles of St. Paul (3) Examination of the religious and cultural background in the Greco-Roman world during the lifetime of St. 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 a Society: Christianity in the Greco-Roman World (3) (Identical with CLAS 306, which is home).
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.

101a-101b. Elementary Russian (4-4) Both 101a and 101b are offered each semester. (The first year of work offered in a foreign language shall not be counted toward a minor.)

120. Russia Today (3) Introduction to contemporary Russian society.

195. Colloquium
a. The Balkans: A Cultural-Historical View (1)

201a-201b. Intermediate Russian (4-4) P, 101b.

205. Reading Scientific Russian (4) Alternate course for 201b for students interested in reading and translating scientific literature. P, 201a.

210. Utopian Visions: Promise and Reality in the 20th Century (3) 20th century literature, art, music, architecture, film, and theater in pre- and post-revolutionary Russia and the emigration.


280. Business Russian Level I (3) Introduction to modern written and spoken Russian with an emphasis on business terminology.

285. Introduction to Humanities Computing (3) (Identical with GER 285, which is home).

293. Internship
a. Business Internship Level I (3)
   b. Business Internship Level II (3)

296. Seminar
a. Language Program in U.S.S.R. I (3) Training in Russian language, literature and culture at St. Petersburg State University. Field trips.

301a-301b. Advanced Grammar and Composition (3-3) P, 201b or 205.

305b. Readings in Russian Texts (3) Reading of original texts, with emphasis on the development of reading skills and the acquisition of passive vocabulary through the study of word formation. P, 201b or 205.


309. Reading Russian Newspapers (2) Reading Russian newspapers in order to develop comprehension of the written word and to build vocabulary.

310. Russian Civilization and Cultural Identity (3) 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 non-majors. Writing-Emphasis Course.*

316. Russian Phonetics and Intonation (1) Practice in Russian language with emphasis on phonetics and intonation of spoken Russian.

328. Women in Russian Literature and Culture (3) 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. The Russian Novel (3) Readings and discussion in English of representative Russian literary works of the 19th century.

350. The Soviet Experiment (3) Readings and discussion in English of representative Russian literary works from the 20th century.

396H. Honors Proseminar (3)

402. Grammar, Morphology and Syntax (5) Introduction to the field of Russian/Slavistics.

405a-405b. Survey of Russian Literature (3-3) 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, 301b or 305b. May be convened with 505a-505b.

406. Survey of Russian Literature (2) An overview of Russian literature with readings from selected authors; discussion in Russian.


408. Conversation and Composition (5) Development of oral communication skills through various conversational tasks of writing skill through composition.

409. Business Level Russian II (3) 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 Graduate Level (3) P, four years of college level Russian or equivalent.
   b. Business Internship Level III (3)

500. Seminar
b. Russian Literature: 18th Century (3) [Rpt./12 units]
   c. Russian Literature: 19th Century (3) [Rpt./12 units]
   d. Russian Literature: 20th Century (3) [Rpt./12 units]

RUSSIAN & SOVIET STUDIES (RSS)
Modern Languages Bldg., Rm. 340
The University of Arizona
PO Box 210067
Tucson, AZ 85721-0067
(520) 621-7341; FAX: (520) 626-4007
e-mail: gregil@ccit.arizona.edu
http://russian.arizona.edu

Baccalaureate degree
Bachelor of Arts (B.A.)

Major
Russian & Soviet Studies (B.A.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.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.

305. Soviet Economic System (3) (Identical with ECON 305, which is home)
374. The Holocaust (3) (Identical with HIST 374, which is home).
409. Russia and the Former Soviet Union (3) (Identical with GEOG 409, which is home).
421. History of Russia: Early Period (3) (Identical with HIST 421, which is home).
422. History of Russia: Modern Period (3) (Identical with HIST 422, which is home).
423. Intellectual History of Russia (3) (Identical with HIST 423, which is home).
424. The Russian Revolutions (3) (Identical with HIST 424, which is home).
425. History of the Soviet Union (3) (Identical with HIST 425, which is home).
433. Soviet and Post-Soviet Politics (3) (Identical with POL 443, which is home). May be convened with 543.
451. Soviet and Post-Soviet Foreign Policy (3) (Identical with POL 451, which is home).
496. Seminar
543. Soviet and Post-Soviet Politics (3) (Identical with POL 443, which is home). May be convened with 443.

SPANISH & PORTUGESE (SPAN/PORT)
Modern Languages Bldg., Rm. 545
The University of Arizona
PO Box 210067
Tucson, AZ 85721-0067
(520) 621-3123; Fax: (520) 621-6104
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
Portuguese (B.A.)
Spanish (B.A., M.A., Ph.D.)
B.A. specializations: language & culture
Hispanic language & linguistics
M.A. emphases: literature
language & linguistics

Program Requirements
For academic program requirements for undergraduates, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

SPANISH (SPAN)

101. First Semester Spanish (4) GRD Oral approach. For the student with no previous experience in Spanish.


111. The Arts and Politics in Latin America (3) 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.

195. Colloquium
a. Topics in Spanish Culture, Literature and Language (1).

201. Second Year Spanish (4) CDT Credit allowed for 201 or 203, but not for both. P, 102 or placement by exam.

202. Second Year Spanish (4) GRD Credit allowed for 202 or 333, but not for both. P, 201 or placement by examination.

203. Writing and Oral Skills for the Native Speaker of Spanish (4) Designed for students who learned most of their Spanish in a home environment. Introduces students to written Spanish. (Students receiving credit for 203 will not receive credit for 202, but can receive credit for 201.) This course fulfills the University's foreign language requirement.

204a-204b-204c. Intensive Spanish (8-8-8) Offered in Guadalajara only. 204a is the equivalent of 101 and 102. 204b is the equivalent of 102 and 201. 204c is the equivalent of 201 and 202. P, recommended for highly motivated students and/or those with experience in another Romance language.

205. Intensive Spanish (4) 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) 206 is the equivalent of 201 and 202. Recommended for highly motivated students and/or those with experience in another Romance language. P, 205.

212. Latin America on Film (3) 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.


251. Intermediate Spanish (3) CDT Combines all forms of language skills (speaking, reading, writing, and comprehension) with intermediate grammar. Credit is allowed for this course or 253, but not both. P, 202.

253. Intermediate Spanish for the Native Speaker (3) 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.)

277. Eroticism and Love in the Middle Ages (3) (Identical with GER 277, which is home).

285. Introduction to HumanitiesComputing (3) (Identical with GER 285, which is home).

305. Intensive Spanish, Fifth and Sixth Semesters (6) GRD Offered in Guadalajaran 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, 204. Credit allowed for this course or 325, but not for both.

323. Intermediate Grammar and Writing for the Native Speaker (3) 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, 251/253.

325. Intermediate Grammar and Writing (3) Essential points of grammar, with emphasis on syntax and development of writing skills. P, 251.


333. Intermediate Composition and Conversation for the Native Speaker (3) For the 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.)


343. Phonetics for the Native Speaker (3) For native speakers of Spanish. Basics of Spanish 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, 203.

400. Survey of Spanish Literature (3) Introduction to Spanish literature from the Middle Ages to the contemporary period. P, 350.


403. Mexican and Mexican-American Literature (3) 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, 350. (Identical with LA S 403, and MAS 403).

414. Teaching of Modern Languages (3) (Identical with TTE 414, which is home).


436. Readings in Spanish Prose from the Middle Ages through the Twentieth Century (3) Readings in Spanish prose from the Middle Ages through the twentieth century. P, 350.

437. Spanish Theater (3) Spanish theater selections from the middle ages through the twentieth century. P, 400.


446. Mexican and Mexican-American Theater (3) Major works by Mexican and Mexican-American dramatists from the Colonial period through the twentieth century P, 350. (Identical with LA S 446 and MAS 446).


449. Topics in Spanish, Spanish-American, Mexican and Mexican-American Literature (3) [Rpt.] Monographic, generic, work or author courses in any area of Spanish, Spanish-American, Mexican or Mexican-American literature. P, 350.

450. Conversation and Writing Skills (3) Study and practice in formal and informal usage of Spanish as oral communication. P, 330, 333.


455. Introduction to Romance Philology (3) Introduction to the diachronic study of the major Romance languages in their phonologic and syntactic development from the Latin language. (Identical with FREN 455, ITAL 455, and PORT 455).


473. Spanish for the Classroom Teacher of Spanish (3) Practical Spanish for the elementary and secondary school subject-matter teacher who uses Spanish as the medium of instruction. P, 253/251 or 325/323 or 330/333. (Identical with MAS 473).

501. Introduction to Hispanic Studies (3) Broad view of fields of research, faculty and courses to familiarize students with some practical aspects of graduate studies, issues that pertain to specific fields of research and questions currently being debated across the profession.

510. Development of Spanish Medieval, Renaissance, and Golden Age Literature (3) Spanish medieval, renaissance, and golden age literature (short fiction, poetry, novel and drama) from the twelfth through the seventeenth century.

511. Topics in Medieval Literature, Renaissance, and Golden Age Literature (3) (Rpt./3 when topic varies) Representative topics include: the development of lyric verse; Mester de Clericia, art of the Jugar; the Romanecero; the development of prose; renaissance and baroque prose or verse; Cervantes; Golden Age drama; picaresque novel.


521. Topics in Eighteenth, Nineteenth and Twentieth-Century Spanish Literature (3) [Rpt./3 when topic varies] 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) 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 when topic varies] Representative topics include pre-Columbian Aztec, Mayan, and Maya-Quiche literature; the chronicle; Renaissance and baroque poetry.


541. Topics in Spanish American Nineteenth and Twentieth Century Literature (3) [Rpt./3 when topic varies] Representative topics include: nineteenth-century Hispanic-American prose fiction; modernism; modern Hispanic-American prose fiction; modern Hispanic-American poetry; contemporary Hispanic-American prose fiction; contemporary Hispanic-American poetry; modern and contemporary Hispanic-American theater; trends in the Hispanic-American short story.

551. Topics in Mexican and Mexican-American Literature (3) [Rpt./3 when topic varies] Representative topics include: novel of the Mexican revolution; trends in Mexican and Mexican-American films; trends in contemporary Mexican literature; Mexican American prose fiction since 1965; trends in Mexican-American theater; major movements and authors of Mexican-American literature.

561. Topics in Hispanic Literature (3) [Rpt./3 when topic varies] Representative topics include Hispanic women writers; U.S. Hispanic literature; trends in modern and contemporary Spanish film; trends in modern and contemporary Hispanic American film.

571. Topics in Literary Theory and Criticism (3) [Rpt./3 when topic varies] Topics include historical overview of major developments in literary theory and criticism with theoretical and critical analysis of Hispanic texts.

574. Linguistic Perspectives on Mexican-American Spanish and Bilingualism (3) For a description of course topics see 474. Graduate-level requirements include two examinations and a tape analysis. P, 340. (Identical with LING 574 and MAS 574). May be convened with 474.

580. Introduction to Hispanic Linguistics (3) 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) 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) 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.

587. Testing and Evaluation in Foreign/Second Language Programs (3) (Identical with GER 587, which is home).

696. Seminar a. Spanish Peninsular Literature (3) [Rpt./3] b. Spanish American Literature (3) [Rpt./3] c. Mexican and Mexican American Literature (3) [Rpt./3] d. Hispanic Linguistics (3) [Rpt./3]

PORTUGUESE (PORT)

101. First Semester Portuguese (4) GRD Communicative approach, emphasis on all language skills. Recommended for students with no previous experience with the language.

102. Second Semester Portuguese (4) GRD Communicative approach, emphasis on all language skills. P, 101 or the equivalent.

195a. Topics in Portuguese Culture, Literature, and Language (1)

205. Intensive Portuguese (4) 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, 205 or 101 and 102.

206. Intensive Portuguese (4) Communicative approach, emphasis on all language skills. Recommended for highly motivated students or those with experience in another Romance language or the equivalent. P, 206 or the equivalent. (Identical with LA S 325).

325. Intermediate Grammar and Writing (3) 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, 206 or the equivalent. (Identical with LA S 430).

350. Introduction to Genres and Literary Analysis (3) Introductory course in literary reading and analysis based on texts from the Portuguese-speaking countries. P, 206 or the equivalent.

397. Workshop r. Portuguese Language Skills and Culture (4) Offered only in Fortaleza, Brazil. P, 206 or the equivalent.

401. Luso-Brazilian Literature to 1900 (3) 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 Príncipe) from the beginning of their literature to 1900. P, 325 or the equivalent. May be convened with 501.


414. Teaching of Modern Languages (3) (Identical with TTE 414, which is home).

425. Advanced Grammar, Composition and Writing Skills (3) 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, 325 or the equivalent.

430. Brazilian Civilization (3) 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, 325 or the equivalent. (Identical with LA S 430). May be convened with 530.

431. Civilization in the Portuguese-Speaking World (3) Cross-cultural examinations of the Portuguese-speaking world (Brazil, Portugal, Angola, Cape Verde, Mozambique, Guinea-Bissau, Porto Príncipe). Topics include: colonization and decolonization, religion, music, dance, painting, architecture. P, 325 or the equivalent (Identical with LA S 431). May be convened with 531.

449. Brazilian Literature in Film (3) Presentation of the masterpieces of Brazilian literature and the great films based upon them. P, 325 or the equivalent. (Identical with LA S 449). May be convened with 549.

455. Introduction Romance Philology (3) (Identical with SPAN 455, which is home).

463. Topics in Luso-Brazilian Literature (3) Major works, authors and tendencies in the literature of the Portuguese speaking countries (Brazil, Portugal, Angola, Cape Verde, Mozambique, Guinea-Bissau, Porto Príncipe). P, 325. (Identical with LA S 463). May be convened with 563.

501. Luso-Brazilian Literature to 1900 (3) For a description of course topics see 401. Graduate-level requirements include a 20-page paper and an oral presentation. P, 325 or the equivalent. May be convened with 401.

530. Brazilian Civilization (3) For a description of course topics see 430. Graduate students required to write four research papers and give one lecture on a topic of his/her choice. May be convened with 430.

531. Civilization in the Portuguese-Speaking World (3) For a description of course topics see 431. Graduate-level requirements include a twenty-page paper and an oral presentation. P, 325 or the equivalent. (Identical with LA S 531). May be convened with 431.

549. Brazilian Literature in Film (3) For a description of course topics see 449. Graduate-level requirements include an in-depth research paper. P, 325 or the equivalent. (Identical with LA S 549). May be convened with 449.

563. Topics in Luso-Brazilian Literature (3) For a description of course topics see 463. Graduate-level requirements include additional research and reports. (Identical with LA S 563). May be convened with 463.
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690. Law Office Management and Technology (3)

695. Colloquium
a. The Jurisprudence of Gender and Race (2) (Identical with W S 695b).
d. Supreme Court in the History of the United States (1)
ee. Judicial Clerking Program (1-2)
f. ASUA/Legal Aid Interviewing Program (1)
g. High School Teaching Program (1)
h. Florence Immigrant and Refugee Rights Project (2-3)
i. Ares Fellows (1-2) [Rpt.]
l. Civil Rights Law (2)
m. Commodities Regulation (3)

696. Seminar
c. Clinical Practice (3-4) P, 608, 609.
d. Tribal Law Clinic (4-4)
f. Legal Ethics (3)
g. International Investment and Technology Transfer (2)
h. Sports Law (2)
i. International Environmental Law (3)
j. International Trade Law (3)
k. Advanced Writing Seminar (3)
o. Therapeutic Jurisprudence (2)
p. Tax Policy (3)
q. Information Technology and the Judicial System (3)
t. Problems in Corporate Litigation (2) P, 616.
u. Constitutional Values in Public School Settings (2)
w. Regulated Industries (3)
y. Air Pollution Seminar (2)
z. AIDS and the Law (2)

COLLEGE OF MEDICINE
Arizona Health Sciences Center, Rm. 2209
The University of Arizona
PO Box 210201
Tucson, AZ 85721-0201
Phone: (520) 626-6214; FAX: (520) 626-4884
http://www.ahsc.arizona.edu/com.shtml

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
Cancer Biology (Ph.D.)
Cell Biology and Anatomy (M.S., Ph.D.)
Medicine (M.D.)
Microbiology and Immunology (M.S., Ph.D.)
Pharmacology and Toxicology (Ph.D.)
Physiological Sciences (M.S., Ph.D.)
Public Health (M.P.H.)

Undergraduate programs
The School of Health Professions, located within the College of Medicine, offers three undergraduate degrees. For more information about those degrees, see the schools section of this manual.

Graduate programs
For information about graduate degrees, consult the departments section of the Graduate Catalog, or contact the college at one of the addresses listed above.

Premedical requirements, application and admission
Requests for application material may be obtained from the Admissions Office of the College of Medicine. Information about pre-medical requirements and application materials may be obtained from the pre-med advisor's office, Office of Academic Services, consult the Office of Academic Services, College of Medicine Catalog, or contact the College of Medicine at the address 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.

401. Human Gross Anatomy (3) Survey of the gross structure of the human body. 1R, 6L. Open to pharmacy and selected students. (Identical with PCOL 401).

415. Human Reproductive Biology (3) Structure and function of the human reproductive system with emphasis on physiological mechanisms which regulate fertilization, pregnancy, birth, puberty, reproductive control and reproductive senescence. P, one semester of biology. May be convened with 515.

456. Developmental Biology (3) (Identical with AN S 456, which is home). May be convened with 556.


467. Endocrine Physiology (3) (Identical with PSIO 467, which is home).

502. Principles of Neuroanatomy (4) Cellular elements and recognized subsystems of the mammalian nervous system, with emphasis on general principles of neuroanatomical organization and their functional significance. Not open to premed students. P, 8 units of biological laboratory science; 401; PSYC 302, PSIO 480 desirable. Consult instructor before enrolling. (Identical with PSIO 502, PSYC 502, and SPH 502).

512. Biological Electron Microscopy (4) (Identical with MCB 512, which is home).

515. Human Reproductive Biology (3) For description of course topics see 415. Graduate-level requirements include oral presentations and an in-depth research paper on a selected topic of current interest in reproductive biology. May be convened with 415.

550. Topics in Pigment Cell Biology (2) Selected topics on the development function and control of normal and abnormal pigment cells in various pigmen
tary phenomena. (Identical with MCB 550).

555. Cancer Therapeutics (3) (Identical with CBIO 555, which is home).

556. Developmental Biology (3) (Identical with AN S 556, which is home). May be convened with 456.

557. Experiments in Developmental Biology (4) For a description of course topics see 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. P, 456, CHEM 241b. (Identical with MCB 557). May be convened with 457.

560. Clinical Cancer Biology (1) Explores three areas of clinical cancer biology: Cancer Diagnosis and Pathology, Radiation and Surgical Oncology, and Medical Oncology. A practical experience for non-medical students investigating the
problems of clinical cancer prevention, diagnosis, treatment, and medical management. One on interaction of the students with practicing physician specialists in selected areas of oncology. A minimum of sixteen hours of experience will be provided. Enrollment is limited to three students. P, consent of instructor.

567r. Endocrinology (3) (Identical with MCB 567R).

575. Special Topics in Biological Imaging (2) 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 PSIO 575 and MCB 575).


582. Topics in Neural Development (2) (Identical with NRSC 582, which is home).

583. Topics in Neural Plasticity (2) (Identical with MCB 583, which is home).

584. Cellular Neurobiology (2) Readings and discussions of primary literature on the cellular biology of the synapse. P, consent of instructor and prior course in neurobiology or cell biology. (Identical with MCB 584 and NRSC 584).

588. Principles of Cellular and Molecular Neurobiology (4) (Identical with NRSC 588, which is home).

589. Principles of Systems Neurobiology (4) (Identical with NRSC 589, which is home).


596. Seminar c. Concepts in Cellular Differentiation (2) P, 577 or equivalent (Identical with MCB 596c).

i. Principles in Cellular and Molecular Cardiovascular Biology (3) [Rpt./6 units] (Identical with SURG 596i, which is home).


603. Microscopic Structure (1-3) 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, 601, 602.

604. Gross Human Anatomy (2-6) Comprehensive study of the development and gross structure of the human body or of selected areas of systems. Consent required to enroll; consult instructor before registering.

625. Human Neuroscience (6) (Identical with MED 625, which is home).

696. Seminar a. Departmental Seminar (1) [Rpt./14] Open to majors only.
b. Student Seminar (1) [Rpt./4] Open to majors only. Consult instructor before registering.


700. Laboratory Rotation (3) [Rpt./6 units] Rotations in the research laboratories of faculty in the Department of Anatomy. 10L. Consult instructor before registering.

800. Research (3-6) 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) 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) Morphological organization of the human central nervous system. (Identical with MCB 825, which is home).

MEDICINE (MED/ANES/F CM/ MEDI/NEUR/OB G/OPH/PATH/ PED/ PSY/RONC/RADI/SURG)
Arizona Health Sciences Center, Rm. 2107
College of Medicine
The University of Arizona
PO Box 245026
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(520) 626-6518; FAX: (520) 626-4884
e-mail: cflint@u.arizona.edu
http://www.ahsc.arizona.edu/com.shtml

Professional degree
Doctor of Medicine (M.D.)

Program Requirements
For academic program requirements for graduate degrees, consult the College of Medicine 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.

INTERDEPARTMENTAL (MED)

501. Preparation for Clinical Medicine (12) P, formal admission to the Ph.D./M.D. program and consent of the course director.

505. Social and Behavioral Science (6) P, formal admission to the Ph.D./M.D. program and consent of the course director.

596. Seminar d. Medicine and Literature: The Human Perspective (2)

I. Comprehensive Cancer Care (1) [Rpt./1] (Identical with RONC 5961, 896).

m. Mind: Body and Behavioral Health (2) [Rpt./1]

n. Research Methods for Clinical and Epidemiological Studies (2)


696. Seminar a. Introduction to Forensic Pathology (2) P, PATH 801 or consent of instructor.

801. Preparation for Clinical Medicine (12).

805. Social and Behavioral Science (6).


830. Supplementary Registration (1-9)

896. Seminar a. Introduction to Forensic Pathology (2) P, PATH 801 or consent of instructor.

b. Physical and Biological Basis of Nuclear Medicine (2)

d. Medicine and Literature: The Human Perspective (2)

f. Epidemiologic Investigations of Infectious Diseases (2) P, 3rd year medical school.

g. Epidemiologic Investigations of Chronic Diseases (2) P, 3rd year medical school.

h. Gene Therapy for Vascular Disease (2) P, open to 3rd and 4th-year medical students. (Identical with SURG 896h).

j. Medical Jurisprudence (2)

k. Cardiovascular Pathophysiology (2)

l. Comprehensive Cancer Care (1) [Rpt./1] (Identical with RONC 5961, 896).

m. Mind: Body and Behavioral Health (2) [Rpt./1]

n. Research Methods for Clinical and Epidemiological Studies (2)

q. Space Biology (1-2)

s. Salt, Water and Kidney Diseases (2)

t. Pathophysiology of Respiratory Diseases (2)

u. Cardiovascular Pathophysiology (2)
ANESTHESIOLOGY (ANES)

800. Research (1-6) [Rpt/1]

810. Clerkship
a. Anesthesiology (4-6)
b. Pain Management (4) P, fourth year medical students or consent of instructor.
c. Clerkship in ICU (Maricopa Medical Center, Phoenix) (4) P, fourth year medical students or consent of instructor.

815. Subspecialty
a. BNI Neuroanesthesiology (4)
b. Obstetrical Anesthesia (4)
p. Critical Care Medicine (4-6) (Identical with MEDI 815p).

891. Preceptorship
a. Anesthesiology and Subspecialties (1-18)

FAMILY AND COMMUNITY MEDICINE (F CM)

195. Colloquium
a. Empowerment-Mind-Sickness-Health (1-3) [Rpt.] GRD

401. Mind and Behavioral Medicine (2) [Rpt./1] 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, upper division or graduate or credit in 195a. May be convened with 501.

487. Poverty and Health (3) (Identical with NURS 487, which is home). May be convened with 587.

500. Research (3-12) [Rpt./2]. P, basic science courses. (Identical with PHL 500).

501. Mind and Behavioral Medicine (2) [Rpt.] For a description of course topics see 401. Graduate-level requirements include a research project or paper. May be convened with 401.

532. Survey of Art Therapy (3) [Rpt./3 units] Surveys the development of art therapy in the United States through examination of the literature, theories, and current trends in the field.

539. Art, Symbolism, and Psychopathology (3) [Rpt./3 units].

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) Knowledge base, social strategies, health policies and programs relating to health and well-being of women, especially of child-bearing 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).


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) Community and individual nutritional assessment; risk profiles; planning, implementing and evaluating programs; international; national and local resources/programs; Healthy People 2000 goals. (Identical with PHL 578).

580. Community Based Research Methodologies (3) 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, 596a. (Identical with PHL 580).

581. Introduction to Community Health (3) 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) (Identical with NURS 587, which is home). May be convened with 487.

588. Healing Systems in the Southwest (3) (Identical with NURS 588, which is home).

593 Internship
a. Public Health (1-12) [Rpt./12 units] (Identical with PHL 593a, which is home).

596. Seminar
a. International Health: Clinical and Community Care (3) Open to health majors only.
g. Occupational Disease (1-2) [Rpt./4 units]. Open to medical or industrial hygiene students only. Consult department before enrolling. (Identical with PHL 596g).
h. Prevention and Control of Disease (1) [Rpt./4 units] Consult department before enrolling. (Identical with PHL 596h).
i. Seminar for Clinical Educators (4) (Identical with PHL 596i).
m. Practice of Community-Oriented Medicine in Rural Areas (2) (Identical with PHL 596m).
n. International Nutrition (2-3) (Identical with NSC 596n and PHL 596o).
o. Environmental and Occupational Health (3) P, consent of instructor.
m. Managed Health Care (3) (Identical with PHL 596m).

619. FNP: Primary Care III (3) 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, admission to MS program and FNP option, 500.

693. Internship
a. Art Therapy (1-12) [Rpt./15 units] 3-9L. Consult department before enrolling.

696. Seminar
g. Nutrition in a Bioculture Context (3) (Identical with ANTH 596g, which is home).

800. Research (2-16) [Rpt./2] (Identical with PHL 800).

803. Clinical Clerkship (6)

811. Subinternship
a. Family Medicine (4-6)

815. Subspecialty
a. Public Health and Community Medicine Rotations (4)
b. The Dying Patient (3) [Rpt./1] (Identical with PHL 815b).
c. Geriatrics in Family Medicine (4) P, consent of instructor before enrolling.
d. Problems in Community Oriented Primary Care (6-12)
e. Personal Change in Lifestyle Related Behavior (3-6)

f. Geriatrics (4-6) [Rpt./6 units] P, 3rd year rotation in FCM and MEDI (Identical with MEDI 815f, which
MEDICINE (MEDI)

555. Cancer Therapeutics (3) (Identical with CBIO 555, which is home).

560. Clinical Cancer Biology (1) (Identical with CBIO 560, which is home).

596. Seminar
a. Pathophysiology and Immunology of the Clinical Manifestations of Coccidioidomycosis (2)

800a. Clinical Research in Minority Health Issues (4-16) Open to medical students only.

803. Clinical Clerkship (12)

810. Clerkship
a. Ambulatory Care (4-8) [Rpt./12 units] P, completion of third year medical school.
b. Ambulatory Diagnosis and Therapeutics (6)
c. Clinical Geriatrics (3-12) [Rpt./1] P, MEDI 803.

d. Medical Intensive Care Unit/Coronary Care Unit (4-6)
e. Medical Intensive Care Unit (4-6)
f. Medical Intensive Care Unit (4-6)

811. Subinternship
a. Internal Medicine (4-12)
c. Coronary Care Unit - Acting Internship (3-4)
e. Honors Course-Internal Medicine (12)
f. Primary Care Combined Internal Medicine/Pediatrics (Identical with PED 811g).
i. Medical Intensive Care Unit/Coronary Care Unit (4-6)

815. Subspecialty
a. Clinical Cardiology (4-8)
b. Clinical Dermatology (3-4)
c. Endocrinology (4-12)
d. Clinical Gastroenterology (3-6)
e. Hematology-Oncology (3-8)
f. Geriatrics (4-6) [Rpt./6 units] P, third year rotation in FCM and MEDI (Identical with FCM 815f).
g. Infectious Diseases (4-12)
h. Pulmonary Diseases (1-6)
i. Pulmonary Laboratory and Consultation Service (3-6)

815. Seminar
a. *International Health: Clinical and Community Care (3) Open to health majors only. (Identical with PHL 896a).
b. Behavioral Problem: Child and Adolescent (2) (Identical with PHL 896b).
c. Principles and Practice of Home Health Care (2) Consult department before enrolling. (Identical with PHL 896c).
d. Doctor-Patient Relations (2)
e. Nutrition in a Bicultural Context (3)
f. *International Nutrition (2-3) (Identical with PHL 896d).
g. Public Health Nutrition (1) P, medical school year I, II.
h. *Managed Health Care [Rpt.] (Identical with PHL 896e).
i. Tropical Disease Problems (2) (Identical with PHL 896f).


891. Preceptorship
a. General Medicine and/or Subspecialties (3-12) [Rpt./2]
b. Ambulatory Internal Medicine: Clinical Problems (4-6) Open to fourth year medical students.
d. Cardiology (3-8) P, fourth year medical students.
e. Hematology/Oncology (3-8) P, 803.

909. Seminar
a. Pathophysiology and Immunology of the Clinical Manifestations of Coccidioidomycosis (2)

NEUROLOGY (NEUR)

515f. Subspecialty
f. Neuromuscular Disorder (3-6) P.

625. Human Neuroscience (6) (Identical with MED 625, which is home).

695. Colloquium
a. Motor Control [Rpt./8 units] (Identical with PSIO 695a, which is home).

800. Research (1-12) [Rpt./1] (See College of Medicine Electives Manual).

803. Clinical Clerkship (3-6)

810. Clerkship
a. Neurology Consult Service (4)
b. Neurology (3-6) P, 803

815. Subspecialty
c. Cerebrovascular Disease (4-6) P, 803.
d. Epilepsy Elective (4-6)
e. Vestibular and Eye Movement Disorders (3-4)

825. Human Neuroscience (6) (Identical with MED 825, which is home).

891. Preceptorship
a. Neurology (1-18) [Rpt./2]
**OBSTETRICS AND GYNECOLOGY (OB G)**

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<th>Course</th>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td>800. Research</td>
<td>(3-18) [Rpt./1]</td>
<td>Research (6-9)</td>
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<tr>
<td>803. Clinical Clerkship</td>
<td>(6-9)</td>
<td>Clinical Clerkship (4-6) P, completion of basic sciences.</td>
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<td>b. Preparation for Private Practice (3-6) P, 803.</td>
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<td>c. Gynecological Oncology (4) P, 803 and one other junior clerkship.</td>
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<td>d. Gynecologic Surgery (4-6)</td>
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<td>d. Gynecology-Endocrinology (3-6) P, 803.</td>
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<td>f. Medical Gynecology (3-4)</td>
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<td>g. Reproductive Endocrinology and Fertility (4-6) P, 803.</td>
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<tr>
<td><strong>891. Preceptorship</strong></td>
<td></td>
<td>a. Obstetrics and Gynecology (1-18)</td>
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**OPHTHALMOLOGY (OPH)**

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<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>800. Research</td>
<td>(6-18)</td>
<td>Research (6-18)</td>
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<tr>
<td><strong>815. Subspecialty</strong></td>
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<td>a. Ophthalmology (3-6)</td>
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**PATHOLOGY (PATH)**

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<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>501. Molecular and Medical Genetics (3)</strong></td>
<td>Acquire a basic understanding of human molecular genetics and learn how to apply that understanding in the pathophysiology of disease. (Identical with GENE 501).</td>
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<tr>
<td><strong>801. Medical and Molecular Genetics (3)</strong></td>
<td>Acquire a basic understanding of human molecular genetics and learn how to apply that understanding in the pathophysiology of disease.</td>
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<td>d. Inpatient Pediatrics (4)</td>
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<td><strong>811. Subinternship</strong></td>
<td>a. Ambulatory Pediatrics (1-18)</td>
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<td></td>
<td>g. Primary Care Combined Internal Medicine/Pediatrics (4) (Identical with MEDI 811g, which is home).</td>
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<td><strong>815. Subspecialty</strong></td>
<td>a. Advanced Neonatology (4-6)</td>
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<td>b. Pediatric Infectious Diseases (3-6)</td>
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<td>c. Neurodevelopmental Follow-Up of High Risk Infants (4-6) P, 803.</td>
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<td>d. Cardiac Ultrasound Echo and Doppler (4-6)</td>
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<td>e. Pediatric Cardiology (4-6)</td>
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<td>f. Pediatric Neurology (4-6)</td>
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<td>g. Pediatric Hematology/Oncology (4-6)</td>
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<td>h. Pediatric Orthopaedics (3-6) P, completion of basic sciences.</td>
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<td></td>
<td>i. Developmental and Behavioral Pediatrics (4-6) P, pediatric clerkship.</td>
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<td>j. Pediatric Pulmonary (4-6) P, 803.</td>
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<td></td>
<td>l. Clinical Allergy (4-6) Open to medical students only. (Identical with MEDI 815l, which is home).</td>
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<td>o. Pediatric Gastroenterology (4-8) P, 803 or equivalent.</td>
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<td>p. Pediatric Endocrinology (4-6) P, 803.</td>
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<td>q. Pediatric Nephropathy (4)</td>
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<td></td>
<td>v. Clinical Evaluation and Treatment of Sleep Disorders (3-6) Limited to fourth-year medical students.</td>
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<tr>
<td><strong>816a. Subspecialty</strong></td>
<td>a. Pediatric Surgery (4) (Identical with SURG 815a, which is home).</td>
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<td>c. Rural Pediatric Orthopedics (3-4)</td>
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<td><strong>891. Preceptorship</strong></td>
<td>a. Pathology (1-18) [Rpt./2]</td>
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<td>c. Barrow Neurological Institute Neuropathology (4-6) P, completion of basic sciences.</td>
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**PEDIATRICS (PED)**

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<th>Course</th>
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<tbody>
<tr>
<td><strong>501. Molecular and Medical Genetics (3)</strong></td>
<td>Acquire a basic understanding of human molecular genetics and learn how to apply that understanding in the pathophysiology of disease. (Identical with GENE 501).</td>
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<tr>
<td><strong>803. Clinical Clerkship</strong></td>
<td>(6-9) [Rpt./1]</td>
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<tr>
<td><strong>810. Clerkship</strong></td>
<td>a. Clinical and Community Psychiatry (4-6)</td>
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<td></td>
<td>b. Child Psychiatry (6)</td>
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<td>c. Psychiatry (4-6) P, 803; consult department before enrolling.</td>
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<td>c. Outpatient Psychiatry (4-6) P, 803.</td>
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<td>d. Positron Emission Tomography (4-6) P, completion of third-year psychiatry clerkship.</td>
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<td>g. Geriatric Psychiatry (4-6) P, 803; consult department before enrolling.</td>
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<td>v. Clinical Evaluation and Treatment of Sleep Disorders (3-6) (Identical with MEDI 815v, which is home).</td>
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**PSYCHIATRY (PSYI)**

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<tr>
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<tr>
<td><strong>515. Subspecialty</strong></td>
<td>h. Cancer Epidemiology and Prevention (3) P, none; statistics helpful. (Identical with EPI 515h, which is home).</td>
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<td></td>
<td>i. Cancer Prevention and Control (3-15) (Identical with EPI 515i, which is home).</td>
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<tr>
<td><strong>551. Molecular Mechanisms of Carcinogenesis (3)</strong></td>
<td>(Identical with CBIO 551, which is home).</td>
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<tr>
<td><strong>555. Cancer Therapeutics (3)</strong></td>
<td>(Identical with CBIO 555, which is home).</td>
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<tr>
<td><strong>596. Seminar</strong></td>
<td>h. Cancer Biology Series (1) (Identical with CBIO 596h, which is home).</td>
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<td><strong>815. Subspecialty</strong></td>
<td>a. Introduction to Radiation Oncology (1-16)</td>
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<td></td>
<td>b. Cancer Epidemiology and Prevention (3) P, none; statistics helpful. (Identical with FCM 815h, which is home).</td>
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<td></td>
<td>i. Cancer Prevention and Control (3-15) (Identical with FCM 815v, which is home).</td>
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**RADIATION ONCOLOGY (RONC)**

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<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
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<tr>
<td><strong>515. Subspecialty</strong></td>
<td>h. Cancer Epidemiology and Prevention (3) P, none; statistics helpful. (Identical with EPI 515h, which is home).</td>
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<td></td>
<td>i. Cancer Prevention and Control (3-15) (Identical with EPI 515i, which is home).</td>
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<tr>
<td><strong>551. Molecular Mechanisms of Carcinogenesis (3)</strong></td>
<td>(Identical with CBIO 551, which is home).</td>
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<tr>
<td><strong>555. Cancer Therapeutics (3)</strong></td>
<td>(Identical with CBIO 555, which is home).</td>
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<tr>
<td><strong>596. Seminar</strong></td>
<td>h. Cancer Biology Series (1) (Identical with CBIO 596h, which is home).</td>
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<tr>
<td><strong>815. Subspecialty</strong></td>
<td>a. Introduction to Radiation Oncology (1-16)</td>
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<td></td>
<td>b. Cancer Epidemiology and Prevention (3) P, none; statistics helpful. (Identical with FCM 815h, which is home).</td>
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<td></td>
<td>i. Cancer Prevention and Control (3-15) (Identical with FCM 815v, which is home).</td>
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**RADIOLOGY (RADI)**

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<tr>
<td><strong>800. Research</strong></td>
<td>(1-6) [Rpt./1]</td>
<td>See College of Medicine Electives Manual.</td>
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<tr>
<td><strong>803. Clinical Clerkship</strong></td>
<td>(6-9) [Rpt./1]</td>
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<tr>
<td><strong>815. Subspecialty</strong></td>
<td>a. Diagnostic Radiology (4)</td>
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<td>b. Nuclear Medicine (1-6)</td>
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<td>b. Diagnostic Radiology (4) P, completion of basic sciences.</td>
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SURGERY (SURG)

596. Seminar
i. Molecular Cardiovascular Biology (3) [Rpt./6 units] (Identical with CBA 596i, CBIO 596i, PSIO 596i, MCB 596i).

670. Principles of Perfusion Techniques I (3) (Identical with PCOL 670, which is home).

671. Perfusion Technology Laboratory (1) (Identical with PCOL 671, which is home).

672. Principles of Perfusion Techniques II (2) (Identical with PCOL 672, which is home).

699. Independent Study (1-18).

800. Research (1-12) P, 803. (See College of Medicine Electives Manual).


803. Clinical Clerkship (6-9)

807. Specialty Clerkship (3) P, basic science courses.

810. Clerkship
a. General Surgery (3-8)
b. Burn Care (4-8) P, fourth year medical students or completion of 803.

811. Subinternship
b. BNI Neurological Surgery (4-6) P, fourth year medical students.

815. Subspecialty
a. Urinary Stone Disease (6)
b. Cardiothoracic Surgery (4-12)
c. Neurosurgery (3-6)
d. Surgical and Medical Problems in Fluid and Electrolyte Balance (1-3) [Rpt./1]
e. Urology (4-6)
f. Orthopedics (3)
g. Cardiovascular Physiology and Research (1-12)
h. Lymphovascular System in Health and Disease (6-12)
i. Surgical Critical Care (4) P, completion of 3rd year clerkship. Credit is given for this course or ANES 815p, but not for both.
j. Otorhinolaryngology (3)
k. Sports Medicine (Section of Orthopedic Surgery) (4) [Rpt./1]
l. Orthopedic Biomechanics/Biomechanics (6) P, nine weeks of surgery clerkship, 803 and/or 807.
m. Trauma (3-8)

670. Principles of Perfusion Techniques I (3) (Identical with PCOL 670, which is home).

671. Perfusion Technology Laboratory (1) (Identical with PCOL 671, which is home).

672. Principles of Perfusion Techniques II (2) (Identical with PCOL 672, which is home).

699. Independent Study (1-18).

800. Research (1-12) P, 803. (See College of Medicine Electives Manual).


803. Clinical Clerkship (6-9)

807. Specialty Clerkship (3) P, basic science courses.

810. Clerkship
a. General Surgery (3-8)
b. Burn Care (4-8) P, fourth year medical students or completion of 803.

811. Subinternship
b. BNI Neurological Surgery (4-6) P, fourth year medical students.

815. Subspecialty
a. Urinary Stone Disease (6)
b. Cardiothoracic Surgery (4-12)
c. Neurosurgery (3-6)
d. Surgical and Medical Problems in Fluid and Electrolyte Balance (1-3) [Rpt./1]
e. Urology (4-6)
f. Orthopedics (3)
g. Cardiovascular Physiology and Research (1-12)
h. Lymphovascular System in Health and Disease (6-12)
i. Surgical Critical Care (4) P, completion of 3rd year clerkship. Credit is given for this course or ANES 815p, but not for both.
j. Otorhinolaryngology (3)
k. Sports Medicine (Section of Orthopedic Surgery) (4) [Rpt./1]
l. Orthopedic Biomechanics/Biomechanics (6) P, nine weeks of surgery clerkship, 803 and/or 807.
m. Trauma (3-8)

503R. Biology of Animal Parasites (3) (Identical with V SC 503R, which is home). May be convened with MIC 403R.

503L. Parasitology Laboratory (1) (Identical with V SC 503L, which is home). May be convened with MIC 403L.

504. Molecular Parasitology (3) (Identical with V SC 504, which is home). May be convened with MIC 404.

505. Eukaryotic DNA Replication (3) [Rpt./1] (Identical with CBIO 505, which is home).

511. Molecular Biology (1) (Identical with MCB 511, which is home).

512. Biological Electron Microscopy (4) (Identical with MCB 512, which is home).

517. Microbial Physiology and Gene Cloning (3) Biochemical and physiological activities of microorganisms. P, CHEM 241b, 243b.


520. Pathogenic Bacteriology (3) P, MIC 325, CHEM 241b, 243b. Students are expected to be familiar with the World Wide Web and, ideally, have access via Netscape. Students must have an active e-mail address before the third class session convenes. (Identical with V SC 520, which is home). May be convened with V SC 420.

523. Mechanisms of Disease (5) (Identical with V SC 523, which is home). May be convened with MIC 423.

525. Environmental Microbiology (3) Current topics in water quality, aerobiology, and microbial biogeochemistry. P, MIC 205, CR, CHEM 241b, 243b. (Identical with SWES 525, which is home). May be convened with SWES 425.

526. Environmental Microbiology Laboratory (2) (Identical with SWES 526, which is home). May be convened with MIC 426.

527. General Mycology (3) General mycology, with emphasis on the microfungi. P, MIC 205.

527L. General Mycology Laboratory (2) General mycology laboratory, with emphasis on the microfungi. P, MIC 205.


530. Introduction to Biophysics (2) (Identical with PHYS 530, which is home). May be convened with PHYS 530.
Physiological sciences; historical perspectives, areas of research, and career opportunities. P, 201, 202.

360. Functional Kinesiology (3) Anatomical and mechanical factors affecting human movement, particularly in sport and exercise situations. Open to physical education majors only. P, 201, 202, MATH 117R/S.

373. Physiological Basis of Physical Education and Athletics (3) Physiological responses and adaptations to physical activity in various populations and environments; emphasizes fitness evaluation and application of training principles for exercise and sport. Open to physical education majors only. P, PSIO 201, 202, CHEM 103a-103b, 104a-104b.

374. Physiological Basis of Physical Education and Athletics Laboratory (1) P, CR 373.

403. Introduction to Cell Physiology (4) How cells work and how the workings of different types of cells provide the foundation for how organs work and how organisms function. P, CHEM 243d, MATH 124 or 125a, PHYS 103.

418. Physiology for Engineers (4) 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 and ECE 418).

419. Physiology Laboratory (2) 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. Open to non-majors only. P, 418 or CR. (Identical with CHEE 419 and ECE 419).

420. Exercise Physiology (3) Regulation and adjustment of physiological systems during acute exercise and adaptations with chronic exercise in various populations and environments; emphasizes physiological mechanisms. P, BIOC 460 or 462a, CHEM 103a-103b, 104a-104b, 241a-241b, 243a-243b, PSIO 201, 202, MATH 117R/S, 118, PHYS 102, 103. May be convened with 520.


445. Evaluation and Regulation of Body Build and Composition (3) Laboratory and field assessment of body fat, lean body mass and comatotype, anthropometry; body build and composition of the athlete; morphology of fat and lean tissue; exercise and dietary regulation of obesity and chronic underweight. P, 201 and 202. May be convened with 545.


466. Physiology Laboratory (3) (Identical with ECOL 466, which is home). May be convened with 566.

467. Endocrine Physiology (3) Mammalian endocrine regulation from an integrative physiological perspective. Primary focus is on calcium and fuel metabolism, stress, fluid balance, reproduction, and growth and development. P, 201, 202, or MCB 181R, 182. (Identical with CBA 467 and MCB 467).

468. Comparative Physiology (3) (Identical with ECOL 468, which is home). May be convened with 568.


480. Human Physiology (5) 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. Consult department before enrolling. P, CHEM 243b, MATH 123, PHYS 103. (Identical with PCOL 480).

495. Colloquium a. Research in Physiological Sciences (1-2) [Rpt./3 units] Open to physiological science majors only. May be convened with 595a.
   b. Biomechanics (2) [Rpt./1] P, 462.
   c. Environmental Physiology (2) [Rpt./1] P, 420. May be convened with 595d.
   d. Endocrinology and Metabolism (2) [Rpt./1] P, 420. May be convened with 595e.
   e. Integrative Cardiovascular Physiology (2) [Rpt./1] P, 420. May be convened with 595f.
   f. Kinesiology (2) [Rpt./1] P, 462. May be convened with 595g.
   i. Body Composition (2) [Rpt./1] P, 445 or 454. May be convened with 595i.

*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

502. Principles of Neuroanatomy (4) (Identical with CBA 502, which is home).

503. Cellular and Molecular Physiology (5) 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. P, CHEM 103b, 104b, 241b, 243b; PHYS 103; MATH 125a-125b; BIOC 460.

512. Biological Electron Microscopy (4) (Identical with MCB 512, which is home).

520. Exercise Physiology (3) For a description of course topics see 420. Graduate-level requirements include a research-review paper on an approved topic. P, BIOC 460 or 462a, CHEM 103a-103b, 104a-104b, 241a-241b, 243a-243b, PSIO 201, 202, MATH 117R/S, 118, PHYS 102, 103. May be convened with 420.

521. Physiological Sciences Laboratory (2) Graduate-level requirements include additional laboratory reports. P, CR, 520. May be convened with 421.

545. Evaluation and Regulation of Body Build and Composition (3) For description of course topics see 445. Graduate-level requirements include an additional research project and case report. P, 201 and 202. May be convened with 445.

562. Neomechanical Kinesiology (3) For a description of course topics see 462. Graduate-level requirements include a research paper. P, 201, 202, MATH 118, PHYS 102, 103, 181, 182. May be convened with 462.

566. Physiology Laboratory (3) (Identical with ECOL 566, which is home). May be convened with 466.

568. Comparative Physiology (3) (Identical with ECOL 568, which is home). May be convened with 468.

570. Research Design in Physiological Sciences (2) 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) 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, 570.

573. Statistical Analysis (3) Analysis of research designs and data analysis procedures in the field of exercise and sport sciences with emphasis on 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, 570 and 571.

575. Special Topics in Biological Imaging (2) (Identical with CBA 575). P, 570, 571.

580. Systems Physiology (5) Principles of systems physiology. Designed for graduate students throughout the University. Consult department before enrolling. P, 503 or equivalent, CHEM 243b, MATH 123, PHYS 103. (Identical with PCOL 580).

582. Topics in Neural Development (2) (Identical with NRSC 582, which is home).

585. Neural Mechanisms of Behavior (2) (Identical with NRSC 585, which is home).

588. Principles of Cellular and Molecular Neurobiology (4) (Identical with NRSC 588, which is home).

589. Principles of Systems Neurobiology (4) (Identical with NRSC 589, which is home).
985. Colloquium
a. Research in Physiological Sciences (1-2) [Rpt./3 units] May be convened with 495a.
d. Environmental Physiology (2) [Rpt./1 P, 420. May be convened with 495d.
e. Endocrinology and Metabolism (2) [Rpt./1 P, 420. May be convened with 495e.
f. Integrative Cardiorespiratory Physiology (2) [Rpt./1 P, 420. May be convened with 495f.
g. Kinesiology (2) [Rpt./1 P, 462. May be convened with 495g.
i. Body Composition (2) [Rpt./1 P, 445 or 545.
j. Molecular Neurobiology (2) Open to graduate students in PS, PCOL, and NEUR. P, consent of instructor.
k. Mathematical Techniques in Physiology (2) [Rpt./12 units] P, MATH 125a-125b, 160.
l. *Molecular Physiology (2) P, 503.
m. *Assignments in Motor Control (1) P, 480 or equivalent. Consult department before enrolling.
n. *Endocrinology (2).
o. *Renal Physiology (2) P, 580 or equivalent.
p. *Molecular and Cellular Excitability (2).
q. *Peripheral Vascular Physiology (2) P, 580 or equivalent.
r. *Membranes and Transport (2).
s. *Systems Neurophysiology (2).
Available as both 595 and 895.

596. Seminar
i. Principles in Cellular and Molecular Cardiovascular Biology (3) [Rpt./6 units]

601. Systems Physiology (7) Comprehensive coverage of systemic physiology with emphasis in the underlying principles of function. Consent required to enroll; consult instructor before registering.

610. Research Methods in Physiology (1-3) [Rpt./10 units] Laboratory course providing students with an understanding of the types of research available in the department. (Maximum length is 8 weeks). Consult with department before enrolling.

625. Human Neuroscience (6) (Identical with MED 625, which is home).

695. Colloquium
a. Motor Control (2) [Rpt./8 units]

696. Seminar
a. Physiology Series (1) [Rpt./3] Open to majors only.
b. Physiology: Preparation and Presentation (1) [Rpt./1] Open to majors only. Consult with department before enrolling.
c. Physiology Student Forum (1) [Rpt./3 units]

697. Workshop
a. Physiology Tutorial (3) [Rpt./4] P, 503, 580 or equivalent. Consult department before enrolling.

800. Research (3-6) Involvement in a special research project of special interest to the student. P, consent of instructor.

801. Human Physiology (7) Comprehensive approach to understanding the system of human physiology.

825. Human Neuroscience (6) (Identical with MED 825, which is home).

891. Preceptorship
a. Physiology (3-12) [Rpt./12 units]

895. Colloquium
* Molecular Neurobiology (2) Open to graduate students in PS, PCOL, and NEUR. P, consent of instructor.

College of Nursing
Nursing Building, Rm. 109
The University of Arizona
PO Box 210203
Tucson, AZ 85721-0203
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e-mail: mhenkel@rnl.nursing.arizona.edu
http://www.nursing.arizona.edu/

The College of Nursing offers a professional program leading to the Bachelor of Science in Nursing (B.S.N.) degree and graduate programs leading to the Master of Science and Doctor of Philosophy degrees with a major in nursing. The college also offers a B.S.N. pathway for registered nurses who graduated from associate degree or diploma nursing programs and an accelerated B.S.N. pathway for superior students who are college graduates holding a baccalaureate or higher degree in a non-nursing field.

The college is accredited by the National League for Nursing and approved by the Arizona State Board of Nursing. Upon recommendation of the faculty, graduates of the college will be admitted to the licensing examination administered by the state board. Graduation from the College of Nursing is not the sole criterion for obtaining a license to practice nursing in Arizona. Licensing requirements are the exclusive responsibility of the State Board of Nursing. Graduates must satisfy licensure requirements independently of degree requirements.

Baccalaureate degree
Bachelor of Science in Nursing (B.S.N.)

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

Major
Nursing (B.S.N., M.S., Ph.D.)

Admission to the baccalaureate program

Any entering freshman who meets university admission requirements may be admitted to University College for the pre-nursing portion of the program. Transfer students must meet the same university admission requirements. In addition to these requirements, registered nurses from diploma or associate degree schools of nursing must hold a current, valid Arizona license to practice nursing. Preference is given to Arizona residents. All students entering the College of Nursing are required to have basic computer knowledge obtained in high school, computer store, university courses, or self-taught. Applicants must also be in good physical and mental health; otherwise, they may be denied admission or, once admitted, recommended for withdrawal.

Admission to the pre-nursing phase of the program does not guarantee admission to the professional phase. Admission to the professional program is competitive. Contact the college at the address above for additional information about selection criteria and the admissions process.

Undergraduate program
The program which leads to the B.S.N. is composed of pre-nursing courses and general education courses, which are taken in University College, followed by the professional nursing major. After having completed the pre-nursing phase of the program, students are admitted selectively to the College of Nursing to begin the nursing major in fall or spring.

Once admitted to the major, the student must be full-time, attending five consecutive semesters. During these semesters the student must be enrolled for all required courses.

Clinical laboratories are in a variety of community settings. All students in the clinical nursing courses are required to provide their own transportation to the areas where they are assigned for patient-care experience.

Undergraduate minor
No minor is required for the baccalaureate program.

General education program
All undergraduate students are required to complete a 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 specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the undergraduate major(s) listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available online at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic requirements for graduate degrees consult the Graduate Catalog and the departmental office listed above.
Grading policy for nursing courses
The grade of "D" is unacceptable for courses in the nursing major, including pre-nursing courses, as it does not reflect acceptable performance. Pre-nursing students who do not complete a required course(s) with a grade "C" or better must repeat the course. Students already enrolled in the College of Nursing who do not complete a required course(s) with a grade "C" or better, are not eligible to progress in the professional nursing major. The student may be permitted to repeat the course for credit.

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)

250. Pathophysiology (3) Provides a conceptual integrative approach to selected pathophysiological phenomena and human responses to illness. Non-majors who wish to enroll should consult the instructor and complete all prerequisites. P, CHEM 101a-101b, ECOL 181R and PSIO 201.

255. Perspectives in Nursing and Health Care (3) Orientation to professional nursing, nursing processes within the context of health care delivery and societal health needs. Required of nursing majors. Open to non-majors; consult with college before enrolling.

263. Nursing Processes I (5) Application of nursing knowledge to address basic human health patterns; use nursing process to promote health and provide continuing care. Open to majors only. 2R, 9L. Fee. P, 255.

281. Nursing Issues and Research (2) 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. Open to accelerated-pathway nursing majors only.

285. Professional Nursing Skills (5) The first course in clinical nursing focuses on basic skills, nursing process, and health assessment. Theoretical concepts of health wellness, communication, functional health patterns, culture, physical assessment and basic nursing skills will be taught by lecture, demonstration, seminar and clinical practice. Open to accelerated-pathway nursing majors only. Fee.

285. Professional Nursing Role II (2) [Rpt.] Examination of professional nursing issues, including nursing jurisprudence and ethics, as related to nursing processes, practice roles, and the health care delivery system. Open to majors only. P, 255.

364. Nursing Processes II (4) [Rpt.] 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 experience. 1R, 2L. P, 250, 255, 263.

374. Care Provider Across the Lifespan: Families (6) [Rpt.] Application of nursing processes to providing care in the family context with a focus on health experiences related to the transitions, including childbirth, parenting, health and changes in aging. 3R, 3L. P, 250, 255, 263.

378. Nursing Care in Death and Dying (3) 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. Open to majors only, or consult college before enrolling. Writing-Emphasis Course.*

379. Nursing Research (2) Development of knowledge and skills related to the research process and use of research findings. Open to majors only. P, 255. Writing-Emphasis Course.*


390. Seminar a. Health and Family Assessment (2) Open to registered nurse students only. P, admission to College of Nursing.
b. Professionals Nursing Role (1) Open to registered nurse students only. P, admission to the College of Nursing.

390H. Honors Proseminar (3)

420. Health Assessment of the School Age Child (3) Health maintenance, health promotion, physical and developmental assessment, screening, management and referral of the school age child. Open to majors only. P, 481, or consult college before enrolling.

421. Nursing Care of the Child with a Handicap or Chronic Illness (3) Overview of congenital and acquired handicaps or chronic conditions in school age children. Assessment and management in the school setting of these children and their families. Open to majors only. P, 481, or consult college before enrolling. May be convened with 521.

422. School Nursing Practice (3) 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. Open to majors only. P, 481, or consult college before enrolling. May be convened with 522.

431. Professional Nursing Issues (2) [Rpt./1] Contemporary professional issues influencing professional nursing practice. Credit is allowed for this course or 488, but not for both. Open to majors only. Available only to students in the Accelerated Pathway for Second Degree Students program.

455. Professional Nursing Role III (3) Exploration of nursing issues and processes as applied to professional leadership and influencing change in health care and health care delivery systems. Open to majors only. P, 355, 382, 384.

475. Care Provider in Complex Health Experiences (5) Nursing care of individuals and families across their lifespan who are experiencing complex health experiences; emphasis is in tertiary and community settings. Open to majors only. 2R, 9L. Fee. P, 382, 384.

480. Principles of Physiology in Health Care (4) 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 580.

481. Health Experiences of Human Systems: Communities (5) 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. Open to majors only. 2R, 9L. Fee. P, 475, 483.

483. Perspectives of Cancer Care for Health Professionals (3) Current methods of care for individuals with cancer and for their families. 6R, 9L. Not accepted in doctoral program of study in nursing. P, enrollment in baccalaureate or graduate programs in nursing or pharmacy. (Identical with PHSP 483).

486. 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. Open to majors only. 2R, 9L. Fee. P, 475, 483.

487. Poverty and Health (3) 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. P, six units of social science. (Identical with CM 487). May be convened with 587. Writing-Emphasis Course.*

502. Professionalizing Presentation Skills (1) (Identical with BIOC 502, which is home).

504. Conceptual Models (3) Theory and research surrounding conceptual models with emphasis on description of conceptual models.

521. Nursing Care of the Child with a Handicap or Chronic Illness (3) For a description of course topics see 421. Graduate-level requirements include a paper and/or a presentation. P, 481, or
consult college before enrolling. May be convened with 421.

522. School Nursing Practice (3) For a description of topics see 422. Graduate-level requirements include identifying a select population; conducting a needs assessment; planning, implementing, and evaluating a specific health program. P, 481, or consult college before enrolling. May be convened with 422.

530. Methods in Nursing Research (3) 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) 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, 580.

579. Issues in Rural Health (3) 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 and PSYC 579).

580. Principles of Physiology in Health Care (4) For a description of course topics see 480. Graduate-level requirements include a comprehensive paper. P, undergraduate physiology. May be convened with 480.

584. Statistical Packages in Research (3) 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) For a description of course topics see 487. Graduate-level requirements include an in-depth research paper on an aspect of poverty. Advanced degree credit available for non-Ph.D. majors only. P, six units of social science. (Identical with PHL 587 and F CM 587). May be convened with 487.

588. Healing Systems in the Southwest (3) 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, nine units of behavioral science. (Identical with ANTH 588 and F CM 588).

589. Health of the Older Adult (3) Current research of the aging process including physical and mental alterations; emphasis on physiological changes. Consult college before enrolling. (Identical with GER 589).

600a-600b-600c-600d-600e. Nursing Theory and Practice (3-3-3-3-3) Maintenance, therapeutic and preventive nursing care of persons in various settings. Student elects practice in one area of nursing: 600a child, maternal-newborn. 600b: psychiatric-mental-health. 600c: community health. 600d: gerontology. 600e: adult health.

601. Pathophysiologic Alterations (3) 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, 580 or 3 hours of graduate-level physiology.

603. Public Health Science (3) Health promotion and primary 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) Examination of the principles and philosophy of the lifespan 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) 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) 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) 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) Client problems related to the processing of sensory information including etiologic factors. Research-based nursing interventions for clients with cognitive alterations are examined. Open to majors only.

609. Health Assessment (3) 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 only to masters students in the NP options or by consent of the instructor.

617. FNP: Primary Care I (3) First of three primary care courses preparing FNP's. Beginning skills in health promotion, disease prevention, assessment/management of common health conditions in individuals and families. P, admission to MS level in nursing and FNP Option; N580; N609 (concurrent); N694 (concurrent).

618. FNP: Primary Care II (3) Second of three primary-care courses preparing FNP's. Focus on assessment and management of selected acute and chronic health conditions in individuals and families across the age continuum. P, admission to M.S. program and FNP option; 609, 617, CR, 517, 694b.

619. FNP: Primary Care III (4) 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, admission to MS program and FNP option, 617, 618.

621. Educational Process (3) 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.


623. Clinical Agency Administration (3) Practical application of administrative processes in a nursing care delivery setting. Focuses on the use of selected skills essential to effective administration. Open to majors only. P, 624.

624. The Administrative Process (3) 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) 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. Open to majors only. P, 580.

626. Primary Care of Adults (3-4) 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. Open to majors only. P, 609.

627. Advanced Psychiatric Mental Health Nursing II (3) Focus on concepts of personality development using psychoanalytic 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, 600a, graduate standing in nursing.

632. Research Utilization (3) Development and use of models and tools for facilitating the use of research in science-based nursing practice within organizational settings. 2R, 3L. P, 530.

633. Evaluation Research (3) Development and use of models and tools for assessing nursing processes, programs and performances. Approaches to and psychological reactants of evaluation are explored. Issues and development of market packages with cost consideration are discussed along with program grant preparation. (Identical with PHL 633).
Research (3) Investigation of selected quantitative strategies appropriate to researching problems in clinical nursing. P, 530, 633, admission to Ph.D. program.

731. Qualitative Methods in Clinical Nursing Research (3) Application of selected qualitative research methods from the social sciences to clinical nursing. Open to majors only. P, 530, admission to Ph.D. program.

781a-781b. Instrument Construction (3-3) Deductive and inductive processes for constructing/testing instruments to measure nursing care interventions/patient outcomes. 781a: Instrumentation for behavior and objective phenomena. 781b: Instrumentation for subjective phenomena. Includes instrument strategies; experience developing a pilot measure. 2R, 3L. Open to majors and minors only. P, 705, 730, graduate level statistics. 781a is not prerequisite to 781b.

795. Colloquium b. Professional Role Development (1)

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**COLLEGE OF PHARMACY**

Pharmacy Building, Rm. 344
The University of Arizona
PO Box 210207
Tucson, AZ 85721-0207
Phone: (520) 626-1427; FAX: (520) 626-4063
http://www.pharm.arizona.edu/

The College of Pharmacy prepares pharmacists to provide pharmaceutical and related health care services. These services are mainly concerned with monitoring 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, or the Departments section of the on-line catalog.

**Admission requirements for the Doctor of Pharmacy program**

Admission to the Doctor of Pharmacy program requires completion of courses as specified in the pre-pharmacy curriculum. For information about specific pre-pharmacy requirements, consult the college section of the on-line catalog, or contact the college at the address above. Equivalent courses completed at other colleges or universities may be accepted in fulfillment of pre-pharmacy requirements, subject to advisor approval.

Students in the pre-pharmacy program at the University of Arizona are enrolled in the University College. Candidates are admitted into the professional pharmacy program only in the fall semester. Students who seek admission to the College of Pharmacy are urged to initiate the application process in October of the year preceding admission and have all application materials submitted as soon as possible, but no later than by mid January. Applicants will be informed of their admission status by early April.

For additional information about the application process, application materials and admissions criteria, contact the College of Pharmacy at (520) 626-1427.

**College scholastic requirements**

Students are subject to general university policy governing satisfactory academic progress (e.g., minimum GPA) found in the policy section of this manual. Additionally, students in the four-year professional Pharm.D. program must register for and complete a minimum of 14 units each semester. Students must also maintain a minimum GPA in professional course work. For specific information, see the on-line College of Pharmacy Student Handbook.

**General education program**

Students are required to take a number of general and practicum electives. The Summer Session and Fourth Professional Year practica are individually designed by the clerkship coordinator and the student. The student may be required to complete rotations outside of the Tucson Area.

**Program requirements**

For specific academic program requirements for both pre-Pharmacy and professional requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the undergraduate majors listed above may be obtained from the college office. APRRs for all undergraduate majors are available online at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic requirements for graduate degrees 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.
PHARMACY PRACTICE & SCIENCE (PHPR)
College of Pharmacy, Rm. 313
The University of Arizona
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Tucson, AZ 85721-0207
(520) 626-5730; FAX: (520) 626-4063
http://www.pharm.arizona.edu/

Program Requirements
For academic program requirements for both pre-Pharmacy and professional requirements, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/ oncource/aprr.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.

195. Colloquium
a. Perspectives on Health Care: Current Issues and Trends (1)
   b. Medication Misadventures (1)

400. Pharmaceutical Calculations (1) Pharmaceutical calculations pertinent to the selection, formulation, preparation, dosage and administration of drugs and their dosage forms.

401. Dosage Form Design (2) Application of physical-chemical principles to pharmaceutical dosage forms, including a discussion of the biopharmaceutical considerations which influence the efficacy of pharmaceutical formulations.

402. Pharmaceutics (3) Discussion of the physical and chemical factors that relate to the development of pharmaceutical products and drug delivery systems. Emphasis is placed on newly emerging technologies and an industrial perspective. P, PHYS 102, 182, CHEM 103b, 104b.

403a-403b. Beginning Pharmacy Practice (1-1)
   a. Orientation to career opportunities for pharmacists; medical terminology and abbreviations.
   b. Basic communication skills and thinking strategies needed for effective medication history interviewing and patient counseling.

404. Interviewing and Counseling Skills (1-2)


408a-408b. Pharmacokinetics Discussion (1-1)
   a. Discussion related to the application of pharmacokinetic principles with case-study examples. CR, 407 for 408a, 485 for 408b. May be convened with PHSC 508a-508b.

410. Research Options in Pharmacy (1) 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) Orientation to professional practice issues; pharmacy practice site visitations. Involves weekly discussions, site visits to various pharmacy practices, and a written paper. Field trip. Open to majors only.


414. Pharmacy Practice Lab (1) Laboratory for 413.

415. Toxicokinetics (3) 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 toxicity, especially as it relates to the drug or toxic disposition. Issues in experimental design, extrapolation of data from animals to humans, and aspects of risk assessment. May be convened with PHSC 515.


417. The Internet: Application and Use (2) Internet terms, concepts, tools, utilities, and resources. Application of Internet technologies for the delivery of pharmaceutical care and the accessing health care information is emphasized.

422. Case Discussions in Medical Chemistry and Pharmacology (1) Student centered problem oriented discussions that stress application and integration of medicinal chemistry and pharmacology using simulated patient scenarios and cases. Open to College of Pharmacy students only. CR, PCOL 471a and 473a.


427. Antineoplastic Drugs (2) Discovery and development of natural and synthetic antineoplastic drugs; preclinical screening and toxicity evaluation; phase I, II, and III clinical studies in humans. P, CR, 437b or CR. May be convened with PHSC 527.

432. Managed Health Care (2) An introduction to the concepts and various aspects of managed health care systems within the United States and roles for pharmacists. P, 445.

442. Professional Practice Management (3) Management of professional situations and the interaction among patients, colleagues, and other healthcare providers, with application to institutional, community, and clinical pharmacy practice. P, 445. May be convened with PHSC 542.

443. Pharmacy Law (2) Legal concepts covering professionalism, negligence, liability, legal processes and semantics; pertinent federal, state, and local statutes and regulations.

445. Medication Use and the U.S. Health Care System (3) An overview of the U.S. health care system and the consumers, providers, payers, and regulators that comprise it. The role of pharmacy 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. May be convened with PHSC 545.


448. Perspectives in Geriatrics (2) Multidisciplinary approach to the health-care needs of the elderly, including medication use, nutrition, health care agencies and roles of individual health care professionals. Open to non-majors. P, CR, 447 for non-majors. (Identical with GERO 448 and N SC 448). May be convened with PHSC 548.

454. Drug Information and Drug Literature Evaluation (3) Skills and principles of drug information, biostatistics, and literature evaluation needed to evaluate biomedical literature. P, 403.

460. Methodology in Pharmacy Research and Drug Literature Evaluation (3) Application of research design, statistical methods, evaluation techniques, and ethical dimensions to critically evaluate published literature, research reports and proposals. P. MATH 263. May be convened with PHSC 561.

475a-475b. Phamacotherapeutics (5 to 6-6)

487. Public Speaking and Teaching Techniques for Health Care Professionals (2) Public speaking and teaching techniques for health care professionals. Students develop speeches aimed at different target groups, participate in formal debate and prepare learning objectives and assessment questions. May be convened with PHSC 585.
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PO Box 210207
Tucson, AZ 85721-0207
(520) 626-5730; FAX: (520) 626-7355
http://www.pharm.arizona.edu

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

Majors
Pharmaceutical Sciences (M.S., Ph.D.)

Program Requirements
For academic requirements for graduate degrees, 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.

507. Pharmacokinetics (4) For a description of course topics see PHPR 407. Graduate-level requirements include an in-depth analysis of a pharmacokinetic problem, P, 307. May be convened with PHPR 407.

508a-508b. Pharmacokinetics Discussion (1-1) For a description of course topics see PHPR 408a-408b. Graduate-level requirements include an in-depth analysis of a pharmacokinetic problem. CR, 407 for 408a, 485 for 408b. May be convened with PHPR 408a-408b.


512. Quantitative Structure-Activity Relationships (3) Approaches to the quantification of pharmacological actions of drugs on the basis of chemical structure.

513. Pharmaceutical Economics (3) Application of management principles to problem solving and decision making techniques in the provision of pharmaceutical services within the institutional environment. Field trips. Open to majors only. P, 511.

515. Toxicokinetics (3) For a description of course topics see PHPR 415. Graduate-level requirements include different examination and/or writing of papers. (Identical with PCL 515). May be convened with PHPR 415.

527. Antineoplastic Drugs (2) For a description of course topics see PHPR 427. Graduate-level requirements include an extra paper or equivalent course project. May be convened with PHPR 427.

536. Medicinal Chemistry and Pharmacology (4) (Identical with PCL 536, which is home).

537a-537b. Medicinal Chemistry (3-2) For a description of course topics see PCL 437a-437b. Graduate-level requirements include extensive use of the current literature and emphasis on drug design principles. P, PCL 536. May be convened with PCL 437a-437b.

542. Professional Practice Management (3) For description of course topics see PHPR 442. Graduate students will write either an additional paper or proposal. May be convened with PHPR 442.

545. Medication Use and the U.S. Health Care System (3) 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 Laboratory (1) P, CR 448. (Identical with GERO 547 and N SC 547). May be convened with PHPR 447.

548. Perspectives in Geriatrics (2) 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. Open to non-majors. P, CR 447 for non-majors. (Identical with GERO 548 and PHIL 548). May be convened with PHPR 448.

561. Methodology in Pharmacy Research and Drug Literature Evaluation (3) For 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 of Cancer Care for Health Professionals (3) (Identical with NURS 583, which is home). May be convened with PHPR 483.

585. Advanced Clinical Pharmacokinetics (3) For a description of course topics see PHPR 485. Graduate-level requirements include an additional paper. May be convened with PHPR 485.

589. Clinical Pharmacotherapy of Mental Disorders (2) For a description of course topics see PHPR 489. Graduate-level requirements include a research paper on a single topic of psychopharmacology. (Identical with PCL 589). May be convened with PHPR 489.

596. Seminar
a. Pharmaceutical Chemistry (1) [Rpt./5]
b. Pharmaceutical Chemistry Research (1) [Rpt./5]
c. Pharmaceutics Research (1 to 2) [Rpt./5] Open to majors only.
d. Pharmaceutics (1) [Rpt./5 units]
e. Pharmacy Administration (1) [Rpt./5]
f. Pharmacy Administration Research (1) [Rpt./5]

601. Advanced Physical Pharmacy (3) Applications of physical chemistry to pharmacy. P, physical pharmacy or physical chemistry course.


606. Industrial Manufacturing Pharmacy (3) Pharmaceutics as applied to various aspects of industrial pharmacy. Field trips.

611. Pharmaceutical Education Research (3) 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) 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) 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 (4-3) Rational drug design, receptor site theories, mechanism of drug action, and metabolic pathways of medicinal agents; chemical and enzymatic synthesis of important pharmaceuticals. P, PCOL 471b.

632a-632b. Natural Medicinal Products (3-3) Origin and isolation of steroidal and alkaloidal drugs and other natural products of interest. P, PCOL 471b.

634. Biomedical Applications of Mass Spectrometry (3) 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) [Rpt.]
   b. Administrative Clerkship (1-15) [Rpt.]

695. Colloquium a. Research in Gerontology (1) (Identical with GERO 695a, which is home).

815. Pharmacy Subspeciality I. Research (5) 15-30. P, or CR, 10 units of PHPR 810. (Identical with PHPR 8151, which is home).

Bachelor of Arts (B.A.)
Bachelor of Science (B.S.)
Bachelor of Science in Agriculture (B.S.A.)
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.S., M.S., Ph.D.)
Atmospheric Sciences (B.S., M.S., Ph.D.)
Biochemistry (B.A., B.S., B.S.A.*, M.S., **, Ph.D.)
Botany (M.S., Ph.D.)
Chemistry (B.A., B.S., M.A., M.S., Ph.D.)
Computer Science (B.S., M.S., Ph.D.)
Ecology and Evolutionary Biology (B.A., B.S., M.S., Ph.D.)
General Biology (B.S., M.S., Ph.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 & Hearing Sciences (B.S.S., M.S. Ph.D.)

* The Bachelor of Science in Agriculture is jointly administered with the College of Agriculture.
** 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 Ecology and Evolutionary Biology.
**** Administered by the department of Veterinary Science and Microbiology in the College of Agriculture.

Undergraduate minors
A minor is required in the Bachelor of Arts and Bachelor of Science degree programs.

For information on specific undergraduate majors, minors and options available, see the department sections of the catalog. For more information about graduate degree programs please consult the Graduate Catalog.

General education program
All undergraduate students are required to complete a 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 specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.as.arizona.edu/academic/oncourse/aprr.html.

Astronomy (ASTR)
Steward Observatory Rm. N204
The University of Arizona
PO Box 210081
Tucson, AZ 85721-0081
(520) 621-2288; FAX: (520) 621-1532
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
Astronomy (B.S., M.S., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. For academic program requirements for graduate degrees, 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.

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 110a. Labwork includes frequent mathematical calculations using basic algebra. Recommended preparation is satisfactory completion of the University entrance requirement in mathematics. Credit will be allowed for only 100 or 102.

102. Introductory Astronomy (4) Survey of astronomy equivalent to combination of 100 and 101L. Our solar system, stars, galaxies and the structure and evolution of the universe. Labora-
tory sessions include planetarium work, some
nighttime observing sessions and field trips. Labo-
ratory exercises require use of basic algebra. Re-
commended preparation is satisfactory completion
of the University entrance requirements in math-
ematics. 3R. 3L. Credit will be allowed for only
100 or 102.

103. Life in the Universe (4) Application of a-
stronomy and other sciences to the study of the like-
lihood, 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. 100 or 102.

104. The Universe and Humanity: Origin and
Destiny (3) (Identical with PTYS 105a, which is
home).

106. Survey of the Solar System (3) (Identical
with PTYS 106).

109L. Exploration and Discovery in Planetary
Science (1) (Identical with PTYS 109L, which is
home).

296. Seminar
a. Topics in Astronomical Research (1) GRD P,
100 or equivalent

300a-300b. Astronomy and Astrophysics (3-3)
A quantitative approach to astronomy and astro-
physics. P, MATH 125a; PHYS 141 or 151.

302. Introduction to Observational Astronomy
(3) Observational applications of coordinate sys-
tems and time; basics of astronomical instrumen-
tation, measuring equipment, and data reduction
practices. Practice in observing at optical and
radio wavelengths. 2R. 3L. P. MATH 125a.

320. Philosophical and Historical Aspects
of Astronomical Thought (3) Historical develop-
ment 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.

396H. Honors Proseminar (3) Offered every third
semester.

400a-400b. Theoretical Astrophysics (3-3) Stars,
interstellar matter, galaxies, radio sources, cosmol-
ogy. P, MATH 254, 6 units upper-division phys-
ics. 400a is a Writing-Emphasis Course. P. Sat-
sfaction of the upper-division writing-requirement
requirement.

403. Physics of the Solar System (3) (Identical
with PTYS 403, which is home). May be convened
with 503.

418. Modern Astronomical Instrumentation
and Techniques (3) Radiant energy; signals and noise;
detectors and techniques for imaging, photometry,
polarimetry and spectroscopy. Examples from stel-
lar and planetary astronomy in the x-ray, optical,
infrared and radio. (Identical with PTYS 418). May
be convened with 518.

502. Astronomical Instrumentation Project (3)
Design, construction, and testing of an astronomi-
cal instrument chosen by each student under the
guidance and supervision of the instructor. Regu-
lar class sessions are devoted to discussing tech-
niques and reporting progress and problems.

503. Physics of the Solar System (3) (Identical
with PTYS 503, which is home). May be convened
with 403.

515. Interstellar Medium and Star Formation
(3) Derivation of physical conditions from spec-
tral 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) For a description of course topics
see 418. Graduate-level requirements include an
in-depth research paper. (Identical with PTYS
518). May be convened with 418.

522. Atomic and Molecular Astrophysics (3)
Interpretation of astronomical spectra: basic as-
pects of atomic and molecular spectra and pro-
cesses 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) (Identical with PTYS 522).

535. Stellar Structure (3) Equations of stellar
structure, virial theory, energy transport, equations
of state, opacities, nuclear reactions, stellar mod-
els, evolution of low and high mass stars, observ-
ational tests, rotation and magnetic fields, binary
evolution.

540. Structure and Dynamics of Galaxies (3)
Observational properties of galaxies; structure,
kinematics, star and gas content. Structure of our
own galaxy. Dynamics of stellar systems: equilib-
ria, instabilities, internally and externally driven
evolution.

541. Extragalactic Astronomy and Cosmology
(3) The structure, origin and evolution of the physi-
cal universe from theory and observations of sys-
tems outside our own galaxy. Relativistic cosmol-
ogy; galaxy evolution and clustering, active gal-
axies and quasars; the microwave background;
galaxy formation; the hot big bang; and physics of
the early universe. P, 540.

545. Stellar Atmospheres (3) Radiative transfer,
grey atmosphere, opacity, line formation, non-
LTE, curves of growth, stellar hydrodynamics,
planetary applications. (Identical with PTYS 545).

553. Solar System Dynamics (3) (Identical with
PTYS 553).

555. Remote Sensing of Planetary Surfaces (3)
(Identical with PTYS 555).

556. Electrodynamics of Conducting Fluids and
Plasmas (3) (Identical with PTYS 556).

575. General Relativity and Cosmology (3) Gen-
eral relativity with application to celestial mechan-
ics, stellar structure, gravitational radiation, black
holes, gravitational lensing and cosmology.

582. High Energy Astrophysics (3) Radiation
mechanisms, synchrotron radiation, charged par-
teil acceleration, pulsars, black holes, accretion
disks, X-ray binaries, gamma-ray sources, radio
galaxies, active galactic nuclei. (Identical with
PHYS 582 and PTYS 582).

589. Topics in Theoretical Astrophysics (3)
[Repl.] (Identical with PHYS 589, which is home).

596. Seminar
b. Methods in Computational Astrophysics (3)

**ATMOSPHERIC SCIENCES (ATMO)**

Physics-Astronomical Sciences Bldg., Rm.542
The University of Arizona
PO Box 210081
Tucson, AZ 85721-0081
(520) 621-6831; FAX: (520) 621-6833
e-mail: addept@air.arizona.edu
http://www.atmo.arizona.edu

Baccalaureate degree
Bachelor of Science (B.S.)

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

**Major**

Atmospheric Sciences (B.S., M.S., Ph.D.)

B.S. Options: general hydrometeorology

Program Requirements
For academic program requirements for under-
graduate degrees, consult the On Course! Aca-
demic Program Requirements Reports (APRRs).
APRRs for the major listed above may be obtained
from the college or departmental office. APRRs
for all undergraduate majors are available on-line
at http://www.arizona.edu/academic/oncourse/
apr.html.

For academic program requirements for graduate
degrees, consult the Graduate Catalog and the de-
partmental 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.

171. Introduction to Meteorology and Clima-
tology (3) An introduction to weather processes
and climate, including discussions of fronts and
cyclones, precipitation processes, the wind systems
of the world, severe storms, and weather modifi-
cation. P, MATH 116R/S. (Identical with GEOG
171).

171L. Introduction to Meteorology and Clima-
tology Laboratory (1) Quantitative exercises il-
ustrating the physical and chemical behavior of
the atmosphere and the fundamental concepts used
(Identical with GEOG 171L).

195. Colloquium
a. The Atmosphere, U of A, and You (1)
300a-300b. General Meteorology (3-3) Survey of physical (300a) and dynamic (300b) meteorology, recommended for students wanting a more quantitative approach to meteorology than provided in 171. 300a: P, CR; MATH 125b, recommended ATMO 171. 300b: P, CR; MATH 223.

336. Weather, Climate and Society (3) The effects of weather on society, including its influence on history, comfort and health, and music and art.


410. Statistical Methods in the Atmospheric Sciences (3) Review of basic statistical procedures; time series analysis; analysis of multivariate data sets; statistical weather forecasting and forecast verification. P, MATH 125b, knowledge of FORTRAN or a similar programming language. May be convened with 510.

421. Physical Climatology (3) The global and surface energy balance; the hydrologic cycle; the influence on climate of the atmospheric and oceanic circulation; climate history, sensitivity, modeling, and natural and anthropogenic change. P, 171, MATH 125b. (Identical with GEOG 421). May be convened with 521.

440. Air Pollution Meteorology (3) 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, 300a, PHYS 142, MATH 254, CHEM 103a, or consult department before enrollment. May be convened with 540.

441a-441b. Dynamic Meteorology (3-3) Thermodynamics and its application to planetary atmospheres, hydrostatics, fundamental concepts and laws of dynamic meteorology. P, 300a-300b or consent of instructor; PHYS 142; MATH 254. (Identical with PTYS 441a-441b). May be convened with 541a-541b.

451a-451b. Introduction to Physical Meteorology (3-3) 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, 300a-300b or consent of instructor; PHYS 142; MATH 254. May be convened with 551a-551b.

460. Aerosol Science and Engineering (3) (Identical with CHEE 460, which is home). May be convened with 560.

465. Mesoscale Analysis (3) For a description of course topics and prerequisites see 465. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter. May be convened with 465.


490. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 490, which is home). May be convened with 590.

510. Statistical Methods in the Atmospheric Sciences (3) For a description of course topics see 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 a similar programming language. May be convened with 410.

521. Physical Climatology (3) For a description of course topics and prerequisites, see 421. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter. (Identical with ARL 521). May be convened with 421.

524. Hydroclimatology (3) (Identical with HWR 524, which is home).

530. Micrometeorology (3) 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, 541b.

535. Air/Sea Interactions (3) 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, 300b.

540. Air Pollution Meteorology (3) For a description of course topics and prerequisites, see 440. Graduate-level requirements include more difficult homework and project assignments that require a deeper understanding of the material and more comprehensive examinations. May be convened with 440.

541a-541b. Dynamic Meteorology (3-3) For a description of course topics and prerequisites, see 441a-441b. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter. (Identical with PTYS 541a-541b). May be convened with 441a-441b.

544. Physics of High Atmospheres (3) (Identical with PTYS 544).


551a-551b. Introduction to Physical Meteorology (3-3) For a description of course topics and prerequisites, see 451a-451b. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter. May be convened with 451a-451b.

560. Aerosol Science and Engineering (3) (Identical with CHEE 560, which is home). May be convened with 460.

565. Mesoscale Analysis (3) For a description of course topics and prerequisites see 465. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter. May be convened with 465.

567. Inverse Problems in Geophysics (3) (Identical with GEOS 567, which is home).

571. Synoptic Meteorology (3) For a description of course topics and prerequisites see 471. Graduate-level requirements include a survey paper on some aspect of weather prediction. May be convened with 472.

583. Remote Sensing Instrumentation and Techniques (3) (Identical with ECE 583, which is home).

589. Atmospheric Electricity (3) An introduction to the 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, MATH 322, PHYS 241. (Identical with ECE 589).

590. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 590, which is home). May be convened with 490.

595. Colloquium
a. Atmospheric Measurement Techniques (1-3)
b. Global Climate Change (1-3) [Rpt./1] P, strong quantitative background in HWR, GEOS or RNR. (Identical with GEOS 595b and HWR 595b).
c. General Circulation Observations and Modeling (1-3) P, 541a, 551a, ENGR 170 (FORTRAN). (Identical with GEOS 595c and HWR 595c).

641. Theoretical Meteorology (3) Methods of solution of the hydrodynamic equations; identification and analysis of acoustic, gravity, Kelvin-Helmholtz, inertial, Kelvin, barotropic and baroclinic waves. P. 541b.

651. Cloud and Precipitation Physics (3) Thermodynamics of nucleation, drop growth by condensation, collection and coalescence processes, drop breakup, ice crystal growth, accretion and aggregation. P. 551a.

656a-656b. Atmospheric Radiation and Remote Sensing (3-3) Theory of atmospheric radiative transfer processes; specific methods for solving the relevant equations; applications to problems in...
radiative transfer; theoretical basis for remote sensing from the ground and from space; solutions to the "inverse" problem. P, MATH 254. (Identical with OPTI 656a-656b).

**BIOCHEMISTRY (BIOC)**

Biological Sciences West Bldg., Rm. 357
The University of Arizona
PO Box 210088
Tucson, AZ 85721-0088
FAX: (520) 621-9288
e-mail: wilson@biosci.arizona.edu
http://scrugs.biosci.arizona.edu/biochem/biochem.htm

Baccalaureate degrees
Bachelor of Arts (B.A.)
Bachelor of Science (B.S.)
Bachelor of Science in Agriculture (B.S.A.)*

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

* Jointly administered with the College of Agriculture.

**Program Requirements**

For academic program requirements for undergraduate degrees, consult the *On Course! Academic Program Requirements Reports (APRRs).* APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

105a. The Universe and Humanity: Origin and Destiny (3) (Identical with PTYS 105a, which is home).

181L. Introductory Biology Laboratory (1) (Identical with MCB 181L, which is home).

181R. Introductory Biology I (3) (Identical with MCB 181R, which is home).

182. Introductory Biology II (4) (Identical with ECOL 182, which is home).

195. Colloquium
   a. Great Experiments in Microbiology (1) (Identical with MIC 195a, which is home).
   b. Biotechnology (1) (Identical with MIC 195b and MCB 195b).
   c. Society and Science (1) (Identical with ECOL 195c, MCB 195c, MIC 195c).

295. Colloquium
   a. Opportunities in Biological Science (1) [Rpt./4 units]

296. Seminar
   a. Biochemistry (1) (Identical with CHEM 296a, which is home).

321. Genetics Lab (2) Laboratory principles and techniques that govern genetic analysis including molecular, chromosomal, organismal, population, and evolutionary aspects. (Identical with MCB 321).

404. Physiological Systems (3) (Identical with ECOL 404, which is home).

407. Neurobiology (4) (Identical with NRSC 407, which is home).

410. Cell Biology (3) (Identical with MCB 410, which is home).

411. Molecular Biology (3) (Identical with MCB 411, which is home).

416. Bioinformatics and Genomic Analysis (3) (Identical with MCB 416, which is home). May be convened with 516.


443. Research Animal Methods (3) (Identical with V SC 443, which is home). May be convened with 543.

455. Developmental Mechanisms (3) (Identical with MCB 455, which is home).


461. General Nucleic Acid Biochemistry (2) Fundamentals of nucleic acid biochemistry. Open to non-majors only. P, 181, CHEM 241b; CR, 460. (Identical with CHEM 461 and N SC 461). Credit allowed for 461 or 461, but not for both.

462a-462b. Biochemistry (3-3) Introduction to the properties and metabolism of proteins, nucleic acids, enzymes, carbohydrates and lipids. Designed primarily for majors and minors in chemistry, biochemistry and biology. P, CHEM 241b, one semester calculus. For MCB students, MCB 410 is prerequisite to 462b. (Identical with CHEM 462a-462b, MCB 462a-462b, and PCOL 462a-462b). Honors section available for (4) honors credits.

473. Recombinant DNA Methods and Techniques (4) (Identical with MCB 473, which is home).

494. Practicum:
   r. Research (3) [Rpt./2] P, ENGL 101, MATH 117, ABE 120, and consent of instructor.

496. Seminar
   a. Biochemistry (1) [Rpt./1] Open to majors only. P, 462a or CR. Consult department before enrolling. Writing-Emphasis Course.*

497. Workshop
   a. Special Tutoring Workshop (1-5) Open to senior MCB and Biochemistry majors only. Consult department before enrolling. (Identical with MCB 497a, which is home).

*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

501. Medical Biochemistry (7) P, formal admission to the Ph.D./M.D. program, and consent of the course instructor.


505. Eukaryotic DNA Replication (3) [Rpt./1] (Identical with CBIO 505, which is home).

510. Plant Molecular Biology (3) (Identical with PL S 510).

511. Molecular Biology (3) (Identical with MCB 511).

512. Biological Electron Microscopy (4) (Identical with MCB 512, which is home).

516. Bioinformatics and Genomic Analysis (3) (Identical with MCB 516). May be convened with 416.

518. Laboratory Methods in Insect Physiology (3) (Identical with INSC 518, which is home).

533. Teaching Biology Labs (2) For description of course topics see 433. Graduate-level requirements include an additional project. (Identical with ENTO 533). May be convened with 433.

543. Research Animal Methods (3) (Identical with V SC 543, which is home). May be convened with 443.

545. Concepts in Genetic Analysis (3) (Identical with MCB 545, which is home).

555. Molecular Mechanisms of Development (3) (Identical with MCB 555, which is home).

561. Introduction to Biochemical Literature (1) 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. P, CR 462a-462b. (Identical with CHEM 561).


prokaryotic and eukaryotic systems will be considered. P, BIOC 411/511, MCB 411/511, or an equivalent introductory molecular biology course, or consent of the instructor. (Identical with GENE 568, INSC 568, and MCB 568).

569. Topics in Gene Regulation (2) 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, 568 or consent of instructor. (Identical with MCB 569).

572. Cell Regulation (3) (Identical with MCB 572, which is home).

574. Advances in Mammalian Genetics (2) [Rpt./1] 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 and MCB 574).

577. Biological Structure II (3) Advanced study of macromolecular structure; theory, methods, and results of x-ray crystallography and NMR. P, 585 or consent of instructor.


586. Intracellular Messengers (2) (Identical with NRSC 586, which is home).

588. Principles of Cellular and Molecular Neurobiology (4) (Identical with NRSC 588, which is home).

595. Colloquium a. Oncogenes and Signal Transduction (1) [Rpt./2] Open to graduate students in biological discipline, exceptionally qualified undergraduates (Identical with CBIO 595a).

597. Workshop a. Recombinant DNA Techniques (2) Open to high school biology teachers only. 1R, 3L. (Identical with MCB 597a).

Current Topics for Biology Teaching (1) [Rpt./29] Designed to inform in-service and pre-service biology teachers of new developments in the biologically sciences. Topics vary with each offering. Open to in-service and pre-service teachers only. P, 18 units of biological sciences.

621. Molecular, Plant, Microbe Interaction (3) (Identical with PL P 621, which is home).

623a-623b. Biology Update (2-2) Focuses on recent advances in the understanding of basic biology and new applications. Open to middle and high school biology teachers only. 623a is not a prerequisite to 623b. (Identical with ECOL 623a-623b and MCB 623a-623b).

633. Secondary Biology Lab Curricula (3) 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. Open to middle and high school biology teachers only. 2R, 3L. P, 18 units of biological sciences.

643. Biology Lesson Development (3) 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. 2R, 3L. P, 2 units of 900 level research; CR, 2 units of 900 level research. Open to middle and high school biology teachers only.

665. Analysis & Purification of Proteins (3) (Identical with AN S 665, which is home).

681. Introduction to Biochemical Research (1-5) [Rpt./1] Supervised research experiences in the laboratories of individual faculty members. 3 or 6L. Open only to first-year majors. P, CR 561.


696. Seminar a. Biochemistry I (1-3) [Rpt./9 units] b. Biochemistry II (1-3) [Rpt./9 units]

800. Research (1-16) Yr.


891. Preceptorship a. Biochemistry (3-12) [Rpt./12 units]

BIOLOGY

Four departments (Biochemistry, Ecology and Evolutionary Biology, Microbiology and Immunology, and Molecular and Cellular Biology) teach and do research in biology. They share a common core of courses. Details of their programs may be found under their respective listings.

CHEMISTRY (CHEM)

Chemistry Bldg., Rm. 221
The University of Arizona
PO Box 210041
Tucson, AZ 85721-0041
(520) 621-2808; FAX: (520) 621-8407
http://www.chem.arizona.edu/

Baccalaureate degrees
Bachelor of Arts (B.A.)
Bachelor of Science (B.S.)
104a-104b. *Fundamental Techniques of Chemistry (1-1) 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. Fees. P, CR, the corresponding 103 lecture class. Both 104a and 104b are offered each semester. For Honors listing see 106a-106b.

105a-105b. *Honors Fundamentals of Chemistry (3-3) Fundamental concepts of chemistry, with emphasis on theoretical and physical principles; atomic and molecular structure and theory, properties of gases, liquids and solids, thermodynamics and equilibria, kinetics, descriptive inorganic chemistry. Open to students who have had high school chemistry and physics and received acceptable scores on the ACT tests. 105a: P, CR, MATH 124.

106a-106b. *Honors Fundamentals Techniques of Chemistry (1-1) Advanced techniques in college chemistry; measurements, separations; identification; purification and analysis of organic and inorganic substances. Lab stresses individual studies and library research. P, CR, the corresponding 105 lecture class. Fees. Students are encouraged to CR for 199H to pursue original research project.

*Credit is allowed for only one of the following lecture-laboratory combinations: 101a-102a, or 103a-104a and 103b-104b, or 103a-106a and 103b-106b.

195. Colloquium c. Visions and Lasers (1)

241a-241b. **Lectures in Organic Chemistry (3-3) General principles of organic chemistry, P, 103b and 104b, or 105b and 106b. Both 241a and 241b are offered each semester.

242a-242b. **Honors Lectures in Organic Chemistry (3-3) General principles of organic chemistry. P, 103b and 104b, or 105b and 106b.

243a-243b. **Organic Chemistry Laboratory (1-1) An introduction to the organic chemistry 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. Heavy emphasis on microscale techniques, laboratory safety and waste disposal. Not available for chemistry majors. The experiments are designed to complement the principles concurrently presented in the corresponding lecture class and require knowledge of the lecture material to interpret. Fees. P, CR, the corresponding 241 lecture class. Both 243a and 243b are offered each semester.


296. Seminar a. Biological Chemistry (1) Open to introductory students in chemistry or the life sciences and premedical students. P, 103b and 104b, or 105b and 106b. (Identical with BIOL 296a).

302. Scientific Glassblowing (1-2) Methods of design and construction of scientific glass apparatus. Fees. 6L.

322. **Principles of Analysis I (2) Principles of modern quantitative analysis. Open to non-majors only. P, 103b and 104b, or 105b and 106b; CR, 323 encouraged.

323. **Principles of Analysis I Laboratory (1) Experiments in modern quantitative analysis. Open to non-majors only. Fees. 3L. P, CR, 322 or 325.

325. **Analytical Chemistry (2) Principles of modern quantitative analysis, including consideration of stoichiometry, equilibrium principles, treatment of experimental data, titrimetric and photometric analysis, and analytical separation processes. P, 103b and 104b, or 105b and 106b; CR, 323 or 326 encouraged.


400a-400b. Chemical Measurements Laboratory (2-2) Laboratory work in modern chemical measurements and instrumentation. Fees. 1R, 6L. 400a: P, 424 or CR. 400b: P, 480b. Writing-Emphasis Course* (400a).


404. Inorganic Chemistry (3) Fundamentals of inorganic chemistry. P, 480a or CR. May be convened with 504.

405. Chemical Safety (1) Fundamental principles of the safe handling, use, storage and disposal of hazardous chemical substances. Survey of protective and emergency equipment, hazard evaluation, laws and regulatory statutes and liability. P, 241b; 243b or 245b, or consent of the instructor.

407. Chemistry of the Solar System (3) (Identical with PTVS 407, which is home).

412. Inorganic Preparation (3) Standard inorganic laboratory preparations, including coordination compounds, isomeric compounds, and compounds typifying the groups of the periodic table. Fees. 9L. P. two semesters of laboratory chemistry beyond the first year. P, CR, 404 or consent of instructor. May be convened with 512.

424. Instrumental Analysis (3) Principles of modern instrumental methods of analysis treating basic instrumentation, data acquisition, and spectroscopic, electroanalytical, and chromatographic methods. P, 241b or 242b, 325 or 322, PHYS 103, 182.

433. Chemistry Demonstrations (3) Preparation and presentation of demonstrations of chemical phenomena in the classroom. Designed for undergraduate teaching majors in chemistry, for graduate students interested in teaching chemistry at the secondary or college level, and for chemistry teachers already employed in secondary school. 1R, 6L. P, 241b; 242b or 245b; or consent of instructor. May be convened with 533.

440. Qualitative Organic Analysis (3) The systematic classification and identification of organic compounds. Fees. 1R, 6L. P, 241b or 242b, 243b or 245b, 325 or 322.

446. Organic Preparations (3) Special experimental methods for the synthesis of organic compounds. Fees. 1R, 6L. P, 241b or 242b, 243b or 245b.

460. **General Protein and Metabolic Biochemistry (3) (Identical with BIOL 461, which is home).

461. General Nucleic Acid biochemistry (2) (Identical with BIOL 461, which is home).

462a-462b. **Biochemistry (3-3) (Identical with BIOL 462a-462b). Honors section available for (4) honors credits.

**Credit is allowed for only one course or sequence in each of the following groups: 101b or 241a-241b or 242a-242b; 102b or 243a-243b or 245a-245b; 325 or 322; 326 or 323; 460 or 462a-462b.

480a-480b. Physical Chemistry (3-3) Fundamental principles of physical chemistry. P, 103b and 104b, or 105b and 106b; MATH 125b; PHYS 103 or 132 or 241 or CR.

481. Biophysical Chemistry (3) Topics in physical chemistry pertinent to the biological sciences, including chemical dynamics, transport processes, thermodynamics, bonding, and spectroscopy. P, 480a.

491. Preceptorship a. College Teaching (1) [Rpt./2 units] May be convened with 591a.

b. Chemistry Course Development (1) [Rpt./2 units] May be convened with 591b.

c. Professional Service (1) [Rpt./2 units] May be convened with 591c.

Note: A combination of 491a, 491b, or 491c may be taken up to a total of 6 units.

493. Internship

I. Legislative Internship (1-12)

*Writing-Emphasis Course. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

501. Intermediate Analytical Chemistry (3) Survey of principles of modern analytical chemistry intended as concise review of modern chemical analysis. P, 424, 480b or consent of instructor.

502. Intermediate Organic Chemistry (3) For a description of course topics see 402. Graduate-level requirements include an in-depth research paper focusing on current research in a major area covered by the course. P, 241b or 242b. May be convened with 402.
503. Intermediate Physical Chemistry (3) General survey of physical chemistry, including thermodynamics, structure, kinetics and electrochemistry. P, 480b.

504. Inorganic Chemistry (3) For a description of course topics see 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 404.

510a-510b. Advanced Inorganic Chemistry (3-3) Survey at the advanced level of the chemistry of the elements. P, 404.

512. Inorganic Preparations (2-4) For course topics see 412. Graduate level requirements include more extensive background research and more in-depth lab reports. May be convened with 412.

517. Structural Chemistry (2) 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 (2) Laboratory designed to accompany 517. Students work in the lab, solve structures and report their findings in papers. 3L. CR, 517.

518. Computational Chemistry (2) State-of-the-art computational methods in chemical research, including approximate and ab initio electronic structure methods, molecular mechanics and modeling graphics. P, consent of department.

518L. Computational Chemistry Laboratory (1-2) Laboratory designed to accompany 518. Students work in the computer lab and report their findings in papers. 3 or 6L. P, consent of department. CR, 518.

520. Advanced Topics in Analytical Chemistry (2-3) [Rpt./6 units] Special topics in modern analytical chemistry. Recent offerings have included principles of biochemical 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, 424 or consent of instructor.

521a-521b. Advanced Analytical Chemistry (3-3) 521a: Principles of electronics, principles of signal processing hardware and software, instrumental principles of atomic and molecular spectroscopy, statistical treatment of data, chemometrics. P, 325, 424, 480b. 521b: Advanced fundamentals of equilibrium chemistry, principles of analytical separations including chromatography, principles of electroanalysis including ion selective electrodes and chemical sensors. P, 325, 424, 480b.

522. Electroanalytical Chemistry (2-3) Principles of electrochemistry and electroanalysis, including topics on electrochemical equilibria, electrode kinetics, potentiometry, coulometry, voltammetry and spectroelectrochemistry. Students enrolled in 3 units are required to complete an additional research project including a written paper and an oral presentation. P, 424 or consent of instructor.

523. Advanced Topics in Equilibrium Chemistry (2-3) [Rpt./6 units] 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, 521b or consent of instructor.

526a-526b. Analytical Spectroscopy (2-3/2-3) (a) Principles of atomic absorption and emission spectroscopy and x-ray methods for chemical analysis. (b) 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, 424 or consent of instructor.

527. Analytical Separations (2-3) 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, 424 or consent of instructor.


529. Methods of Surface and Materials Analysis (2-3) 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, 424 or consent of instructor.

533. Chemistry Demonstrations (3) For description of course topics see 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 433.

540. Organic Syntheses (3) Organic reactions and the methods by which they are applied to synthetic problems in organic chemistry. P, 241b, 480b.


561. Introduction to Biochemical Literature (1) (Identical with BIOC 561, which is home).

615. 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, 510b.


642a-642b. Polymer Chemistry (3-3) Synthesis, stereochemistry, and mechanisms of formation of high polymers. 642a: Condensation and ring-opening polymers. 642b: Vinyl polymers. P, 540. 642a is not prerequisite to 642b.
644. Heterocyclic Compounds (3) The behavior of the more important heterocyclic systems. P, 540.


646. Advanced Organic Chemistry (3) [Rpt.] Advanced topics in organic chemistry, such as peptide chemistry, computer simulations, bio-organic chemistry, and other topics characterized by faculty expertise. Topics will vary each semester. P, consult department before enrolling.


695. Colloquium a. Chemical Research Opportunities (1) [Rpt./7 units]
b. Exchange of Chemical Information (1 to 3) [Rpt./8 units]

696. Seminar a. Analytical Chemistry (1-3) [Rpt./8 units]
b. Inorganic Chemistry (1-3) [Rpt./8 units]
c. Organic Chemistry (1-3) [Rpt./8 units]
d. Physical Chemistry and Chemical Physics (1-3) [Rpt./8 units]

697. Workshop a. Chemical Instruments (1-3) [Rpt./8 units]

**COMPUTER SCIENCE (C SC)**

Gould-Simpson Bldg., Rm. 721
The University of Arizona
PO Box 210077
Tucson, AZ 85721-0077
(fax: (520) 621-6613; e-mail: Undergraduate: whitekat@cs.arizona.edu Graduates: wjs@cs.arizona.edu http://www.cs.arizona.edu/

Baccalaureate degree
Bachelor of Science (B.S.)

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

Major
Computer Science (B.S., M.S., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available online at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

127a. Introduction to Computer Science (4) Programming in a high-level language such as C++. Emphasis on program design issues. Programming topics: basic control structures, primitive data types, arrays, structures, simple recursion. 3R, 1L.

127b. Introduction to Computer Science (4) Continuation of 127a, programming in high-level language such as C++. Continued emphasis on program design. Programming topics: advanced recursion, linked lists, binary trees, hashing. 3R, 1L, P, 127a.

227. Program Design and Development (4) Programming using a language such as C. Several medium-sized projects will be required, with emphasis on program design and implementation techniques. P, 115, MATH 124 or 125a.


342. Data Structures and Algorithms (3) Mathematical preliminaries; fundamental data structures and associated algorithms, implementations and applications: stacks, queues, trees, graphs, sorting, and searching. P, 227, MATH 243 or MATH 362. (Identical with MATH 342).


372. Comparative Programming Languages (3) Introduction to several major high-level programming languages and their characteristics. Programming projects are required in at least three languages. P, 237 or MATH 307 or ECE 274, 342. (Identical with MATH 372).

402. Mathematical Logic (3) (Identical with MATH 402, which is home). May be convened with 502.

409a-409b. Advanced Symbolic Logic (3) (Identical with PHIL 409a-409b, which is home). May be convened with 509a-509b.

411b. Symbolic Logic (3) (Identical with PHIL 411b, which is home).

421. Advanced Systems Modeling and Simulation (3) (Identical with MIS 421, which is home).


425. Principles of Computer Networking (3) 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, 452. May be convened with 525.


438. Computational Linguistics (3) (Identical with LING 438, which is home). May be convened with 538.

443. Theory of Graphs and Networks (3) (Identical with MATH 443, which is home). May be convened with 543.

445. Algorithms (3) Mathematical preliminaries; using induction to design algorithms; introduction to analysis of algorithms; algorithms involving sequences and sets; graph algorithms; advanced topics. P, 342, 344, MATH 362. Writing-Emphasis Course.**

449. Continuous-System Modeling (3) (Identical with ECE 449). May be convened with 549.


452. Principles of Operating Systems (4) Concepts of modern operating systems; concurrent processes; process synchronization and communication; resource allocation; kernels; deadlock; memory management; file systems. P, 430.

453. Compilers and Systems Software (4) Basic concepts of compilation and related systems software. Topics include lexical analysis, top-down parsing, semantic analysis, code generation; assemblers, loaders, linkers; debuggers. P, 344, 372, 430.


472. Continuous-System Simulation (3) (Identical with ECE 472, which is home). May be convened with 572.

473. Automata, Grammars and Languages (3) Finite automata, regular expressions, and their applications; context-free grammars, pushdown automata, and their applications; Turing machines and undecidability; the Chomsky hierarchy. P, 344. (Identical with MATH 473). Writing-Emphasis Course.*

474a-474b. Computer-Aided Logic Design (3-3) (Identical with ECE 474a-474b, which is home). May be convened with 574a-574b.

475a-475b. Mathematical Principles of Numerical Analysis (3-3) (Identical with MATH 475a-475b, which is home).

479. Game Theory and Mathematical Programming (3) (Identical with MATH 479, which is home). May be convened with 579.

*Open only to students who meet the requirements for Advanced Standing as specified in the College of Business and Public Administration section of this manual.

**Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirements. (See "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual.)

502. Mathematical Logic (3) (Identical with MATH 502, which is home). May be convened with 402.

509a-509b. Advanced Symbolic Logic (3) (Identical with PHIL 509a-509b, which is home). May be convened with 409a-409b.

520. Principles of Programming Languages (3) Important programming language concepts, including types, control and data abstraction, denotational semantics, declarative and object-oriented languages, implementation issues. P, 453.

521a-521b. Systems Modeling and Simulation (3-3) (Identical with MIS 521a-521b, which is home).

522. Principles of Concurrent Programming (3) For a description of course topics see 422. Graduate-level requirements include more extensive problem sets and different examinations. P, 344; CR, 452.

525. Principles of Computer Networking (3) For a description of course topics see 425. Graduate-level requirements include additional and more challenging programming projects and different examinations. May be convened with 425.

530. Case Studies in Software Design (3) For a description of course topics see 430. Graduate-level requirements include additional and more challenging programming projects and different examinations. P, 237 or ECE 274, 342. May be convened with 430.

533. Computer Graphics (3) For a description of course topics see 433. Graduate-level requirements include more extensive and challenging programming assignments. P, 344, 430. May be convened with 435.

538. Computational Linguistics (3) (Identical with LING 538, which is home). May be convened with 438.

541a-541b. Computer-Aided Information System Analysis and Design (3-3) (Identical with MIS 541a-541b, which is home).

543. Theory of Graphs and Networks (3) (Identical with MATH 543, which is home). May be convened with 443.


549. Continuous-System Modeling (3) (Identical with ECE 549). May be convened with 449.

550. String and List Processing (3) For a description of course topics see 450. Graduate-level requirements include more extensive problem sets and different examinations. P, 344, 372, 430. May be convened with 450.

552. Advanced Operating Systems (3) Operating system design, implementation and modeling: deadlock and memory management models; protection mechanisms; operating systems for parallel and distributed systems. P, 452.


560. Database Systems (3) For a description of course topics see 460. Graduate-level requirements include more extensive problem sets and different examinations. P, 344, 372, 430. May be convened with 460.

571a. Digital Systems Design (3) (Identical with ECE 571a, which is home).

572. Continuous-System Simulation (3) (Identical with ECE 572, which is home). May be convened with 472.


574a-574b. Computer-Aided Logic Design (3-3) (Identical with ECE 574a-574b, which is home). May be convened with 474a-474b.

575a-575b. Numerical Analysis (3-3) (Identical with MATH 575a-575b, which is home).


578. Computational Methods of Algebra (3) (Identical with MATH 578, which is home).

579. Game Theory and Mathematical Programming (3) (Identical with MATH 579, which is home). May be convened with 479.

620. Advanced Topics in Programming Languages (3) [Rpt./12 units] 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./12 units] 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./12 units] 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./12 units] Operating system design, development, analysis, and performance; specific topics to be determined by current literature and faculty and student interest.

674. Test Generation for Automata (3) (Identical with ECE 674).

969. Seminar
a. Current Computing Research (1-3) [Rpt./8]
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.

100. Biology Concepts (4) Levels of biological organization from biosphere to atoms provide a framework around which are developed concepts of diversity and unity of life forms, genetic continuity and evolutionary change, and the independent nature of ecosystem components. Non-science majors orientation. 3R, 3L. Field trips.

105R. Introductory Botany (3) Structure, function, development, and economic importance of flowering plants; brief overview of plant diversity. 3R. 105R must be taken concurrently with 105L to satisfy general education science requirements.

105L. Introductory Botany Laboratory (1) Study of botanical materials, involving observation, experimentation and data analysis. Non-majors orientation. 3L. P. CR 105R.

108. Plants and Society (3) Lecture-demonstration course on the interrelationships between plants and man; discussion of plants as a source of food, fiber, drugs and other products; plants for esthetic value, survival and energy.

123. Introduction to Evolution (2) 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) Elementary biology of the common plants and animals of the Southwest; identification, distribution, ecology. 2R, 2L. Field trips.

181L. Introductory Biology Laboratory (1) (Identical with MCB 181L, which is home).

181R. Introductory Biology I (3) (Identical with MCB 181R, which is home).

182. Introductory Biology II (4) 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. High school biology recommended. Field trips. P, at least MATH 117 (Level III) placement on the Math Readiness Test. (Identical with BIOC 182, MCB 182, MIC 182).

183. Marine Biology (3) Survey of the marine environment and its biotic communities, with emphasis on the natural history of marine organisms. 2R, 3L. Weekend field trip.

195. Colloquium c. Society and Science (1) (Identical with BIOC 195c, which is home).

205H. Do Animals Think? (3) A survey of studies on animal cognition. Discussion and comparison of papers describing the rationale, design, and success of research projects comparing nonhuman primates, mammals, and birds. P, completion of First-Year Composition. For psychology credit, you must take PSYC 101 first. (Identical with PSYC 205H).


260. Elementary Plant Physiology (4) Functions, nutrition, metabolism, and development of higher plants. 3R, 3L. P, 181 and 182, or PL 100; CHEM 101b, 102b.


303. Vertebrate Diversity (4) Phylogeny and diversification of the major groups of fishes and tetrapods, and evolution of their diagnostic features and adaptations. P, 182 or equivalent.

320. Genetics (4) 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, 181R, 181L and 182, CHEM 103b, 104b. (Identical with MCB 320).

320H. Genetics (5) 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) 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) 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, 181R, 181L, 182.

380. Math Models in Biology (3) 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).


403R. Biology of Animal Parasites (3) (Identical with V SC 403R, which is home). May be convened with 503R.

403L. Parasitology Laboratory (1) (Identical with V SC 403L, which is home). May be convened with 503L.

404. Physiological Systems (3) 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, 182, MCB 181R, 181L, course in bio-chemistry suggested. (Identical with BIOC 404, ENT0 404, and INSC 404).

405. Aquatic Entomology (3) (Identical with ENT0 405, which is home). May be convened with 505.


411. Insect Behavior (3) (Identical with ENT0 411, which is home). May be convened with 511.

412. Plants Useful to Man (2) 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 512.

414. Plants of the Desert (2) Designed for teachers and others wishing to become familiar with common native and cultivated plants; identification, ecology, and uses. May be convened with 514.

415R. Insect Ecology (3) (Identical with ENT0 415R, which is home). May be convened with 515R.

415L. Insect Biology Laboratory (1) (Identical with ENT0 415L which is home). May be convened with 515L.

416. Bioinformatics and Genomic Analysis (3) (Identical with MCB 416, which is home). May be convened with 516.

417. Insect Systematics (4) (Identical with ENT0 417, which is home). May be convened with 517.

420. Evolutionary Quantitative Genetics (4) 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 520.

421. Philosophy of the Biological Sciences (3) (Identical with PHIL 421, which is home). May be convened with 521.

423. Cytogenetics (3) Investigation into the structure and function of chromosomes and their role in heredity and evolution. 2R, 3L. P, 320. (Identical with GENE 423). May be convened with 523.

424. Theoretical Population Genetics (3) Mathematical theory of modern population genetics developed from first principles with emphasis on evolutionary implications and the historical development of ideas. P, 320, MATH 223. (Identical with ANTH 424, INSC 424, and GENE 424). May be convened with 524.

428. Microbial Genetics (3) (Identical with PL P 428, which is home).
433. **Human Genetics** (3) (Identical with GENE 433, which is home). May be convened with 533.

434. **Population Interactions** (4) [Rpt.] Empirical and theoretical treatment of competition, exploitation, and mutualism within and between species, with emphasis on application of modern dynamics to ecological problems. Computer lab. 3R, 3L. P, 302, two semesters of calculus. May be convened with 534.

435. **Evolution II** (4) 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, 320, MATH 125a, P or CR 125b. (Identical with GENE 435). May be convened with 535. Writing-Emphasis Course.*


438. **Biogeography** (3) The role of historical events and ecological processes in determining the past and present geographic distribution of plants and animals. P, 182. (Identical with GEOS 438). May be convened with 538.

439. **Animal-Human Communication** (3) Survey of animal-human communication studies. Critical discussion of papers describing the rationale, design and success of projects involving nonhuman primates, marine mammals, and a parrot, supplemented by films and videos. Background material on animal-animal communication and animal intelligence. Emphasis on what can be learned about human and nonhuman capacities from studying how animals acquire and use human communication systems. P, 487 or equivalent, or instructor’s consent. (Identical with PSYC 439). May be convened with 539.

440R. **Oceanography** (2) Introduction to the physical, chemical, geological, and biological dimensions of the oceans, with emphasis on their importance as biological environments. May be convened with 540R.

441. **Limnology** (4) (Identical with WFSC 441, which is home). May be convened with 541.

442. **Marine Ecology** (6) A field introduction to basic concepts in marine ecology with emphasis on the behavior and ecology of invertebrates and fishes and the factors affecting the diversity and community structure of marine communities. The entire course is conducted at selected sites in the Gulf of California. Optional travel fee. Consult instructor before enrolling. May be convened with 542.

444. **Insect Ecology** (3) (Identical with ENTO 444, which is home). May be convened with 544.

459. **Comparative Vertebrate Histology** (4) (Identical with V SC 459, which is home). May be convened with 559.


466. **Physiology Laboratory** (3) Emphasis on data acquisition, analysis and interpretation. Laboratory techniques and investigation of physiological mechanisms. 2R, 4L. P, either 437, 468, V SC 404a-404b; or PSIO 480. (Identical with MCB 466, PSIO 466, PCOL 466 and V SC 466). May be convened with 566.

468. **Comparative Physiology** (3) The responses of physiological systems to the environment; energy exchanges, respiration, thermal and osmotic regulation, locomotion, behavioral regulation, and integration of responses. P, either 437, V SC 404a-404b, or PSIO 480. (Identical with PSIO 468 and V SC 466). May be convened with 568.

470. **Plant Diversity and Evolution** (4) Survey of the plant kingdom, with emphasis on comparative structure and evolution of major plant divisions. 2R, 6L. Field trips. P, 4 units of biology or plant sciences. May be convened with 570.

472. **Systematic Botany** (4) Evolutionary relationships of orders and families of spermatophytes; systems of classification; collection and identification of local flora. 2R, 6L. (Identical with PL S 472). May be convened with 572.

474. **Aquatic Plants and the Environment** (4) (Identical with SWES 474, which is home). May be convened with 574.

475. **Freshwater and Marine Algae** (4) Systematics, ecology, and evolution of planktonic and benthic species; field techniques and lab. culture. 2R, 6L. Field trips. P, 4 units of biology or plant sciences. (Identical with SWES 475 and WFSC 475). May be convened with 575. Writing-Emphasis Course.*

476a-476b. **Analysis of Biological Diversification** (3-3) [Rpt./1] 476a: Patterns of biological diversity and the history of diversification and extinction. Phylogenetic analysis will be introduced to address issues in ecology, paleobiology, development and genetics. One Saturday field trip. P, 181 and 182 and either an evolution or paleobiology course or consent of instructor. Writing-Emphasis Course.* 476b: Explores approaches to studying biological diversification, integrating phylogenetic biology, ecology, population genetics, developmental biology and molecular biology. P, 335 or consent of instructor. (Identical with GEOS 476a-476b and MCB 476a-476b). May be convened with 576a-576b.

478. **Global Change** (3) (Identical with GEOS 478, which is home). May be convened with 578.

479. **Art of Scientific Discovery** (3) [Rpt.] Techniques of posing questions and solving puzzles encountered in scientific research, with emphasis on life sciences and mathematics. P, consult with department before enrolling. May be convened with 579.

480. **Invertebrate Zoology** (4) Comparative morphology, physiology, and ecology of invertebrates. 3R, 3L. Field trips. P, 182. May be convened with 580.

482. **Ichthyology** (4) Ecology, evolution and systematic of fishes, with field and lab. emphasis on Gulf of California and Arizona fishes. 2R, 6L. Field trips. P, 182. (Identical with WFSC 482). May be convened with 582. Writing-Emphasis Course.*

483. **Herpetology** (4) Systematics, ecology, and evolution of the amphibians and reptiles. 2R, 6L or field work. P, 304. (Identical with WFSC 483). May be convened with 583.

484. **Ornithology** (4) Natural history of birds and its bearing upon the problems of animal behavior, distribution, and evolution. 2R, 2L. Field trips. P, one basic biology course. (Identical with WFSC 484). May be convened with 584. Writing-Emphasis Course.*


487R. **Animal Behavior** (3) Concepts and principles of the mechanism, development, function and evolution of behavior, with emphasis on its adaptiveness. P, 8 units of biology. May be convened with 587R. Writing-Emphasis Course.*

487L. **Animal Behavior Laboratory** (1) Exposure to current topics in behavior and process of behavioral research through video presentations, demonstrations of live animals and readings. May be convened with 587L.

488L. **Arizona Mammals Laboratory** (1-2) The identification, distribution, and ecology of species of local mammals; with laboratory, library, and field experience. P, 485, or P, CR, 488R or 588R. (Identical with WFSC 488L). May be convened with 588L.


489. **Selected Studies of Birds** (2) [Rpt.] Recent advances in ornithology. 1R, 1L. P, 484. (Identical with WFSC 489). May be convened with 589.

496. **Seminar**

a. **Workshop**

1. **Undergraduate Teaching Training in Ecology**
and Evolutionary Biology (1-5) [Rpt./12 units] P, consult department before enrolling.

*Writing-Emphasis Course. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

500a-500b. Topics in Ecology and Evolutionary Biology (4-3) 500a: Introduction to graduate study in ecology and evolutionary biology, via discussion of ongoing faculty research interests. 500b: Introduction to field research methods in ecology. Field trips. (Identical with INSC 500a-500b).

501. Biological Materials (2) For a description of course topics see 401. Graduate-level requirements include the design and presentation of a unique and challenging laboratory experience appropriate for a secondary school biology course. P, 12 units of biology. May be convened with 401.

503R. Biology of Animal Parasites (3) (Identical with V SC 503R, which is home). May be convened with 403R.

503L. Parasitology Laboratory (1) (Identical with V SC 503L, which is home). May be convened with 403L.

505. Aquatic Entomology (3) (Identical with ENTO 505, which is home). May be convened with 405.

506. Conservation Biology (3-4) For description of course topics see 406. Graduate-level requirements include a research paper. P, 182, 302. (Identical with RNR 506 and GEOS 506). May be convened with 406.

511. Insect Behavior (3) (Identical with ENTO 511, which is home). May be convened with 411.

512. Plants Useful to Man (2) For a description of course topics see 412. Graduate-level requirements include a research paper. May be convened with 412.

514. Plants of the Desert (2) For a description of course topics see 414. Graduate-level requirements include a research paper on a relevant topic. May be convened with 414.

515R. Insect Biology (3) (Identical with ENTO 515R, which is home). May be convened with 415R.

515L. Insect Biology Laboratory (1) (Identical with ENTO 515L, which is home). May be convened with 415L.

516. Bioinformatics and Genomic Analysis (3) (Identical with MCB 516, which is home). May be convened with 416.

517. Insect Systematics (4) (Identical with ENTO 517, which is home). May be convened with 417.

518. Laboratory Methods in Insect Physiology (3) (Identical with INSC 518, which is home).

520. Evolutionary Quantitative Genetics (4) For a description of course topics see 420. Graduate-level requirements include a research paper. P, calculus. May be convened with 420.

521. Philosophy of the Biological Sciences (3) (Identical with PHIL 521, which is home). May be convened with 421.

523. Cytogenetics (3) For a description of course topics see 423. Graduate-level requirements include an in-depth research paper on a current problem in cytogenetics. P, 320. (Identical with GENE 523). May be convened with 423.

524. Theoretical Population Genetics (3) For a description of course topics see 424. Graduate-level requirements include an oral presentation. P, 320, MATH 223. (Identical with ANTH 524, INSC 524 and GENE 524). May be convened with 424.


533. Human Genetics (3) (Identical with GENE 533, which is home). May be convened with 433.

534. Population Interactions (4) [Rpt.] For a description of course topics see 434. Graduate-level requirements include independent study of a model or data ecological system to be specified by the professor. P, 302, two semesters of calculus. May be convened with 434.

535. Evolution II (4) For a description of course topics see 435. Graduate-level requirements include two term papers, the subject to be determined by the professor. P, 302, 320; MATH 125a, P or CR, 125b. (Identical with GENE 535). May be convened with 435.

538. Biogeography (3) For a description of course topics see 438. Graduate-level requirements include a research paper. P, 182. (Identical with GEOS 538). May be convened with 438.

539. Animal-Human Communication (3) For a description of course topics see 439. Graduate-level requirements include a research paper. (Identical with PSYC 539). May be convened with 439.

540R. Oceanography (2) For a description of course topics see 440R. Graduate-level requirements include an additional literature paper on a modern aspect of oceanography. May be convened with 440R.

541. Limnology (4) (Identical with WFSC 541, which is home). May be convened with 441.

542. Marine Ecology (6) For a description of course topics see 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 442.

544. Insect Ecology (3) (Identical with ENTO 544, which is home). May be convened with 444.

545. Concepts in Genetic Analysis (3) (Identical with MCB 545, which is home).

level requirements include use of all techniques in a semester-long research project and final paper. P, consult with department before enrolling. May be convened with 479.

580. Invertebrate Zoology (4) For a description of course topics see 480. Graduate-level requirements include an in-depth research project on a modern aspect of invertebrate zoology. P, 182. May be convened with 480.

582. Ichthyology (4) For a description of course topics see 482. Graduate-level requirements include an in-depth research project on a single aspect of the course topic. P, 182. (Identical with WFSC 582). May be convened with 482.

583. Herpetology (4) For a description of course topics see 483. Graduate-level requirements include an in-depth paper. P, 304. (Identical with WFSC 583). May be convened with 483.

584. Ornithology (4) For a description of course topics see 484. Graduate-level requirements include an oral presentation of the results of an independent research project. Field trips. P, one basic biology course. (Identical with WFSC 584). May be convened with 484.

585. Mammalogy (4) For a description of course topics see 485. Graduate-level requirements include an exercise in mammalian taxonomy and a higher level of performance. P, 304. (Identical with WFSC 585). May be convened with 485.


587R. Animal Behavior (3) For a description of course topics see 487R. Graduate-level requirements include term paper involving hands-on research. P, 8 units of biology. May be convened with 487R.

587L. Animal Behavior Laboratory (1) For a description of course topics see 487L. Graduate-level requirements include organizing and leading of group discussion. May be convened with 487L.

588L. Arizona Mammals Laboratory (1-2) For a description of course topics see 488L. Graduate-level requirements include an in-depth research paper, which may be expanded version of that done for 588R. P, 85; CR, 488R or 588R. (Identical with WFSC 588L). May be convened with 488L.

588R. Arizona Mammals (3) For a description of course topics see 488R. Graduate-level requirements include an in-depth research paper. P, 182. (Identical with WFSC 588R). May be convened with 488R.

589. Selected Studies of Birds (2) [Rpt.] For a description of course topics see 489. Graduate-level requirements include an in-depth presentation of a single aspect of the course topic. P, 484. (Identical with WFSC 589). May be convened with 489.

596. Seminar
a. Evolutionary Ecology (1-2) [Rpt./5]
b. Population Biology (1) [Rpt./6] Open to majors only.
c. Selected Topics in Marine Biology (1-4) [Rpt./6 units] Field trips. P, junior or senior ecology majors. May be convened with 496d. d. Plant Population Ecology (1-3) [Rpt./5] P, some introductory botany, ecology, and consent of instructor. May be convened with 496j.
e. Conservation Biology (1) [Rpt./6 units] Field trip. (Identical with RNR 596m).
f. Macroevolution (2) [Rpt./6 units] (Identical with GEOS 596p).
g. Species Diversity (2) 1995-96 P, 302. May be convened with 496r.

597. Workshop
b. Phylogenetic Inference (2) (Identical with ENTO 597b, which is home).

610a-610b. Research in Ecology and Evolution (1-1) [Rpt.] Introduction to the research currently being pursued by faculty and staff in the department. Open to majors only.

623a-623b. Biology Update (2-2) (Identical with BIOC 623a-623b, which is home).

670. Recent Advances in Genetics (2) [Rpt./10] (Identical with GENE 670, which is home).

GEOSCIENCES (GEOS)
Gould-Simpson Bldg., Rm. 208
The University of Arizona
PO Box 210077
Tucson, AZ 85721-0077
(520) 621-6024; FAX: (520) 621-2672
e-mail: chair@geo.arizona.edu
http://www.geo.arizona.edu/

Baccalaureate degree
Bachelor of Science in Geosciences (B.S.G.)
Graduate degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors
Geosciences (B.S.G., M.S., Ph.D.)
B.S.G. Options: environmental geology
goalogy

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Report (APRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

101. Introduction to Planet Earth (3) Earth's materials; surface and internal geologic processes; development of plate tectonics model. CR, 103.


106. Survey of the Solar System (3) 3R, 3L. (Identical with PTYS 106, which is home).

107a. Introduction to Global Change (4) Examination of the ways humanity alters the global environment; analysis of linkages between components of the earth system (i.e., atmosphere, biosphere, and geosphere). 107a not prerequisite to 107b. For non-majors only. (Identical with HWR 107a).

107b. Introduction to Global Change (4) (Identical with HWR 107b, which is home).

109L. Exploration and Discovery in Planetary Science (1) (Identical with PTYS 109L, which is home).

110. Introduction to Environmental Geology (3) 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. 3R, 3L. Field trips. Primarily for non-majors.

112. Introduction to Oceanography (3) 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.


195. Colloquium
a. Evolution and History of the Earth (1) d. A Sense of Place (1)


204. Structure and Physics of the Earth (4) 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. 3L, 3R. Field trips. P, 201, MATH 124 or 125a.
302. Principles of Stratigraphy and Sedimentation (3) An integrated treatment of the condensed materials that constitute the earth. Review of chemical principles, the origin and distribution of the elements. Crystallography, physical properties, and crystal chemistry of minerals. Systematic treatment of the crystal chemistry and physical properties of rock-forming silicate and non-silicate minerals. Equilibrium relations among geological solids and fluids. Distribution of elements in surficial and crustal rocks, oceanic and mantle minerals, rocks and fluids. Geochemical cycles. Identification of minerals in hand specimen, chemical calculations. 3R, 3L, P. 101, 102, 103, and CHEM 103.

209. Introduction to Mineralogy and Geochemistry (3) 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.

280. History of Life (2) Scenarios for major events in the history of life from the origin of the Earth to the evolution of humans.

302. Principles of Stratigraphy and Sedimentation (3) GRD Basic principles and methods of stratigraphic analysis; sedimentation and deposition, facies relations, evaluation of unconformities, stratigraphic classification and nomenclature, and correlation of sediment and geological history from limited observations. Several required field trips. P. 321.

312. Introduction to Field Methods (1) 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. Several required field trips. P. 321.

312. Introduction to Geophysics (3) GRD Physical principles applied to problems in earth science including seismology, gravity, magnetics, heat flow, plate tectonics. P. PHYS 182 and 241.

330. Introduction to Remote Sensing (3) (Identical with GEOG 330, which is home).


346. Mineral and Energy Resources (3) History of the impact of minerals and metals on development of society and civilization, uniqueness of resources, current situation and problems. P. junior standing.

346H. Mineral and Energy Resources (3) History of the impact of minerals and metals on development of society and civilization, uniqueness of resources, current situation and problems. P. junior standing.

396H. Honors Proseminar

397. Workshop

400. Introduction to Geochemistry (3) Nuclear systematics and thermodynamics with applications to geologic processes. P. 101, 103; CHEM 103b, 104b. May be convened with 500.


403. Physics of the Solar System (3) (Identical with PTYS 403, which is home). May be convened with 503.

406. Conservation Biology (3-4) (Identical with ECOL 406, which is home). May be convened with 506.

407. Photogeology (3) (Identical with G EN 407, which is home). May be convened with 507.

409a. Magmatic and Metamorphic Processes (3) An integrated quantitative approach to process oriented problems in igneous and metamorphic petrology, especially in dynamic environments, through the applications of physio-chemical principles and experimental data to geological observations. P. 315 or equivalent, calculus.

411. Geology of the Solar System (4) (Identical with PTYS 411, which is home).


413. Geology Field Camp II (3) Field studies in geology, with emphasis on geologic mapping. Fee. P. 412.


416. Field Studies in Geophysics (3) (Identical with G EN 416, which is home). May be convened with 516.

417. Sedimentology/Stratigraphy (3) Physical mechanisms of sedimentary basin formation, including flexure, thinning and thermal contraction of the lithosphere; isotasy; subsidence analysis; sequence stratigraphy; paleocurrents and sediment provenance; tectonics of sedimentary basins. P. 302 or 544. May be convened with 517.

418. Advanced Mineralogy (3) Principles of crystallography and crystal chemistry; thermodynamic and kinetic of minerals; macroscopic treatment and atomic basis; phase transformations; systematic mineralogy. P. 209 or consult department before enrolling. May be convened with 518.

419. Physics of the Earth (3) Fundamentals of the physics of the solid earth, including thermodynamics, rheology, geomagnetism, gravity, and plate tectonics. P. MATH 254. (Identical with PTYS 419). May be convened with 519.

421. Structural Geology (3) GRD Integration of geological structures created through deformation of the Earth's crust. Emphasis on fundamental concepts and methods in geometric, kinematic, and dynamic analysis. Strong field component. 3R, 3L, Field trips. P. 204. May be convened with 521.

423. Regional Structural Geology (3) (Identical with PTYS 423) Geologic mapping in a variety of rock types and structural regimes, with emphasis on the recognition and solution of regionally significant structural problems. Field trips. P. 413. May be convened with 523.

425. Regional Tectonics (3) Discussion of the geology, geophysics, petrology, and geochemistry of different types of orogenic systems and their tectonic evolution. Methods of tectonic regionalization and integration based on lithotectonic assemblages and terranes, and regional structural geology. Plate tectonic regimes and kinematics. May be convened with 525.

426. Cordilleran Tectonics (3) Geology and tectonic evolution of the North American Cordillera based on analysis of geologic, paleomagnetic, and paleobiogeographic constraints and tectonic models. May be convened with 526.

430. Chemical Evolution of the Earth (3) Chemical differentiation and evolution of Earth's mantle and crust according to major-element, trace-element and isotopic characteristics of neodymium, hafnium, strontium, lead and other isotopes. May be convened with 530.

431. Hydrogeology (4) (Identical with HWR 431, which is home). May be convened with 531.

432. Introduction to Seismology (3-5) Fundamentals of the generation, propagation, and interpretation of seismic waves. Two sections: earthquake seismology and exploration seismology. Sections meet together for introduction then students choose one (3 units) or both (5 units) for the remainder of the semester. P. MATH 254, or consent of instructor. May be convened with 532.

433. Mine Investment Analysis (3) Economic factors, including taxation, mineral depletion allowance, and finance in the mining industry, includes fundamentals of engineering economics, capital budgeting, and risk analysis. May be convened with 533.

438. Biogeography (3) (Identical with ECOL 438, which is home). May be convened with 538.

440. Geodynamics and Paleomagnetism (3) [Rpt.] Large-scale tectonic problems approached by combined geophysical and geologic analysis in regional context. P, 20 units of geology, including 321, 3 units geophysics, MATH 254; consult with department before enrolling. May be convened with 540.


447. Industrial Minerals and Rocks (3) Geology, origin, mode of occurrence, and methods of evaluation of nonmetallic mineral deposits. 2R, 3L. P, 446. May be convened with 547.

448. Geophysical Exploration and Engineering (3) (Identical with G EN 448, which is home). May be convened with 548.

449. Mineral Exploration (3) (Identical with G EN 449, which is home). May be convened with 549.

450. Geomorphology (4) Concepts of landform development, with emphasis on fluvial processes and environmental applications. 3R, 3L. P, 446. May be convened with 547.

451. Strategies in Environmental Hydrogeochemistry (3) Origin, migration, chemistry, and accumulation of petroleum; reservoir mechanisms, types of traps; recovery of petroleum; oil shales and tar sands. 2R, 3L. May be convened with 552.


456. Thrust Belts and Synorogenic Sediments (3) Geometry and mechanics of thrust faults and thrust belts; tectonics of contractional orogenic belts; geology of thrust belts and foreland basin system; depositional systems and provenance of foreland basin sediments; application of orogenic-wedge models. Field trips. P, 302 or equivalent. May be convened with 556.

458. Geochemistry (3) Introduction to geochemical methods used in the geological sciences including K-Ar, 40 AR/39 AR, Rh-Sr, Sm-Nd, U-Th-Pb, and fission track techniques. Application of isotopic dating techniques to the study of crustal dynamics. May be convened with 558.

459. Thermochronology (3) Closure temperature theory and methods used to determine temperature - time histories of igneous and metamorphic rocks. Applications of thermochronology and P-T-t paths of crustal terranes. May be convened with 559.


465. Phylogenetic Biology (3) (Identical with ECOL 465, which is home). May be convened with 565.


473. Geology and the Urban Environment (3) Geologic processes that result in loss of life and/ or property damage; emphasis on case studies of urban areas in the Southwest. Implications for public policy. 2R, 3L. All-day field trips. (Identical with PLAN 473). May be convened with 573.

476a-476b. Analysis of Biological Diversification (3-2) [Rpt./1] (Identical with ECOL 476a-476b, which is home). May be convened with 576a-576b.

478. Global Change (3) 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. Required. May be convened with ECOL 478, GEOG 478, HWR 478 and RNR 478). May be convened with 578.


482. Paleoclimatology (3) Topics in paleoclimatology including prediction of paleoclimatic patterns, proxy paleoclimatic indicators, and paleoclimatic cycles. May be convened with 582.


490. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 490, which is home). May be convened with 590.

497. Workshop c. Dendrochronology (1-4) 3 or 6L. Field trips. (Identical with ANTH 497c and WS M 497c). May be convened with 597c.

500. Introduction to Geochemistry (3) For a description of course topics see 400. Graduate-level requirements include an independent research project. P, 101, 103, CHEM 103b, 104b. May be convened with 400.

501. Earth Science Teaching Methods and Materials (3) For description of course topics see 401. Graduate-level requirements include two additional projects. May be convened with 401.

502a-502b. Statistical Analysis of Geological Data (3-3) 502a. For a description of course topics see 402a. Graduate-level requirements include an additional term project on an approved topic. P, MATH 124, 125b. May be convened with 402a. 502b. For a description of course topics see 402b. Graduate-level requirements include an additional term project on an approved topic. P, 502a or equivalent. May be convened with 402b.

503. Physics of the Solar System (3) (Identical with PTYS 503, which is home). May be convened with 403.

505. Applied Multispectral Imagery (3) (Identical with G EN 505, which is home).

506. Conservation Biology (3-4) (Identical with ECOL 506, which is home). May be convened with 406.

507. Photogeology (3) (Identical with G EN 507, which is home). May be convened with 407.

509b. Conditions and Rates of Metamorphic Processes (3) An advanced treatment of the topic based primarily on the principles of classical thermodynamics, reaction-, order-disorder- and diffusion-kinetics, and heat transfer. P, 409a or 583 or consent of instructor.

510. Principles of Cosmochemistry (3) (Identical with PTYS 510, which is home).

513. Late Quaternary Geology (3) Paleoenvironment and geochronology of Late Quaternary alluvium as read from the stratigraphic record and paleoecology 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. Domestic field trips. Enrollment limited to 10 students. P, 102, 104. (Identical with ANTH 514).
516. Field Studies in Geophysics (3) (Identical with G EN 516, which is home). May be convened with 416.

517. Sedimentology/Stratigraphy (3) For a description of course topics see 417. Graduate-level requirements include an independent research project. P, 302 or 544. May be convened with 417.

518. Advanced Mineralogy (3) For a description of course topics see 418. Graduate-level requirements include an independent research report. P, 209 or consult department before enrolling. May be convened with 418.

519. Physics of the Earth (3) For a description of course topics see 419. Graduate-level requirements include a term paper in publication format on some aspect of a major course topic. P, MATH 254; PHYS 142. (Identical with PTYS 519). May be convened with 419.

520. Meteorites (3) (Identical with PTYS 520, which is home).

521. Structural Geology (4) For a description of course topics see 421. Graduate-level requirements include a research project. 3R, 3L. Field trips. P, 204. May be convened with 421.

522. Well Logging Interpretation (3) (Identical with G EN 522, which is home).

523. Regional Structural Geology (3) (Rpt./3) For a description of course topics see 423. Graduate-level requirements include additional reading assignments on structural processes and regional geology. Field trips. P, 413. May be convened with 423.

525. Regional Tectonics (3) For a description of course topics see 425. Graduate-level requirements include a research paper on topical or regional tectonics. May be convened with 425.

526. Cordilleran Tectonics (3) For a description of course topics see 426. Graduate-level requirements include final report concerning some aspect of the tectonic evolution of western North America. May be convened with 426.

527. Orogenic Systems (3) 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.


530. Chemical Evolution of the Earth (3) For a description of course topics see 430. Graduate-level requirements will include an additional paper. (Identical with PTYS 530). May be convened with 430.

531. Hydrogeology (4) (Identical with HWR 531, which is home). May be convened with 431.

532. Introduction to Seismology (3-5) For a description of course topics see 432. Graduate-level requirements include a term paper. P, MATH 254, or consent of instructor. May be convened with 432.

533. Mine Investment Analysis (3) For a description of course topics see 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 433.

535. Advanced Subsurface Hydrology (3) (Identical with HWR 535, which is home).

536. Ground Water Resource Evaluation (3) Fees. (Identical with HWR 536, which is home).

537. Economics of Mineral Resource Development and Production (3) For a description of course topics see 437. Graduate-level requirements include an additional term project on an approved topic. May be convened with 437. P, ECON 201a or 210 or equivalent.

538. Biogeography (3) (Identical with ECOL 538, which is home). May be convened with 438.


540. Geodynamics and Paleomagnetism (3) (Rpt.) For a description of course topics see 440. Graduate-level requirements include a quantitative modeling project in some aspect of tectonics and a publication-format paper. P, 20 units of geology, including 321, 3 units geophysics, MATH 254; consult with department before enrolling. May be convened with 440.

541. Soil Genesis (3) (Identical with SWES 541, which is home).

542. Ore Deposit Petrology (3) Orthomagmatic, porphyry base metal, skarn, and leached capping metal systems ranging from currently active belts in both oceanic and continental settings back through Phanerozoic, Proterozoic, and into Archean time.

543. Glacial and Quaternary Geology (3) For a description of course topics see 433. Graduate-level requirements include a research paper review. P, 321, 3 units geophysics, MATH 254; consult with department before enrolling. May be convened with 433.

544. Advanced Physical Sedimentology (3) 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, deltaic, nearshore, shelf, slope and turbidite fan systems. Emphasis is on clastic systems. Field trips. P, 302, MATH 254 or consent of instructor.

546. Economic Mineral Deposits (3) GRD For a description of course topics see 446. Graduate-level requirements include an independent study project. P, 209, 321. May be convened with 446.

547. Industrial Minerals and Rocks (3) For a description of course topics see 447. Graduate-level requirements include a term paper. P, 446. May be convened with 447.

548. Geophysical Exploration and Engineering (3) (Identical with G EN 548, which is home). May be convened with 448.

549. Mineral Exploration (3) (Identical with G EN 549, which is home). May be convened with 449.

550. Geomorphology (4) For a description of course topics see 450. Graduate-level requirements include panel leaderships on environmental discussion sessions, and additional lab exercise questions. 3R, 3L. P, 101, 103. (Identical with ARL 550). May be convened with 450.

552. Strategies in Environmental Hydrogeochemistry (3) For a description of course topics see 452. Graduate-level requirements include a term paper regarding some aspect of a major course topic. 2R, 3L. May be convened with 452.

553. Glacial and Quaternary Geology (3) For a description of course topics see 453. Graduate-level requirements include an independent research project or term paper in publication format. P, 102, 104. May be convened with 453.

554. Evolution of Planetary Surfaces (3) (Identical with PTYS 554, which is home).

555. Remote Sensing of Planetary Surfaces (3) (Identical with PTYS 555, which is home).

556. Thrust Belts and Synorogenic Sediments (3) For a description of course topics see 456. Graduate-level requirements include an in-depth research paper on a single aspect of the course topic. Field trip. P, 302 or equivalent. May be convened with 456.

558. Geochronology (3) For a description of course topics see 458. Graduate students will be required to present projects at the end of the semester. May be convened with 458.

559. Thermochronology (3) For description of course topics see 459. Graduate students will be required to present projects at the end of the semester. May be convened with 459.

560. Electrical Exploration Methods (3) (Identical with G EN 560, which is home).

561. Paleindian Origins (3) (Identical with ANTH 561, which is home).

562. Introduction to Quaternary Ecology (3) For a description of course topics see 462. Graduate-level requirements include a term paper in publication format. Field trip. P, 101. May be convened with 462.

563. Environmental Isotope Hydrology and Low Temperature Geochemistry (3) Theory and application of light stable and cosmogenic isotopes to hydrological and paleoenvironmental problems. Radiometric dating of ground water. (Identical with HWR 563).

564. Introduction to Dendrochronology (4) For a description of course topics see 464. Graduate-level requirements include a research paper reviewing critically some aspect of dendrochronology. 2R, 4L. Field trips. (Identical with ANTH 564 and WS M 564). May be convened with 464.

565. Phylogenetic Biology (3) (Identical with ECOL 565, which is home). May be convened with 465.

568. Advanced Seismology (3) Computational techniques in seismology. The application of synthetic seismograms to model source processes and complex structure. P, 432/532; MATH 422b.

569. Seismic Data Processing (3) For a description of course topics see 469. Graduate-level requirements include a special research project. P or CR, 434, MATH 422a. May be convened with 469.

571. Terrestrial Planets (3) (Identical with PTYS 571, which is home).

572. Global Biogeochemical Cycles (3) (Identical with GC 572, which is home).

573. Geology and the Urban Environment (3) For a description of course topics see 473. Graduate-level requirements include a research paper on a topic related to geologic hazards but not covered in lectures. 2R, 3L. All-day field trips. (Identical with PLAN 573). May be convened with 473.

576a-576b. Analysis of Biological Diversification (3-2) [Rpt./1] (Identical with ECOL 576a-576b, which is home). May be convened with 476a-476b.

578. Global Change (3) For a description of course topics see 478. Graduate-level requirements include an in-depth research paper on a topic selected by the student and instructor. P, graduate standing; introductory course work in biological and physical sciences. (Identical with ECOL 578, GEOG 578, HWR 578 and RNR 578). May be convened with 578.

581. Quaternary Palynology and Plant Macrofossils (2-4) For a description of course topics see 481. (Identical with ANTH 581). May be convened with 481.

582. Paleoclimatology (3) For a description of course topics see 482. Graduate-level requirements include an additional research project. May be convened with 482.

583. Physical Geochemistry (3) 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 125a-125b, or 124, MATH 119 and/or consult with department before enrolling. (Identical with PTYS 583).

588. Soil Geochemistry (3) For a description of course topics see 488. Graduate-level requirements include an in-depth research paper project on a single aspect of the course topic. P, 101, 103, CHEM 103b and CHEM 104b. May be convened with 488.

589. Quaternary Geochronology (3) For a description of course topics see 489. Graduate-level requirements include an in-depth research paper project on a single aspect of the course topic. P, 101, 103, CHEM 103b and CHEM 104b. May be convened with 489.

590. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 590, which is home). May be convened with 490.

595. Colloquium
a. Topics in Geosciences (1-3) [Rpt./1] (Identical with ATMO 595b, which is home).
     b. Global Warming [Rpt./1] (Identical with ATMO 595c, which is home).
     c. General Circulation Observation and Modeling (1-3) (Identical with ATMO 595c, which is home).
     d. Dendrochronology. Physical Applications (3) [Rpt./2] (Identical with WS M 595e).
     e. Dendrochronology: Biological Applications (3) [Rpt./2] (Identical with WS M 595f).
     g. Dendrochronology: Chronometric Applications (3) [Rpt./2] (Identical with WS M 595g).

596. Seminar
a. Mineralogy-Petrology-Geochemistry (1-4) [Rpt./6 units]
     b. Economic Geology (1-4) [Rpt./6 units]
     c. Geomorphology-Quaternary Geology (1-4) [Rpt./6 units]
     d. Paleontology-Sedimentary Geology (1-4) [Rpt./6 units]
     e. Structure-Tectonics (1-4) [Rpt./6 units]
     f. Geophysics (1-4) [Rpt./6 units]
     g. Dendrochronology (1-4) [Rpt./6 units]
     h. Geosciences (1-4) [Rpt./6 units]
     p. Macroevolution (2) [Rpt./6 units]

597. Workshop
b. Phylogenetic Inference (2) (Identical with ENTO 597b, which is home).
     c. Dendrochronology (1-4) or 6L. Field trips. May be convened with 497c. (Identical with ANTH 597c and WS M 597c).

646a-646b. Advanced Ore Deposit Geology (4-4) Geology, characteristics and origins of ore deposits in igneous, sedimentary, and metamorphic rocks. Laboratories include field trips, analytical techniques, problem solving. 2R, 6L. P, 446/546, CHEM 480a or CR.


651. Climatic Geomorphology (3) Effects of climatic changes on geomorphic processes, landforms, and soils; paleoclimatic and earthquake-hazards interpretations. 2R, 3L. Field trips.


Baccalaureate degrees
Bachelor of Arts (B.A.)
Bachelor of Science (B.S.)
Bachelor of Engineering Mathematics (B.S.E.Ma.)*

Graduate degrees
Master of Arts (M.A.)
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Majors
Mathematics (B.A.; B.S., M.A., M.S., Ph.D.)
Options:
- comprehensive
- computer science
- industrial & applied
- probability & statistics
- economics/finance
- Engineering Mathematics (B.S.E.Ma.)*

* Jointly administered with the College of Engineering and Mines.

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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 on-course as an address at the one above.

116R. Introduction to College Algebra (3) Lecture. Not applicable to the mathematics major or minor. Basic concepts of algebra, linear equations and inequalities, relations and functions, quadratic equations, system of equations. P, two entrance units in algebra or an acceptable score on the math readiness test. This course will be offered for the last time in Fall 1997.

116S. Introduction to College Algebra (3) Self-Study. Identical to MATH 116R except taught in a self-study tutorial format. Not applicable to the mathematics major or minor. P, two entrance units in algebra or an acceptable score on the math readiness test. This course will be offered for the last time in Fall 1997.

117R. College Algebra (3) Lecture. Not applicable to the mathematics major or minor. Brief review and continuation of MATH 116R/S, functions, mathematical models, systems of equations and inequalities, exponential and logarithmic functions, polynomial and rational functions, sequences and series. Students with credit in 120 will obtain only two units of graduation credit for 117R. P, 116R or 116S and an acceptable score on the math readiness test. This course will be offered for the last time in Spring 1998.
117S 24 College Algebra (3) Self-Study. Identical to MATH 117 except taught in a self-study tutorial format. Not applicable to mathematics majors or minors. Students with credit in 120 will obtain only two units of graduation credit for 117S. P, 116R or 116S or an acceptable score on the math readiness test. This course will be offered for the last time in Spring 1998.

118 Plane Trigonometry (Not applicable to the mathematics major or minor. Students with credit in 120 obtain one unit of graduation credit for 118. P, one entrance unit in geometry and either 1 1/2 entrance units in algebra, or 116R/S.

119 Finite Mathematics (3) Elements of set theory and counting techniques, probability theory, linear systems of equations, matrix algebra; linear programming with simplex method, Markov chains. P, 121, 117R/S or acceptable score on math readiness test.

120 24 Calculus Preparation (4) Reviews algebra and trigonometry; covers the study of functions including polynomials, rational, exponential, logarithmic and trigonometric. For students who have high school credit in college algebra and trigonometry but have not attained a sufficient score on the math readiness test to enter calculus. Students with credit in MATH 117R/S will obtain only two units of graduation credit for 117R/S. Students with credit in MATH 118 will obtain one unit of graduation credit for 118. Students with credit in MATH 121 will obtain only two units of graduation credit for MATH 120. Students with credit in MATH 118 will obtain only three units of graduation credit for 120. P, high school credit in college algebra and trigonometry, and an acceptable score on the math readiness test. Graphing calculators are required in this course.

121 College Algebra (4) Topics include properties of functions and graphs, polynomial functions, rational functions, exponential and logarithmic functions with applications, 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. Students with credit in MATH 120 will obtain only two units of graduation credit for MATH 121. P, an acceptable score on the 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, two years of high school algebra and a satisfactory score on the Mathematics Readiness Assessment test.

123 Elements of Calculus (3) Introductory topics in differential and integral calculus. Credit allowed for only one of the following courses: 123, 124, or 125A. P, 121, 117R/S or an acceptable score on math readiness test.

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. Credit allowed for only one of the following courses: 123, 124, or 125A. P, 120, or 121 and 118, 117R/S and 118, or an acceptable score on math readiness test.

125A Calculus (3) 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, an acceptable score on math readiness test. Credit allowed for only one of the following courses: 123, 124, or 125A.

125B Calculus (3) 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, 124 or 125A.

129 Calculus with a Computer (2) Designed to supplement regular calculus courses. The use of computers to solve calculus problems emphasizing numerical and geometrical understanding of calculus. P or CR, 125B.

160 Introduction to Statistics (3) 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, 117R/S.

202 Introduction to Symbolic Logic (3) (Identical with PHIL 202, which is home).

215 Introduction to Linear Algebra (3) Vector spaces, linear transformations and matrices. There is some emphasis on the writing of proof. P, 125B.

223 Vector Calculus (4) Vectors, differential and integral calculus of several variables. P, 125B.

243 Discrete Mathematics in Computer Science (3) Set theory, logic, algebraic structures; induction and recursion; graphs and networks. P, 125B.

254 Introduction to Ordinary Differential Equations (3) Solution methods for ordinary differential equations, qualitative techniques; includes matrix methods approach to systems of linear equations and series solutions. Credit allowed for 254 or 355, but not for both. P, 223.

263 Mathematical Analysis (4) Development of a basis for understanding the common processes in elementary mathematics related to the concepts of number, measurement, geometry and probability. 3R, 3L. May not be applied to any mathematics major or minor, other than in elementary education. Open to elementary education majors only. P, 117R/S, or 121, or an acceptable score on the math readiness test.

315 Introduction to Number Theory and Modern Algebra (3) Elementary number theory, complex numbers, field axioms, polynomial rings; techniques for solving polynomial equations with integer and real coefficients. P, 323.

322 Mathematical Analysis for Engineers (3) Complex functions and integration, line and surface integrals, Fourier series, partial differential equations. Credit allowed for this course or 422A, but not for both. P, 254 or 355.

323 Formal Mathematical Reasoning and Writing (3) Elementary real analysis as an introduction to abstract mathematics and the use of mathematical language. Elementary logic and quantifiers; manipulations with sets, relations and functions, including images and pre-images; properties of the real numbers; supremum and infimum; other topics selected from cardinality, the topology of the real line, sequences and limits of sequences and functions; the emphasis throughout is on proving theorems. P, 215. Writing-Emphasis Course.*

330 Topics in Geometry (3) Topics to be selected from 2- and 3-dimensional combinatorial geometry, postulational Euclidean geometry, Euclidean transformational geometry, symmetry, and 2-dimensional crystallography. P, 215.

344 Foundations of Computing (3) (Identical with C SC 344, which is home).

355 Analysis of Ordinary Differential Equations (3) Linear and nonlinear equations; basic solution techniques; qualitative and numerical methods; systems of equations; computer studies; applications drawn from physical, biological and social sciences. Credit allowed for 254 or 355, but not for both. P, 215.

362 Introduction to Probability Theory (3) Sample spaces, random variables and their properties, with considerable emphasis on applications. P, 123 or 125B.

380 Math Models in Biology (3) (Identical with ECOL 380, which is home).

397 Workshop a. Mathematics Education (1) Open only to teaching majors in MATH. P, 315 or 330.
402. Mathematical Logic (3) Sentential calculus, predicate calculus; consistency, independence, completeness, and the decision problem. Designed to be of interest to majors in mathematics or philosophy. Credit allowed for 402 or 411a, but not for both. P, 124 or 125a. (Identical with C SC 402 and PHIL 402). May be convened with 502.

403. Foundations of Mathematics (3) 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, 215. (Identical with PHIL 403). May be convened with 503.

404. History of Mathematics (3) The development of mathematics from ancient times through the 17th century, with emphasis on problem solving. The study of selected topics from each field is extended to the 20th century. P, 125b. May be convened with 504.

405. Mathematics in the Secondary School (3) Not applicable to B.A. or B.S. degrees for math majors. (Identical with TTE 405).

409a-409b. Symbolic Logic (3-3) (Identical with PHIL 409a-409b, which is home). May be convened with 509a-509b.

410.4 Matrix Analysis (3) General introductory course in the theory of matrices. Credit allowed for 410 or 413, but not for both. P, 254 or 355.

413. Linear Algebra (3) Vector spaces, linear transformations and matrices, eigenvalues, linear forms, orthogonal and unitary transformations. Credit allowed for 410 or 413, but not for both. P, 215. May be convened with 513.

415. Introduction to Abstract Algebra (3) Introduction to groups, rings, and fields. P, 323. May be convened with 515.


422a-422b. Advanced Analysis for Engineers (3-3) Laplace transforms, Fourier series, partial differential equations, vector analysis, integral theorems, complex variables. Credit allowed for 422a or 322, but for both. Credit allowed for 422b or 424, but for both. P, 254 or 355. 422a is not prerequisite to 422b. Both 422a and 422b are offered each semester. May be convened with 522a-522b.

424. Elements of Complex Variables (3) Complex numbers and functions, conformal mapping, calculus of residues. Credit allowed for 422b or 424, but not for both. P, 223. May be convened with 524.


426. Real Analysis of Several Variables (3) Continuity and differentiation in higher dimensions, curves and surfaces; change of coordinates; theorems of Green, Gauss and Stokes; exact differentials. P, 425. May be convened with 526.

430. Second Course in Geometry (3) Topics may include low-dimensional topology; knot Theory, including the fundamental group. P, 323.

433. Introduction to Topology (3) Properties of metric and topological spaces and their maps; topics selected from geometric and algebraic topology, including the fundamental group. P, 323 or 243 or graduate standing. (Identical with C SC 443). May be convened with 543.


447. Combinatorial Mathematics (3) Enumeration and construction of arrangements and designs; generating functions; principle of inclusion-exclusion; recurrence relations; a variety of applications. P, 215 or 243. May be convened with 547.


461. Elements of Statistics (3) Probability spaces, random variables, standard distributions, point and interval estimation, tests of hypotheses; includes use of standard Statistical software package.


473. Automata, Grammars and Language (3) (Identical with C SC 473).


479. Game Theory and Mathematical Programming (3) Linear inequalities, games of strategy, minimax theorem, optimal strategies, duality theorems, simplex method. P, 410 or 413 or 415. (Identical with C SC 479) May be convened with 579.


496. Seminar (b) Mathematical Software (3) [Rpt.] P, 254 or 355, knowledge of “C” programming. May be convened with 596b.

*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

502. Mathematical Logic (3) For a description of course topics see 402. Graduate-level requirements include more extensive problem sets or advanced projects. P, 124 or 125a. (Identical with C SC 502 and PHIL 502). May be convened with 402.

503. Foundations of Mathematics (3) For a description of course topics see 403. Graduate-level requirements include more extensive problem sets or advanced projects. P, 215. (Identical with PHIL 503) May be convened with 403.

504. History of Mathematics (3) For a description of course topics see 404. Graduate-level requirements include more extensive problem sets or advanced projects. Not applicable to M.A., M.S., or Ph.D. degrees for math majors. P, 125b. May be convened with 404.

506. Geometry for Elementary School (1-3) [Rpt./3 units] Various topics in geometry for elementary and middle school teachers, such as tessellations, symmetry, length, area, volume, geometric constructions, polyhedra, efficiency of shapes, scale drawings taught with a variety of tools and approaches. Students will construct models, use hands-on materials, do laboratory activities, use the computer for geometric explorations and participate in geometric problem solving. P, certified elementary teachers with two or more years experience or consent of instructor.

509a-509b. Symbolic Logic (3-3) (Identical with PHIL 509a-509b, which is home). May be convened with 409a-409b.

511a-511b. Algebra (3-3) Structure of groups, rings, modules, algebras; Galois theory. P, 415 and 416, or 413 and 415.

513. Linear Algebra (3) For a description of course topics see 413. Graduate-level requirements include more extensive problem sets or advanced projects. Not applicable to M.A., M.S., or Ph.D. degrees for math majors. P, 215. May be convened with 415.

514a-514b. Algebraic Number Theory (3-3) Dedekind domains, complete fields, class groups and class numbers, Dirichlet unit theorem, algebraic function fields. P, 511b.

515. Introduction to Abstract Algebra (3) For a description of course topics see 415. Graduate-level requirements include more extensive problem sets or advanced projects. P, 323. May be convened with 415.

516. Second Course in Abstract Algebra (3) For a description of course topics see 416. Graduate-level requirements include more extensive problem sets or advanced projects. P, 415. May be convened with 416.

517a-517b. Group Theory (3-3) Selections from such topics as finite groups, abelian groups, characters and representations. P, 511b.

518. Topics in Algebra (3) [Rpt./36 units] Advanced topics in groups, rings, fields, algebras; content varies.

519. Topics in Number Theory and Combinatorics (3) [Rpt./36 units] Advanced topics in algebraic number theory, analytic number theory, class fields, combinatorics; content varies.


522a-522b. Advanced Analysis for Engineers (3-3) For a description of course topics see 422a-422b. Graduate-level requirements include more extensive problem sets or advanced projects. Not applicable to M.A., M.S., or Ph.D. degrees for math majors. P, 254 or 355. May be convened with 422a-422b.


524.3 Elements of Complex Variables (3) For a description of course topics see 424. Graduate-level requirements include more extensive problem sets or advanced projects. P, 223. May be convened with 424.

525. Real Analysis of One Variable (3) For a description of course topics see 425. Graduate-level requirements include more extensive problem sets or advanced projects. P, 223 and 323. May be convened with 425.

526. Real Analysis of Several Variables (3) For a description of course topics see 426. Graduate-level requirements include more extensive problem sets or advanced projects. P, 425. May be convened with 426.


528a-528b. Banach and Hilbert Spaces (3-3) 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, 523a, 527b, or 583b.

529. Topics in Modern Analysis (3) [Rpt./36 units] 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) For a description of course topics see 430. Graduate-level requirements include more extensive problem sets or advanced projects. P, 215. For persons enrolled in the Teaching Option. May be convened with 430.

531. Algebraic Topology (3) Poincare duality, fixed point theorems, characteristics classes, classification of principal bundles, homology of fiber bundles, higher homotopy groups, low dimensional manifolds. P, 534a-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, 415 and 425.


538. Topics in Geometry and Topology (3) [Rpt./36 units] Advanced topics in point set and algebraic topology, algebraic geometry, differential geometry; content varies.

539. Algebraic Coding Theory (3) Construction and properties of error correcting codes; encoding and decoding procedures and information rate for various codes. P, 415. (Identical with ECE 539)

543. Theory of Graphs and Networks (3) For a description of course topics see 443. Graduate-level requirements include more extensive problem sets or advanced projects. P, 215 or 223 or 243. (Identical with CS 543) May be convened with 443.

546. Theory of Numbers (3) For a description of course topics see 446. Graduate-level requirements include more extensive problem sets or advanced projects. P, 215. May be convened with 446.

547. Combinatorial Mathematics (3) For a description of course topics see 447. Graduate-level requirements include more extensive problem sets or advanced projects. P, 215 or 243. May be convened with 447.

550. Mathematical Population Dynamics (4) (Identical with ECOL 550, which is home).

553a-553b. Partial Differential Equations (3-3) 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, 523b or 527b or 583b.


556. Applied Partial Differential Equations (3) For a description of course topics see 456. Graduate-level requirements include more extensive problem sets or advanced projects. P, 322 or 421 or 422a. May be convened with 456.

557a-557b. Dynamical Systems and Chaos (3-3) 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, 422a-422b or 454.

559a-559b. Lie Groups and Lie Algebras (3-3) Correspondence between Lie groups and Lie algebras, structure and representation theory, applications to topology and geometry of homogeneous spaces, applications to harmonic analysis. P, 511a, 523a, 534a-534b, or consent of the instructor.

560. Elementary School Probability (1-3) [Rpt./3 units] 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 of experience or consent of instructor.

tion. Hotelling's T-square distribution. Principal components. Students will be expected to utilize standard statistical software packages for computational purposes. P, 410 or 413, and one of 461, 466, or 509.


564. Theory of Probability (3) For a description of course topics see 464. Graduate-level requirements include more extensive problem sets or advanced projects. P, 322 or 323. May be convened with 464.


566. Theory of Statistics (3) For a description of course topics see 466. Graduate-level requirements include more extensive problem sets or advanced projects. P, 464. May be convened with 466.


568. Applied Stochastic Processes (3) For a description of course topics see 468. Graduate-level requirements include more extensive problem sets or advanced projects. P, 464. May be convened with 468.


573. Theory of Computation (3) (Identical with C SC 573, which is home).

574. Introduction to Geostatistics (3) 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.


577. Topics in Applied Mathematics (3) (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) Applications of machine computation to various aspects of algebra, such as matrix algorithms, character tables and conjugacy classes for finite groups, coset enumeration, integral matrices, crystallographic groups. P, 415 and a knowledge of scientific computer programming language. (Identical with C SC 578).

579. Game Theory and Mathematical Programming (3) For a description of course topics see 479. Graduate-level requirements include more extensive problem sets or advanced projects. P, 410 or 413 or 415. (Identical with C SC 579). May be convened with 479.


583a-583b. Principles and Methods of Applied Mathematics (3-3) 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, 424 or 422b or CR, 520a.

585. Mathematical Modeling (3) For a description of course topics see 485. Graduate-level requirements include more advanced projects. P, 422.

586. Case Studies in Applied Mathematics (1-3) (Rpt./6 units) 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) Regular and singular perturbations, boundary layer theory, multiscale and averaging methods for nonlinear waves and oscillators. P, 422a-422b or 454.

588. Topics in Mathematical Physics (3) (Rpt./36 units) Advanced topics in field theories, mathematical theory of quantum mechanics, mathematical theory of Statistical mechanics; content varies.

595. Colloquium (1) [Rpt./12 units]

596. Seminar (1) [Rpt/4 units]

597. Workshop (1) [Rpt/3 units]

181R. Introductory Biology I (3) Introduction to the cell and its properties, basic genetics, the immune system, recombinant DNA technology with illustrations from bacteria, plants, animals and humans. High school biology/chemistry recommended. Honors section available for 4 units. P, at least MATH 117 (level III) placement on the Math Readiness Test, CR 181L, high school biology/chemistry required. (Identical with BIOC 181R, ECOL 181R, and MIC 181R).

182. Introductory Biology II (4) (Identical with ECOL 182, which is home).

195. Colloquium a. Great Experiments in Microbiology (1) (Identical with MIC 195a, which is home).
   b. Biotechnology (1) (Identical with BIOC 195a, which is home).
   c. Society and Science (1) (Identical with BIOC 195c, which is home).

320. Genetics (4) (Identical with ECOL 320, which is home).

320H. Genetics (5) (Identical with ECOL 320H, which is home).

321. Genetics Laboratory (2) (Identical with ECOL 321, which is home).

360. Principles of Plant Physiology (3) [Rpt.] (Identical with PL S 360, which is home).

361. Principles of Plant Physiology Laboratory (1) [Rpt.] (Identical with PL S 361, which is home).

404. Contemporary Biology in Human Affairs (3) Advances in biomedical research will be reviewed and their ethical, social and legal implications discussed. P, one course in BIOC or biology; botany not acceptable.


421a-421b. Microbiological Techniques (3-3) (Identical with MIC 421a-421b, which is home).

428. Microbial Genes (3) (Identical with PL P 428, which is home).

429. General Virology (3) (Identical with MIC 429, which is home).

432. Pathogenic Virology (3) (Identical with V SC 432, which is home).

437. Vertebrate Physiology (4) (Identical with ECOL 437, which is home).

439. Plant Cell Biology (3) (Identical with PL S 439, which is home). May be convened with 539.


456. Developmental Biology (3) (Identical with AN S 456, which is home). May be convened with 556.

457. Experiments in Developmental Biology (4) (Identical with CBA 457, which is home). May be convened with 557.

460. General Protein and Metabolic Biochemistry (3) (Identical with BIOC 460, which is home).

462a-462b. Biochemistry (3) (Identical with BIOC 462a-462b, which is home). Honors section available for (4) honors credits.

466. Physiology Laboratory (3) (Identical with ECOL 466, which is home). May be convened with 566.

467. Endocrine Physiology (3) (Identical with PSIO 467, which is home).

467R. Endocrinology (3) (Identical with CBA 467 R, which is home).


473. Recombinant DNA Methods and Applications (4) 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. 2R, 6L. P, BIOC 462a, CR 411. (Identical with BIOC 473, GENE 473, MIC 473, and PL S 473).

475. Parasite Immunology (3) (Identical with V SC 475, which is home). May be convened with 575.

476a-476b. Analysis of Biological Diversification (3-3) [Rpt./1] (Identical with ECOL 476a-476b). May be convened with 576a-576b.


497. Workshop a. Special Tutoring Workshop (1-5) [Rpt] Open to senior MCB and Biochemistry majors only. Cont-
505. Eukaryotic DNA Replication (3) [Rpt.|1] (Identical with CBIO 505, which is home).

510. Plant Molecular Biology (3) (Identical with PLS 510, which is home).

511. Molecular Biology (1) For a description of course topics see 411. Graduate-level requirements include attending an additional lecture hour per week to discuss independent research. MCB majors should not take this course for graduate credit. P, 462a and consult department before enrolling. (Identical with BIOC 511 and MBIM 511). May be convened with 411.

512. Biological Electron Microscopy (4) Provides theoretical background and practical experience in transmission and scanning electron microscopy that are necessary for the efficient and effective application of ultra-structural and cytochemical techniques as research tools. 2R, 6L. P, one college level course in each of physics, chemistry, and biology. (Identical with CBA 512, AN S 512, BIOC 512, ENTO 512, MBIM 512, PATH 512, PSIO 512, PL P 512, V SC 512).

516. Bioinformatics and Genomic Analysis (3) For description of course topics see 416. Graduate-level requirement include a research project, written report, and a class presentation. (Identical with BIOC 516, ECOL 516 and GENE 516). May be convened with 416.

529. General Virology (3) (Identical with MBIM 529, which is home).

539. Plant Cell biology (3) (Identical with PL S 539, which is home). May be convened with 439.

545. Concepts in Genetic Analysis (3) Methods of genetic analysis including mutant 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, and INSC 545).

550. Topics in Pigment Cell Biology (2) (Identical with CBA 550, which is home).


556. Developmental Biology (3) (Identical with AN S 556, which is home). May be convened with 456.

557. Experiments in Developmental Biology (4) (Identical with CBA 557, which is home). May be convened with 457.

560. Current Advances in Plant Physiology (3) (Identical with PL S 560, which is home).

566. Physiology Laboratory (3) (Identical with ECOL 566, which is home). May be convened with 466.

567R. Endocrinology (3) (Identical with CBA 567R, which is home).

568. Nucleic Acids (4) (Identical with BIOC 568, which is home).

569. Topics in Gene Regulations (2) (Identical with BIOC 569, which is home).

571. Molecular Biology (1) [Rpt.|1] (Identical with BIOC 571, which is home).

572. Cell Regulation (3) Advanced treatment of biological regulation in eukaryotic cells. Topics to be discussed include regulation of cellular metabolism, cytoskeletal dynamics, organellar function, and cell division. P, 462a-462b or consult department before enrolling. (Identical with BIOC 572).

574. Advances in Mammalian Genetics (2) [Rpt.|1] (Identical with BIOC 574, which is home).

575. Special Topics in Biological Imaging (2) (Identical with CBA 575, which is home).

576a-576b. Analysis of Biological Diversifica tion (3) [Rpt.|1] (Identical with ECOL 576a-576b, which is home). May be convened with 476a-476b.

577. Principles of Cell Biology (4) (Identical with BIOC 577, which is home).

582. Topics in Neural Development (2) (Identical with NRC 582, which is home).

583. Topics in Neural Plasticity (2) Reading and discussion of primary literature on cellular, molecular, biochemical, physiological, and structural changes that occur on the adult nervous system. P, a course in neurobiology, consult department before enrolling. (Identical with CBA 583 and NRC 583).

584. Cellular Neurobiology (2) (Identical with CBA 584, which is home).

585. Biological Structures I (4) (Identical with BIOC 585, which is home).

586. Intracellular Messengers (2) (Identical with NRC 586, which is home).

587. Biology of Neurological Disease (2) (Identical with NRC 587, which is home).

588. Principles of Cellular and Molecular Neurobiology (4) (Identical with CBA 588, which is home).

589. Cancer Genes (3) [Rpt.] (Identical with CBIO 589, which is home).

595. Colloquium a. Topics in Molecular Biology (1) [Rpt.|6] Open to majors only.


597. Workshop a. Recombinant DNA Techniques (2) (Identical with BIOC 597a, which is home).

621. Molecular, Plant, Microbe Interactions (3) (Identical with PL P 621, which is home).

623a-623b. Biology Update 2-2 (2-2) (Identical with BIOC 623a-623b, which is home).

695. Colloquium a. Plant Biology (1) (Identical with PL P 695a, which is home).

709. Workshop a. Scientific Infrastructure (2) Open to majors only.

761. Laboratory Rotation I (2) [Rpt.|1] Research project with graduate faculty for 8 weeks, 15 hours per week. Open to majors only.

762. Laboratory Rotation II (2) [Rpt.|1] Research project with graduate faculty for 8 weeks, 15 hours per week. Open to majors only.

763. Laboratory Rotation III (2) Research project with graduate faculty for 8 weeks, 15 hours per week. Open to majors only.

801. Molecular and Cellular Biology (4) P, freshman medical students only.

PHYSICS (PHYS)

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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
Engineering Physics (B.S.E.PH.)*
Physics (B.S., M.S., Ph.D.)*

* Administered jointly with the College of Engineering & Mines.

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/ oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

101. Physics in the Modern World (4) Basic concepts and the societal impact of physics. Topics include mechanics, wave motion, energy, light, nuclear and atomic physics, and astrophysics. 3R, 3L. Open to non-majors only. P, high school algebra.

102.* Introductory Physics I (3) 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. P, high school algebra, geometry and trigonometry. Those wishing to take this course as a lecture-laboratory course should register concurrently for 181.

103.* Introductory Physics II (3) CDT Continuation of 102. P, 102. Those wishing to take this course as a lecture-laboratory should register concurrently for 182.

107. The Physics of Music (4) CDT Sound production, musical instruments, frequency analysis, physics of hearing, psychological and physiological effects, harmony and scales, hall acoustics, electronic production and recording. 3R, 3L.

131.* Introductory Physics with Calculus I (4) Designed for liberal arts and life science majors with no calculus background. Principles of kinematics, dynamics, wave motion and acoustics, MATH 125a, CR, MATH 125b. Those wishing to take this course as a lecture-laboratory course should register concurrently for 181.

132.* Introductory Physics with Calculus II (4) Designed for liberal arts and life science majors with no calculus background. Thermodynamics, electricity and magnetism, geometrical and physical optics, optical instruments, atomic and nuclear physics. P, 131. Those wishing to take this course as a lecture-laboratory course should register concurrently for 182.

141.* Introductory Mechanics (4) CDT Vector concepts; kinematics, statics and dynamics for point masses, particle systems and rigid bodies; conservation laws of energy, momentum, and angular momentum; fluid statics and dynamics. 4R, 2L. P, MATH 125a, CR, MATH 125b.

142.* Introductory Optics and Thermodynamics (2-3) CDT Temperature scales, heat, thermodynamics, heat engines and kinetic theory; geometrical optics, lenses, mirrors and optical instruments; physical optics, diffraction, interference and wave theory. 2R (1R, 2L), P, 141, CR, MATH 223.

142H.* Honors Introductory Optics and Thermodynamics (2-3) 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, 141H or 141 with approval of instructor, CR, MATH 223.


181. Introductory Laboratory I (1) Quantitative experiments in physics, both illustrative and exploratory. Designed to accompany 102 or 132; sections are established corresponding to each course. P, CR, 102 or 131.

182. Introductory Laboratory II (1) Quantitative experiments in physics, both illustrative and exploratory. Designed to accompany 103 or 132; sections are established corresponding to each course. P, 181, CR, 103 or 132.

195. Colloquium a. Creation of the Universe (1)

205. Computational Physics (3) CDT 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, 142 or 152.

241.* Introductory Electricity and Magnetism (4) CDT Field concepts, electrostatics, magneto-statistics, currents, electromagnetic phenomena and electromagnetic waves. 4R, 2L. P, 141, CR, MATH 223.

241H.* Honors Introductory Electricity and Magnetism (4) 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, 141H or 141 with approval of instructor, CR, MATH 223.

242.* Introductory Relativity and Quantum Physics (3) 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, 141, 142, 241 or OPTI 226; MATH 223.


252.* Introduction to Optics and Quantum Theory (4) Continuation of 251. EM waves, physical and geometrical optics, and quantum theory. 4R, 2L. P, 152.

*Credit will be allowed for only one of the following sequences of courses: 102-103 with 181-182; 131-132 with 181-182; 141-142-241-242; 151-152-251-252.

302. Optics (3) Electromagnetic waves; rays, interference, diffraction, scattering, applications to imaging systems, Fourier methods, holography, and crystal optics. P, 242 or 252, MATH 223.

321. Theoretical Mechanics I (3) 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, 241H or 251, MATH 223, CR, 254.

325. Thermodynamics (3) CDT 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, 242 or 252, MATH 223.

331. Electricity and Magnetism I (3) Electromagnetic phenomena leading to Maxwell's equations; static and time-dependent solutions. P, 321 or MATH 422a.

332. Electricity and Magnetism II (3) CDT Continuation of 331. Transmission lines and wave guides; radiation theory, 4-vector formulation of special relativity. P, 331.

371. Quantum Theory (3) CDT Schroedinger's Equation, one-dimensional problems, operators and matrices, three-dimensional problems, two particle problems, angular momentum, the hydrogen atom and spin. P, 242 or 252, 321, MATH 254.

381. Methods of Experimental Physics I (1-3) CDT Designed to develop experimental skills and to demonstrate important concepts in classical and modern physics. 3L. P, two upper-division courses in physics or CR, 205 is a recommended corequisite for students without programming experience. Writing-Emphasis Course.

382. Methods of Experimental Physics II (1-3) CDT Continuation of 381. Both 381 and 382 are offered each semester, but students are encouraged not to enroll simultaneously. Writing-Emphasis Course.

402. Medical Physics (3) 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, 103 or 132; MATH 124 or equivalent. May be convened with 502.

422. Theoretical Mechanics II (3) CDT 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, 321, MATH 254.

430. Introduction to Biophysics (2) CDT Con-ceptual and experimental techniques of molecular biophysics; physical properties of biological macromolecules and cell organelles, optical interactions, macromolecular transitions, molecular mechanism or regulation. P, 103 or 132, CHEM 103a-103b. (Identical with MIC 430). May be convened with 530.
433. Physics Demonstrations (1-3) Introduction to teaching materials and laboratory demonstrations illustrating principles of classical and modern physics, with emphasis on inexpensive techniques and direct experience. Advanced degree credit available for non-majors only. P, two semesters of physics. May be convened with 533.

445. Experimental Physics (1) [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 be given only once for each topic. None is prerequisite to any other. P, 141, 142, 241, or 151, 152, 251, or consult department before enrolling. May be convened with 545a, 545b, 545c, 545d.

a. Experimental Spectroscopy (1) Laboratory experiments with spectroscopic sources, spectrometers, instrument functions, detectors, light collection optics, spectral recording and analysis.
b. Experimental Acoustics (1) Laboratory experiments with sound sources, oscilloscopes, spectrum analyzers, sound level meters, filters, musical instruments, recording, room acoustics.
c. 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 constants, lasers, remote sensing.
d. Experimental Geometrical and Physical Optics (1) Experimental measurements of geometrical and optical properties of basic optical elements—lenses, prisms, gratings, optical fibers, etc.


P, 325, 371. May be convened with 560.


473. Atomic and Molecular Spectroscopy for Experimentalists I (3) Experimental techniques to generate, analyze and detect photons from X-ray to infrared; interpretation of spectra from gases, liquids, solids and biological macromolecules; light scattering, polarization. P, 242 or 252. (Identical with OPTI 473). May be convened with 573.


475. Methods of Mathematical Physics I (3) Mathematical techniques and their physical applications. Vector and tensor analysis; differential equations, complex variable theory, Green's functions, molecular evolution, limits to structure, symmetry, oligomer and virus structure, organellar structure and function. (Identical with MBIM 531).


481. Methods of Experimental Physics I (1-3) Continuation of 481, with emphasis on individual work. Both 481 and 482 are offered each semester, but students are encouraged not to enroll simultaneously.

482. Methods of Experimental Physics IV (1-3) Continuation of 481, with heavy emphasis on individual work. Both 481 and 482 are offered each semester, but students are encouraged not to enroll simultaneously.

**Writing-Emphasis Courses. P. Satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).**

502. Medical Physics (3) For a description of course topics see 402. Graduate-level requirements include an original report demonstrating the ability to construct mathematical models related to one of the diagnostic or therapeutic modalities discussed in the course. P, 132 or 103 and MATH 124 or equivalent. May be convened with 402.

503. Quantum Optics and Lasers (3) (Identical with OPTI 503, which is home).

511. Analytical Mechanics (3) Laws of motion as developed by Newton, d’Alembert, Lagrange and Hamilton; dynamics of particles and rigid bodies. P, 410.

513. Topics in Advanced Mechanics, Nonlinear Physics, and Chaos (3) Modern topics in classical mechanics, including canonical perturbation theory, invariant mappings, nonintegrated system stochastic behavior and applications to semi-classical quantum theory. P, 511.


529. Information and the Foundations of Physics (3) (Identical with OPTI 529, which is home).

530. Introduction to Biophysics (2) For a description of course topics see 430. Graduate-level requirements include extra assignments. P, 103, CHEM 103a-103b. (Identical with MBIM 530). May be convened with 430.

531. Biophysical Theory (2) Physical concepts and theories describing biomolecular structure and function, molecular evolution, limits to structure, symmetry, oligomer and virus structure, organellar structure and function. (Identical with MBIM 531).

533. Physics Demonstrations (1-3) For a description of course topics see 433. Graduate-level requirements include assisting with undergraduate lecture planning and demonstrations. Advanced degree credit available for non-majors only. P, two semesters of physics. May be convened with 433.

535. Advanced Atomic Physics (3) Details of atomic structure; interactions of atoms with electromagnetic fields, electrons and ions; techniques for calculating unperturbed and perturbed energy levels, transition probabilities and atomic interaction cross sections. P, 511, 515b, 570b.

454. 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 be given only once for each topic. None is prerequisite to any other. P, 141, 142, 241, or 151, 152, 251, or consult department before enrolling. May be convened with 445a, 445b, 445c, 445d.

a. Experimental Spectroscopy (1) For a description of course topics see 445a. Graduate-level requirements include an in-depth report on a topic selected in consultation with the instructor.
b. Experimental Acoustics (1) For a description of course topics see 445b. Graduate-level requirements include an in-depth report on a topic selected in consultation with the instructor.
c. Experimental Microscopy, Light Scattering and Optics of Small Particles (1) For a description of course topics see 445c. Graduate-level requirements include an in-depth report on a topic selected in consultation with the instructor.
d. Experimental Geometrical and Physical Optics (1) For a description of course topics see 445d. Graduate-level requirements include an in-depth report on a topic selected in consultation with the instructor.

550. Introductory Nuclear Physics (3) For a description of course topics see 450. Graduate-level requirements include additional special topics to be determined by the instructor. P, 242 or 252, MATH 254. May be convened with 450.

551. Nuclear Physics (3) Theory of nuclear systems, including stability, decay, nuclear forces, scattering, reactions, structure and interaction with electromagnetic radiation, CR, 570a-570b.


556. Electrodynamics of Conducting Fluids and Plasmas (3) (Identical with PTYS 556, which is home).

560. Solid-State Physics (3) For a description of course topics see 460. Graduate-level requirements include an in-depth paper on a topic in solid-state physics. P, 325, 371. May be convened with 460.

561. Physics of the Solid State (3) Elementary excitations in solids, phonons, electrons and holes,
dielectric formalism of optical response, many-body effects in a Coulomb system. P, 460, 570, or OPTI 507 recommended but not formally required. (Identical with OPTI 561).


563. Experimental Condensed Matter Physics (3) 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) Principles of quantum mechanics; wave mechanics and matrix mechanics; applications to atomic structure and spectroscopy. P, 475, 476 recommended but not required.

570c. Intermediate Quantum Mechanics (3) 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) For a description of course topics see 472. Graduate-level requirements include additional homework problems. P, 371. May be convened with 472.

573. Atomic and Molecular Spectroscopy for Experimentalists I (3) For a description of course topics see 473. Graduate-level requirements include homework problem assignments at an advanced level. P, 242 or 252. (Identical with OPTI 573). May be convened with 473.


575. Methods of Mathematical Physics I (3) For a description of course topics see 475. Graduate-level requirements include advanced examinations, as determined by the instructor. P, 321, MATH 254, CR, 331. May be convened with 475.

576. Methods of Mathematical Physics II (3) For a description of course topics see 475. Graduate-level requirements include advanced examinations, as determined by the instructor. P, 322, MATH 254, CR 332. May be convened with 476.

579a-579b. Advanced Relativistic Quantum Mechanics (3-3) Continuous groups; scattering theory; relativistic wave equations; quantum electrodynamics, Feynman diagrams, dispersion theory, renormalization; strong and weak interactions. P, 515b, 570b.

581. Elementary Particle Physics (3) Production, interaction, and decay of mesons, baryons and leptons; high energy scattering of elementary particles; particle classification and symmetries; theoretical interpretation. P, 472.

582. High Energy Astrophysics (3) (Identical with ASTR 582, which is home).

586. Techniques in Particle Physics (3) Classification of elementary particles and their interactions with matter, relativistic kinematics, detectors, data acquisition techniques, statistical techniques, analysis of experiments, cosmic radiation and accelerators.

589. Topics in Theoretical Astrophysics (3) [Rpt.] Current topics in theoretical astrophysics in depth, with emphasis on the methodology and techniques of the theorist and the cross-disciplinary nature of astrophysics theory. Example subjects are nuclear astrophysics, hydrodynamics, transient phenomena, planetary interiors and atmospheres, neutron stars, jets and the evolution of star clusters. (Identical with ASTR 589 and PTYS 589).


600. Advanced Particle Physics (3) [Rpt. /6 units] (Identical with OPTI 590).


610. Survey of the Solar System (3) 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 117R/S. (Identical with ASTR 106 and GEOS 106).


697. Workshop a. Problems in Computational Science (3) [Rpt. /1] (Identical with MATH 697a, which is home).

698. Colloquium a. Advanced Problems in Mathematical Physics (3) [Rpt. /1] (Identical with MATH 698a, which is home).

PLANE TABLET SCIENCES (PTYS)
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Graduate degrees
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

Major
Planetary Sciences (M.S., Ph.D.)

Graduate Minor
Planetary Sciences

Program Requirements
For academic program requirements for graduate degrees, consult the Graduate Catalog and the department office listed above.

105a. The Universe and Humanity: Origin and Destiny (3) 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 nonscientists. (Identical with ASTR 105a, BIOCI 105a, MCB 105a).

106. Survey of the Solar System (3) 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 117R/S. (Identical with ASTR 106 and GEOS 106).


109L. Exploration and Discovery in Planetary Science (1) 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. Can be taken alone or with 105a, 106 or 107. (Identical with ASTR 109L and GEOS 109L).

112. Undergraduate Research in Planetary Science (4) Student research using spacecraft or ground-based telescope data to investigate various topics of current interest in planetary science. P, 105 or 106. 2R, 2L.

195. Colloquium a. Planetary Sciences (1)

211. Image Processing for Scientific Discovery (3) Image processing as a tool for exploration, discovery and analysis of digital images in a variety of sciences. The emphasis is on hands-on image processing with applications to various sciences using a variety of activities and data sets. For science, non-science and science education majors. 2R, 1L. (Identical with TTE 211).

402. Physics of the Solar System (3) Survey of planetary physics, planetary motions, planetary interiors, geophysics, planetary atmospheres, asteroids, comets, origin of the solar system. P, PHYS 142 or PHYS 251. (Identical with ASTR 403 and GEOS 403). May be convened with 503.


411. Geology of the Solar System (4) Geologic processes and landforms on satellites and the terrestrial planets, their modification under various
Planetary environments, and methods of analysis. 3R, 3L. (Identical with GEOS 411).

418. Modern Astronomical Instrumentation and Techniques (3) (Identical with ASTR 418, which is home). May be convened with 518.

419. Physics of the Earth (3) (Identical with GEOS 419, which is home). May be convened with 519.

420. Chemical Evolution of the Earth (3) (Identical with GEOS 430, which is home). May be convened with 530.

41a-441b. Dynamic Meteorology (3-3) (Identical with ATMO 441a-441b, which is home). May be convened with 541a-541b.

503. Physics of the Solar System (3) For a description of course topics see 403. Graduate-level requirements include an in-depth research paper on a selected topic and an oral class presentation. This course does not count toward the major requirements in planetary sciences. P, PHYS 142 or PHYS 251. (Identical with ASTR 503 and GEOS 503). May be convened with 403.


510. Principles of Cosmochemistry (3) Chemical compositions of solar system objects; equilibrium and nonequilibrium chemical processes applied to planets; cosmochemistry. (Identical with GEOS 510).

518. Modern Astronomical Instrumentation and Techniques (3) (Identical with ASTR 518, which is home). May be convened with 418.

519. Physics of the Earth (3) (Identical with GEOS 519, which is home). May be convened with 419.

520. Meteorites (3) Classification; chemical, mineralogical and isotopic composition; cosmic abundances; ages; interaction with solar and cosmic radiation; relation to comets and asteroids. P, 510. (Identical with GEOS 520).


530. Chemical Evolution of the Earth (3) (Identical with GEOS 530, which is home). May be convened with 430.

541a-541b. Dynamic Meteorology (3-3) (Identical with ATMO 541a-541b, which is home). May be convened with 441a-441b.

544. Physics of High Atmospheres (3) 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 Atmospheres (3) (Identical with ASTR 545, which is home).


554. Evolution of Planetary Surfaces (3) 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. (Identical with GEOS 554).

555. Remote Sensing of Planetary Surfaces (3) 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 and GEOS 555).


565. The Outer Solar System (3) 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) (Identical with GEOS 567, which is home).

571. Terrestrial Planets (3) Geophysical and geochemical techniques used to deduce composition and evolution of terrestrial planets. Topics include the Earth, Moon, Mars, Venus, and meteorites. (Identical with GEOS 571). P, 510 and 554.

582. High Energy Astrophysics (3) (Identical with ASTR 582, which is home).

583. Physical Geochemistry (3) (Identical with GEOS 583, which is home).

589. Topics in Theoretical Astrophysics (3) [Rpt.] (Identical with PHYS 589, which is home).


597. Workshop h. Planetary Astronomy (3) i. Image Process: Teaching (1)
370. Adult Communication Disorders (3) 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, 260, 280.


441. Language Acquisition (3) 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, 350. (Identical with LING 441 and PSYC 441) May be convened with 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 staffings and clinical problem-solving. Open to majors only. P, 451, 471 or CR. May be convened with 558.

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. Open to majors only. P, 483 or CR. May be convened with 559.

460. Speech and Hearing Science Instrumentation (2) Consideration of some common and specific instruments and methods employed in speech and hearing laboratories and clinics. P, 260, 280 or CR. May be convened with 560R.

460L. Speech and Hearing Science Instrumentation Laboratory (1) P, CR, 460R. May be convened with 560L.

468. Speech Perception (3) 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, 260. (Identical with LING 468 and PSYC 468) May be convened with 568.

471R. Articulation Disorders and Therapies (2) Etiology, diagnosis, prognosis, and therapy for the articulatory aspects of communication problems. P, 350; 371; 367, senior status advised. May be convened with 571R.

471L. Laboratory in Articulation Disorders (1) Open to senior majors only. P, 471R or CR. May be convened with 571L.

483. Principles of Audiology (3) Basic principles and techniques of audiological testing, etiologies of hearing impairment, and intervention strategies. P, 280 or graduate standing. May be convened with 583.

484. Audiolgic Rehabilitation: Adults (3) Speech reading; auditory training; problems encountered with amplification units; social, psychological, educational, speech, and language difficulties encountered by the hearing handicapped. P, 280, 483. May be convened with 584.


*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see “Writing-Emphasis Courses” in the Academic Policies and Graduation Requirements section of this manual).

500. Introduction to Quantitative Methods and Research in Speech and Hearing Sciences (2) Study of measurement and research design and their application in research and professional practice.

501. Professional Issues in Speech-Language Pathology and Audiology (1) Professional practice issues including certification, licensure, supervision, quality control, ethics, federal and state legislation.

502. Principles of Neuroanatomy (4) (Identical with CBA 502, which is home).

510. Counseling Techniques in Communication Disorders (3) Introduction to counseling the communication handicapped and their families.

541. Language Acquisition (3) For a description of course topics see 451. Graduate-level requirements include a scholarly paper/project on a selected topic relevant to the course. (Identical with LING 541 and PSYC 541). May be convened with 441.

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, 441 or 551.

553. Developmental Language Impairments (3) Topics include: language and nonlanguage characteristics and clinical management of children with developmental language impairment, acquired aphasia, bilingualism and auditory disorders.

554. Developmental Language Disorders (2) 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, 441 or 541.


558. Clinical Studies: Speech-Language Pathology (1-3) [Rpt./9 units] For a description of course topics see 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 458.

559. Clinical Studies: Audiology (1-3) [Rpt./9 units] For a description of course topics see 459. Graduate-level requirements include clinical progress or evaluation reports. Open to majors only. P, 589 or CR. May be convened with 459.

560R. Speech and Hearing Science Instrumentation (2) For a description of course topics see 460R. Graduate-level requirements include a project on a selected topic. P, 260, 280 or CR. May be convened with 460R.

560L. Speech and Hearing Science Instrumentation Laboratory (1) P, CR, 560R. May be convened with 460L.

562. Psychophysical Acoustics (3) Experimental procedures and instrumentation; study of psychoacoustics; stimulus integration, pitch and loudness limits, masking, and auditory fatigue; binaural hearing; theory of signal detection. P, 280, 460.

563. Microcomputer Applications (2) 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) 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, 260. (Identical with PSYC 567).

568. Speech Perception (3) For a description of course topics see 468. Graduate-level requirements include more extensive reading. P, 260. (Identical with LING 568 and PSYC 568). May be convened with 468.

570R. Evaluation Process (2) 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 570L (for majors).

570L. Laboratory in Evaluation Process (1) Open to majors only. P, 570R or CR.

571R. Articulation Disorders and Therapies (2) For a description of course topics see 471R. Graduate-level requirements include a scholarly paper and/or project on a selected topic. P, 350, 371, 367; CR or subsequent registration in 571L (for majors). May be convened with 471R.
571L. Laboratory in Articulation Disorders (1) 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 471L.


574. Cleft Palate, Other Craniofacial Disorders, and Communication (2) Communication disorders associated with cleft palate and other craniofacial defects. Speech assessment, evaluation and treatment; survey of dental and surgical services. P, 471R/L or 571R/L.


576. Communicative Aspects of Aging (1) Hearing, speech, voice, and language changes in the elderly caused by aging and disease. Emphasis on management of these problems. (Identical with GER0 576).


580. Community and Industrial Audiology (2) 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) For a description of course topics see 483. Graduate-level requirements include a scholarly paper/project on a selected topic relevant to the course. P, 280 or graduate standing. May be convened with 483.

584. Audiologic Rehabilitation: Adults (3) For a description of course topics see 484. Graduate-level requirements include a scholarly paper and/or project on a selected topic. P, 280, 483. May be convened with 484.


586. Child Audiology (3) For a description of course topics see 486. Graduate-level requirements include a scholarly paper and/or project on a selected topic. P, 280, 483. May be convened with 486.


595. Colloquium a. Current Problems in Speech and Hearing Sciences (1) [Rpt./5]

596. Seminar a. Experimental Phonetics (1-3) [Rpt./2 or 9 units] b. Clinical Audiology (1-3) [Rpt./2 or 9 units] c. Hearing-physiology and Psycho-physics (1-3) [Rpt./2 or 9 units] d. Language and Language Disorders (1-3) [Rpt./2 or 9 units] e. Speech Pathology (1-3) [Rpt./2 or 9 units]

600. Research Methods in Communication Sciences and Disorders (3) Design and execution of descriptive and experimental research in communication sciences and disorders.


659. Advanced Clinical Studies: Audiology (1-3) [Rpt./9 units] With faculty consultation and supervision, students assume responsibility for all aspects of case management of adults and children. Exposure to clinical research methods and interdisciplinary staffings. Open to majors only. P 589 or CR.

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, 260.

665R. Aerodynamic Evaluation and Management of the Speech Mechanism (2) 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, 260, 460R/L, 567.


695. Colloquium a. Motor Control (2) [Rpt./8 units] (Identical with PSIO 695a, which is home).

696. Seminar a. Experimental Phonetics (1-3) [Rpt./9 units] b. Clinical Audiology (1-3) [Rpt./9 units] c. Hearing-physiology and Psycho-physics (1-3) [Rpt./9 units] d. Language and Language Disorders (1-3) [Rpt./9 units] e. Speech Pathology (1-3) [Rpt./9 units]

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COLLEGE OF SOCIAL & BEHAVIORAL SCIENCES
Douglass Building, Rm. 200W
The University of Arizona
PO Box 210028
Tucson, AZ 85721-0028

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.

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.)
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
A minor is required in the Bachelor of Arts and Bachelor of Science degree programs.
General education program
All undergraduate students are required to complete a 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 specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the undergraduate majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic requirements for graduate degrees 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.

ANTHROPOLOGY (ANTH)
Emil Haury Anthropology Bldg., Rm. 221A
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e-mail: advising@anthro.arizona.edu
http://w3.arizona.edu/~anthro/

Baccalaureate degree
Bachelor of Arts (B.A.)

Graduate degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Majors
Anthropology (B.A., M.A., Ph.D.)
Anthropology/Linguistics (Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college office. APRRs for all undergraduate majors are available on-line at: http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

101. Introduction to Biological Anthropology and Archaeology (3) Basic concepts and methods used by biological anthropologists and archaeologists.

102. Introduction to Cultural Anthropology and Linguistic Anthropology (3) Basic concepts and methods used by cultural and linguistic anthropologists.

110. Exploring Archaeology (3) An introduction to the past as revealed by archaeological research; from Neanderthals and their antecedents to Stonehenge, Maya pyramids, and Homer's Troy.

111. Exploring Biological Anthropology (3) An introduction to human evolution for the non-science student.

171. Ancient Civilizations of the Near East (3) [Identical with NES 171, which is home].

172. Islamic Civilization: Traditional and Modern Middle East (3) (Identical with NES 172) which is home.

195. Colloquium
a. Archaeology (1)
b. Cultural Anthropology (1)
c. Linguistic Anthropology (1)
d. Biological Anthropology (1)

200. Cultural Anthropology (3) Contemporary theories and methods in use among cultural anthropologists.

205. Prehistoric Peoples of the Southwest (3) Nontechnical discussion of the lifeways of the ancient people of the Southwest. (Identical with AIS 205).

206. Native Peoples of the Southwest (3) Nontechnical discussion of Southwestern Indian cultures from historic times to the present. (Identical with AIS 206).

207. Material Culture Studies (3) 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).

222. African American Studies: History of Ideas (3) [Rpt./2] (Identical with AFAS 222, which is home).

235. Principles of Archaeology (3) History of archaeological research, survey of concepts and methods for the study of prehistoric cultures.

248a-248b. Introduction to Folklore (3-3) (Identical with ENGL 248a-248b, which is home).

250H. Ethnographic Foundations (3) An honors course that focuses upon the work of a single anthropologist whose writings substantially shaped the history of the field.

251. Social Constraints on Engineering (3) [Rpt./1] (Identical with MSE 251, which is home).

257. Materials Science of Art and Archaeological Objects (3) (Identical with MSE 257, which is home).

258. Materials Science of Art and Archaeological Objects Laboratory (1) (Identical with MSE 258, which is home).


276. The Nature of Language (3) An introduction to the basic concepts of linguistic anthropology and their implications for the study of culture and society.


284. Language and Society (3) Language as a social phenomenon. P, 101 or 111.

302L. Educational Applications in Museum Anthropology (1) [Rpt./2] Introduction to museum education and anthropology of the Southwest which examines cultural diversity of the region and the conduct of museum tours for public school students. (Identical with TTE 302L).


304. Introduction to Archaeological Fieldwork (3) Practical excavation, class discussion, mapping and the preliminary stages of artifact analysis. 2R, 6L. Field trips.

305. Cultural Change (3) A review of theories of cultural and social change with case studies. P, 6 credits of cultural anthropology courses or consent of instructor.

307. Ecological Anthropology (3) 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) Introduction to the cross-cultural analysis of family and kinship systems. Writing-Emphasis Course.*


311. Urban Adaptation of Ethnic Groups (3) A survey of adaptations of ethnic and social groups to urban areas, focusing on a different group or region each semester. P, six credits of cultural anthropology courses, or consent of instructor.

313. Anthropology and Public Policy (3) Examines the development, goals, techniques, and practices of anthropology as a policy science. P, 6 credits of cultural anthropology courses, or consent of instructor.

315. World Ethnography (3) The comparative study of selected societies of the world through extensive use of the media. Writing-Emphasis Course.*

316. Political Economy of Language in the Southwest (3) Intercultural and interclass contests over language and meanings in development of Southwest as a "region," in relation to access to material resources and civil rights. P, junior standing. Writing-Emphasis Course.*

319. Mexican American Culture (3) Historical background, cultural institutions, identity problems, social relations, and expectations of people of Mexican ancestry in the United States. (Identical with LA S 319 and MAS 319).

320. Evolution of the Earliest States (3) Intensive introduction to the evolution of the world's earliest states: Mesopotamia, Egypt, Indus, China, Peru, Maya, Mexico. Comparative topics include...
319. Mexican American Culture (3) Historical background, cultural institutions, identity problems, social relations, and expectations of people of Mexican ancestry in the United States. (Identical with LA S 319 and MAS 319).

320. Evolution of the Earliest States (3) Intensive introduction to the evolution of the world's earliest states: Mesopotamia, Egypt, Indus, China, Peru, Maya, Mexico. Comparative topics include urbanism, elites, economics, literacy and collapse. P, 101, 110, or consult department before enrolling.

325. Faunal Analysis from Europe, Asia, and Africa (3) Provides a working background of the faunas from sites on the Mediterranean area, Near East, Egypt, and portions of Asia, with selected well-known sites from these areas used as examples. The more important examples of contemporary fauna, identified from bones and related works of art, will be discussed for all classes of animals, from fish to mammals. (Identical with CLAS 325).

329. Cultures and Societies of Africa (3) Introduction to African prehistory, social anthropology, ecology, religions, ancient and modern state formation, slavery, urbanization, and contemporary issues. (Identical with AFAS 329).

331. Anthropology and Development (3) The role of anthropology in interdisciplinary projects involving economic development and planned change on the national and international levels. P, 3 units of anthropology. (Identical with LA S 331).

333. Introduction to Archaeological Analysis (3) 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) (Identical with CLAS 334, which is home).

335. Archaeological Interpretation (3) Survey of modern methods and theories in archaeology, with emphasis on current archaeological problems being investigated throughout the world. P, 235.

337. Studies in Modern Material Culture (3) 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 nonreductive methods of social science research. P, 3 units of social science.

338. Introduction to Zooarchaeology (3) 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-340b. Introduction to Classical Art and Archaeology (3-3) (Identical with CLAS 340a-340b, which is home).

344. African American Religion (3) GRD (Identical with AFAS 344, which is home).

346. Gender and Social Identity (3) An analysis of the social and cultural construction of gender across cultures. Emphasis will be on preindustrial societies, using data to test theories of gender. (Identical with W S 406). May be convened with 506. Writing-Emphasis Course.*

367. Human Population Variation (3) 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, 101 or 111.

384. Sociology of Latin American Societies (3) (Identical with SOC 384, which is home).

396H. Honors Proseminar (3)

402. Gender and Language in Japan (3) (Identical with JPN 402, which is home).

403. Anthropology of Conflict Resolution (3) 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 503.

406. Gender and Social Identity (3) An analysis of the social and cultural construction of gender across cultures. Emphasis will be on preindustrial societies, using data to test theories of gender. (Identical with W S 406). May be convened with 506. Writing-Emphasis Course.*

409. Economic Anthropology (3) Analysis of production, exchange, distribution, consumption, property, economic surplus, inheritance, and types of economic structure. P, 200, or 12 units of economics. (Identical with LA S 409). May be convened with 509.

410. Ceramic Ethnoarchaeology (3) Using ethnoarchaeological 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 510.

411. Anthropology of Religion (3) Comparative approaches to the study of religion, systems of ritual and symbolization in the primitive world, shamanism and possession, religious movements, and religion in the modern world. (Identical with RELI 411). May be convened with 511.

412. Peasants and Peasant Societies (3) Comparison of approaches to analyzing the peasantry. Special concern with peasant political mobilization and consciousness. (Identical with SOC 412). May be convened with 512. Research-Writing-Emphasis Course.*
426. Archaeology of Africa (3) 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 AS 427a). May be convened with 526.

427a. The Prehistory of East Asia (3) 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, 101. (Identical with EAS 427a). May be convened with 527a.

427b. The Archaeology of Pre-Han China (3) 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. 427a is not a prerequisite for 427b. P, 101; consult department before enrolling. (Identical with CHN 427b). May be convened with 527b.


432. Peoples of the Pacific (3) Populations and cultures of Polynesia, Micronesia, and Melanesia; variability of these "natural laboratory" settings in an ecological framework. May be convened with 532.


435. Principles of Archaeological Fieldwork (3) Introduction to the principles of archaeological fieldwork, with emphasis on method and theory of survey and excavation. 2R, 3L, P, 235. May be convened with 535.

436. Japanese Sociolinguistics (3) [Rpt/1] (Identical with JPN 436, which is home).

437. Ethnographic Film and Video (3) P, anthropology majors, junior standing. (Identical with MAR 437, which is home).

440. Engendering the Past (3) Primatological, ethnographic, archaeological, and historical evidence are reviewed and critically evaluated to develop an empirically well-rounded view of engendered statuses, roles, and duties in prehistory and in selected early historic periods. Field trip. (Identical with W S 440). May be convened with 540.

441. Organization of Museums (3) An intensive introduction to museum studies, with emphasis on the history, philosophy, structure, and function of museums. May be convened with 541.

442a-442b. Field Training in Archaeology (3-3) Archaeological methods, theory, and field techniques. 442a: Three-week field excavation and survey. Fee. 442b: Three-week laboratory process-
474. Archaeometry: Scientific Methods in Art and Archaeology (3) 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, 304 or equivalent experience. (Identical with CLAS 474 and NES 474). May be convened with 574.


477. Discourse and Text (3) 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 577.

478. Design, Production and Performance of Ceramics and Metals (3) (Identical with MSE 478, which is home). May be convened with 578.

479. Culture and Materials Technology (3) 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 and MSE 479). May be convened with 579.

480. Historical Comparative Linguistics (3) 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, 276 or LING 101. (Identical with LING 480). May be convened with 580. Writing-Emphasis Course.*

481. Quaternary Palynology and Plant Macrofossils (2-4) (Identical with GEO 481, which is home). May be convened with 581.

482. Hopi Language in Culture (3) 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 582.

488. Governing Science and Technology (3) (Identical with GEOG 488, which is home).

489. Areal Survey of Native North American Languages (3) The field of native North American linguistics; areal and genetic classifications; how the study of particular languages provides insights into theories of linguistic anthropologist and general linguistics. P, ANTH 276 or LING 101. (Identical with LING 489 and AIS 489). May be convened with 589.

490. Women in Middle Eastern Society (3) 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 and W S 490). May be convened with 590.

492. Interpretations of Women's Health (3) (Identical with W S 492, which is home).

496. Seminar f. Ceramic Analysis (3) May be convened with 596f.
h. Experimental Archaeology (3) May be convened with 596h.

497. Workshop c. Dendrochronology (1-4) 3L or 6L. Field trips. (Identical with GEOS 497c, which is home). May be convened with 597c.

502. Dynamics of Indian Societies (3) (Identical with AIS 502, which is home).

503. Anthropology of Conflict Resolution (3) For a description of course topics see 403. Graduate-level requirements include a major term paper. May be convened with 403.

506. Gender and Social Identity (3) For a description of course topics see 406. Graduate-level requirements include additional readings and a detailed research paper. May be convened with 406.

509. Economic Anthropology (3) For a description of course topics see 409. Graduate-level requirements include an in-depth research paper. (Identical with LA S 509). May be convened with 409.

510. Ceramic Ethnoarchaeology (3) For a description of course topics see 410. Graduate-level requirements include a research paper. May be convened with 410.

511. Anthropology of Religion (3) For a description of course topics see 411. Graduate-level requirements include a major term paper. May be convened with 411.

512. Peasants and Peasant Societies (3) For a description of course topics see 412. Graduate-level requirements include an additional research paper. May be convened with 412.

513. Ethnology of the Southwest (3) For a description of course topics see 413. Graduate-level requirements include a research paper. (Identical with AIS 513). May be convened with 413.

514. Late Quaternary Geology (3) (Identical with GEOS 514, which is home).

515. Cultural Ecology of Agrarian Societies in the Middle East (3) 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 416. Graduate-level requirements include a term paper based on original archival or field research. (Identical with AIS 516). May be convened with 416.

517. Cultures of Ancient Mexico (3) For a description of course topics see 417. Graduate-level requirements include a term paper. (Identical with LA S 517). May be convened with 417.

519. Psychological Anthropology (3) For a description of course topics see 419. Graduate-level requirements include a term paper. May be convened with 419.

520. Contemporary American Culture (3) For a description of course topics see 420. Graduate-level requirements include a major term paper. May be convened with 420.

521. Ethnology of North America (3) For a description of course topics see 421. Graduate-level requirements include an oral presentation and a research paper. May be convened with 421.

522a-522b-522c. Pre-Hispanic Art (3-3-3) (Identical with ARH 522a-522b-522c, which is home). May be convened with 422a-422b-422c.

523. Anthropology of Rural Mexico (3) For a description of course topics see 423. Graduate-level requirements include a term paper based on original library, archival or field research. (Identical with AIS 523 and LA S 523). May be convened with 423.

524. Theoretical Population Genetics (3) (Identical with ECOL 524, which is home). May be convened with 424.

525. Language Variation (3) (Identical with LING 525, which is home). May be convened with 425.

526. Archaeology of Africa (3) For a description of course topics see 426. Graduate-level requirements include a 30 page term paper. (Identical with AFAS 526).

527a. The Prehistory of East Asia (3) For a description of course topics see 427a. Graduate-level requirements include a 20 to 30 page research paper. (Identical with EAS 527a). May be convened with 427a.

527b. The Archaeology of Pre-Han China (3) For a description of course topics see 427b. Graduate-level requirements include a 20 to 30 page research paper. (Identical with CHN 527b). May be convened with 427b.

528. Near East Pastoral Nomads and Arid Lands Hunter-Gatherers (3) A rigorous introduction to pastoral nomads and hunter-gatherers with a focus on arid lands.

530. The Anthropology of Visual Art (3) For a description of course topics see 430. Graduate-level requirements include a research paper or project. P, 200. (Identical with AIS 530). May be convened with 430.

532. Peoples of the Pacific (3) For a description of course topics see 432. Graduate-level requirements include a research project and paper. May be convened with 432.

534. Kinship and Social Organization (3) For a description of course topics see 434. Graduate-level requirements include additional readings and a detailed term paper. May be convened with 434.
535. Principles of Archaeological Fieldwork (3) For a description of course topics see 435. Graduate-level requirements include a major term paper. May be convened with 435.

536a. Medical Anthropology (3) 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.

536b. Ethnomedicine (3) Comparative medical systems and healing traditions, regional health areas, 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. 536a is not prerequisite to 536b.

540. Engendering the Past (3) For a description of course topics see 440. Graduate-level requirements include more advanced course work and a book review. Field trip. (Identical with W S 540). May be convened with 440.

541. Organization of Museums (3) For a description of course topics see 441. Graduate-level requirements include a volunteer project in a local museum providing practical, hands-on experience in museum work. May be convened with 441.

543a-543b. The Archaeology of Neolithic and Bronze Age Greece (3-3) (Identical with CLAS 543a-543b). May be convened with 443a-443b.


547. Anasazi Archaeology (3) For a description of course topics see 447. Graduate-level requirements include a longer term paper. May be convened with 447.

548. Writing Culture (3) [Rpt.] For a description of course topics see 448. Graduate-level requirements include a major term paper. May be convened with 448.

549a-549b. Folklore (3-3) (Identical with ENGL 549a-549b, which is home). May be convened with 449a-449b.

551. Archaeology of North America (3) For a description of course topics see 451. Graduate-level requirements include a research paper. May be convened with 451.

552R. Archaeology of the Southwest (3) Development of culture in the prehistoric Southwest from the late Pleistocene to the historic period.

552L. Archaeology of the Southwest (3) The nature of archaeological data recovered in the Southwest, with emphasis on their potential for the drawing of both cultural and chronological inferences.

553a-553b. Mesoamerican Archaeology (3-3) For a description of course topics see 453a-453b. Graduate-level requirements include an additional research paper. 553a is not prerequisite to 553b. (Identical with LA S 553a-553b). May be convened with 453a-453b.

554. Andean Archaeology (3) For a description of course topics see 454. Graduate-level requirements include two reviews of research monographs. (Identical with LA S 554). May be convened with 454.

555. Ethnoarchaeology (3) For a description of course topics see 455. Graduate-level requirements include a research paper. May be convened with 455.

556a-556b. Old World Prehistory (3-3) For a description of course topics see 456a-456b. Graduate-level requirements include a research paper. May be convened with 456a-456b.

557. Prehistoric Mesopotamia (3) For a description of course topics see 457. Graduate-level requirements include additional readings and a detailed research paper. (Identical with NES 557). May be convened with 457.

558. Historical Archaeology (3) For a description of course topics see 458. Graduate-level requirements include an additional research paper. May be convened with 458.

560. History of Archaeological Theory (3) For a description of course topics see 460. Graduate-level requirements include a research paper. May be convened with 460.

561. Paleoindian Origins (3) 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 trip. (Identical with GEOS 561).

562. Archaeological Quantitative Methods (3) Intensive review of the theory and application of statistical and mathematical methods to archaeological data.

563. Evolution of Ancient States and Civilizations (3) 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, consult department before enrolling.

564. Introduction to Dendrochronology (4) (Identical with GEOS 564, which is home). May be convened with 464.

565. Women in International Development (3) For a description of course topics see 465. Graduate-level requirements include additional readings and a research paper. (Identical with FCR 565 and LA S 565). May be convened with 465.

566. Paleanthropology (3) 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 466.

567. Human Osteology (4) For a description of course topics see 468. Graduate-level requirements include an additional research paper. P, consult department before enrolling. May be convened with 468.

570a-570b. Human Adaptability (3-3) For a description of course topics see 470a-470b. Graduate-level requirements include a substantial research paper on a topic appropriate to the subject matter. (570a is identical with GER0 570a). May be convened with 470a-470b.

571a-571b. Applied Medical Anthropology in Western Contexts (3-3) Investigations of the illness experience; symbolic interpretations of medicines and medical procedures; doctor-patient communications and illness narratives. 571a demonstrates the applicability of major social science theories in the related study of health-related behavior. 571b 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, 536a.

572. The Relationship of Early Hominids and Contemporary Faunas (3) For a description of course topics see 472. Graduate-level requirements include a research paper. May be convened with 472.

573. Primate Anatomy (4) For a description of course topics see 473. Graduate-level requirements include a comprehensive research paper or project, an annotated bibliography, or specialized examinations. May be convened with 473.

574. Archaeometry: Scientific Methods in Art and Archaeology (3) For a description of course topics see 474. Graduate-level requirements include one substantial critical review of the literature on some archaeological application of archaeometry. (Identical with CLAS 574 and NES 574). May be convened with 474.

576. Language in Culture (3) For a description of course topics see 476. Graduate-level requirements include a research paper and a journal-style review of a major monograph. (Identical with LING 576). May be convened with 476.

577. Discourse and Text (3) For a description of course topics see 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 477.

578. Design, Production and Performance of Ceramics and Metals (3) (Identical with MSE 578, which is home). May be convened with 478.

579. Culture and Materials Technology (3) For a description of course topics see 479. Graduate-
580. Historical Comparative Linguistics (3) For a description of course topics see 480. Graduate-level requirements include a research paper. (Identical with LING 580). May be convened with 480.

581. Quaternary Palynology and Plant Macrofossils (2-4) (Identical with GEOS 581, which is home). May be convened with 481.

582. Hopi Language in Culture (3) For a description of course topics see 482. Graduate-level requirements include a research paper. (Identical with AIS 582). May be convened with 482.

583. Sociolinguistics (3) 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) (Identical with NURS 588, which is home).

590. Women in Middle Eastern Society (3) For a description of course topics see 490. Graduate-level requirements include an additional research paper. (Identical with NES 590). May be convened with 490.

595. Colloquium f. Special Topics in Applied Anthropology (3)

   b. The Dynamics of Human Subsistence (3)
   c. Pre-Columbian Art (3) [Rpt./4] (Identical with ARH 596e, which is home).
   f. Ceramic Analysis (3) May be convened with 496f.
   h. Experimental Archaeology (3) May be convened with 496h.
   j. Issues in African Art History (3) [Rpt./12 units] (Identical with ARH 596j, which is home).
   k. Risk and Society (3) [Rpt./6 units] (Identical with GEOS 596k, which is home).
   q. Near Eastern Archaeology (3) [Rpt.] (Identical with NES 596q, which is home).

597. Workshop a. Biological and Forensic Anthropology (2) [Rpt.] Consult dept. before enrolling.
   b. Biological and Forensic Anthropology (2) [Rpt.] Consult dept. before enrolling.
   c. Dendrochronology (1-4) 3L or 6L. Field trips. (Identical with GEOS 597c, which is home). May be convened with 497c.

600. Survey of Cultural Anthropology (3) Intensive introduction, overview, and synthesis of cultural anthropology.

605. Professional Ethics and Skills (3) 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 sub-disciplines of anthropology.

606. Women's Health in the United States (3) 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) 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) Survey of the foundations of contemporary theory in the field of cultural anthropology.

613. Policy Making and Organizational Culture (3) Examines the development, goals, techniques and practices of anthropology as a policy science.

620. Linguistic Field Techniques (3) 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) The role of anthropology in interdisciplinary projects involving economic development and planned change on the national and international levels. (Identical with AR L 631 and LA S 631).

636. Foundations of Anthropological Interpretation (3) Surveys the history of archaeological interpretation. Central concepts in archaeological method and theory are presented.

637. Archaeological Methodology (3) Surveys the fundamental principles, methods, and techniques of archaeological analysis and inference from a multidisciplinary perspective.

642a-642b. Advanced Field Course in Archaeology (3-3) Archaeological methods, theory, and field techniques. 642a: Three-week field excavation and survey. Fee. 642b: Three-week laboratory processing and analysis. Fee. Registration restricted. Contact department for application which must be returned by April 1.

645. Early Civilizations (3) [Rpt./2] Comparative analysis of early civilizations from both the Old World and the New World, with emphasis on regularities in cultural development. P, 454, 457, or 456a or 456b.

665. Survey of Biological Anthropology (3) Modern biological anthropology including evolutionary theory, genetics, skeletal biology, primatology, paleoanthropology, human growth, adaptability and demography.


674. The Impact of Modernization on the Third World (3) Intensive study of specific theories and varieties of culture change. P, 6 units in cultural anthropology or consent of instructor.

675a-675b. Anthropology and International Health (3-3) 675a: An intensive overview of the field of international-health and anthropologists' contributions 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. 675b: Health transitions and the household production of health with emphasis on anthropological investigations of health within a broader development context. P, 536a.

679. Language and Ethnography (3) 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.

680. Survey of Linguistic Anthropology (3) Major theoretical and methodological issues in linguistic analysis. Language as a cultural code, biological foundations, universals and typology, language and social reality, textual analysis.

695. Colloquium a. Forensic Anthropology (2) [Rpt./6 units] 2R, 1L. P or CR, 468 and 597b.
   b. Cultural Anthropology (1-3) [Rpt./3] (Identical with AR L 696b).
   c. Linguistic Anthropology (1-3) [Rpt./3]
   d. Biological Anthropology (1-3) [Rpt./3]
   g. Nutrition in a Bicultural Context (3) (Identical with F CM 696g).

COMMUNICATION (COMM)
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The University of Arizona
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Tucson, AZ 85721-0025
(520) 621-1366; FAX: (520) 621-5504
http://www.comm.arizona.edu/comm/site.html

Bachelor of Arts (B.A.)

Graduate degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major Communication (B.A., M.A., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course Academic Program Requirements Reports (APRRs).
toward graduation.

more than 3 units of 125 credit (a or b) may count
is required prior to admission to this offering. No
in departmental shows. Approval of the instructor
Interpreters' Theatre. Open only to students cast
members of the university forensics team. Ap-
tercollegiate debate and forensics. Open only to
Forensics (1) [Rpt.] Student participation in in-
communication transactions. P or CR, 100.

Interpersonal, group, and public communication
functions. Argument preparation and exemplification of principles in small
group discussion. P or CR, 100.

troduction and analysis of interpersonal

Introduction to Nonverbal Communication
(2) Study and application of basic communication concepts to the description and analysis of nonverbal cues. P or CR, 100.

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. P or CR, 100.

Critical Thinking in Communication (3) Argument identification and evaluation in a variety of communication contexts. Argument preparation and presentation in written and oral situations.

Introduction to Organizational Communication (2) Analysis of the structure and function of communication in complex organizations: Interpersonal, group, and public communication experiences are provided. P or CR, 100.

Communication Activities in Debate and Forensics (1) [Rpt.] Student participation in intercollegiate debate and forensics. Open only to members of the university forensics team. Approval of the instructor is required prior to admission to this offering. No more than 3 units of 125 credit (a or b) taken in any combination may count toward graduation.

Communication Activities in Interpreters' Theatre (1) [Rpt.] Student participation in Interpreters' Theatre. Open only to students cast in departmental shows. Approval of the instructor is required prior to admission to this offering. No more than 3 units of 125 credit (a or b) may count toward graduation.

200. Fundamentals of Analysis of Communication Behavior (3) Study and application of principles of analysis to communication functions operating to structure social groups and social systems.

280. Laboratory Methods in Communication Research (3) Introduction to laboratory methods 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.

300. Introduction to Communication Theory (3) Origin and development of basic concepts in communication theory and research; survey and analysis of theories and models in research. P or CR, 280 and 281, or consent of instructor. Writing-Emphasis Course. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).


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, 280 and 281, or consent of instructor.

325. 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, 280 and 281, or consent of instructor.

396H. Honors Proseminar (3)

403. Theories of Small Group Communication (3) Theory and research on social control and deviance in groups from the perspective of communication behavior. P or CR, 300, 318 and 325, or consent of instructor. May be convened with 503.

409. Theories of Mass Communication (3) An in-depth analysis of theories of the social effects of various mass media sources on society. P or CR, 300, 318 and 325, or consent of instructor. May be convened with 509.

410. Struggle for the Presidency (3) Examination of the campaign strategies and tactics of those seeking the nation's most powerful office from 1960 to the present. P or CR, 300, 318 and 325, or consent of instructor. (Identical with POL 410). May be convened with 510.

411. Communication and Conflict Management (3) Consideration of theory and research pertaining to the handling of conflict across diverse contexts. P or CR, 300, 318 and 325, or consent of instructor. May be convened with 511.

414. Verbal Communication (3) Theory and research on verbal messages. Topics include patterns of conversational interaction, processes of message construction and interpretation, functions and contexts of messages. P, 300. May be convened with 514.

415. Nonverbal Communication (3) Theory and research on nonverbal communication codes (kinetics, touch, voice, appearance, use of space, time and artifacts) and social functions (impression formation and management, relational communication, emotional expressions, regulation of interaction, social influence). P or CR, 300, 318 and 325, or consent of instructor. May be convened with 515.

417. Relational Communication (3) The relational communication process and messages people use to define interpersonal relationships, including dominance-submissiveness, affection, involvement and similarity. P or CR, 300, 318 and 325, or consent of instructor. May be convened with 517.

418. Advanced Persuasion Theory (3) Examination of philosophical and theoretical assumptions in persuasion in individual, institutional and societal contexts. P or CR, 300, 318 and 325, or consent of instructor.

420. Communication and the Legal Process (3) Presents 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, 300, 318 and 325, or consent of instructor. (Identical with SOC 420). May be convened with 520.

421. Political Campaign Communication (3) Investigation and analysis of communication principles and practices in contemporary campaigns for elective office. P or CR, 300, 318 and 325, or consent of instructor. May be convened with 521.

422. Presidential Leadership and Communication (3) Examination of presidential leadership and communication strategies of the modern presidents from Kennedy to the present. P, upper-division standing. P or CR, 300, 318 and 325, or consent of instructor. May be convened with 522.

423. Topics in Rhetorical Theory and Criticism (3) [Rpt/1] Intensive reading and analysis of the works of major rhetorical theorists. Each semester will focus on a specific era or perspective. P or CR, 300, 318 and 325, or consent of instructor. May be convened with 523.

424. Media and Politics in America (3) Survey of field; media in political campaigns; media coverage of leaders, issues and institutions; leadership strategies to influence media. May be convened with 524.

425. Scientific Argument in Public Discourse (3) 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. P, 325. May be convened with 525.

428. Communication Research Methods (3) Theories of communication and their research
backgrounds; research methodology in communication behavior studies. P or CR, 300, 318 and 325, or consent of instructor. May be convened with 528.

445. Communication of Poetry (3) Types of poetry analyzed, with emphasis on their differentiation for oral presentation; preparation for and presentations of a public recital. P or CR, 300, 318 and 325, or consent of instructor.

446. Communication of Fiction (3) Analysis of short stories and selected short novels, with emphasis on point of view, tone, and characterization in preparation for performance. P or CR, 300, 318 and 325, or consent of instructor.

447. Projects in the Performance of Literature (3) Study in forms, styles, and aesthetics of Readers Theatre, Chamber Theatre, and the documentary; examination of essay, biography, short fiction, novel, and dramatic literature for group reading. P or CR 300, 318, and 325 or consent of instructor.

450. Communication and Cognition (3) Interrelations between human communication and cognitive processes. Emphasis on theory and research in social cognition. P or CR, 300, 318 and 325 or consent of instructor. May be convened with 550.

452. Communication and Human Relationships (3) 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 standing. May be convened with 562.

496. Seminar (3)
   a. Research in Contemporary Issues in Communication (3) P or CR, 300, 318 and 325, or consent of instructor.

503. Theories of Small Group Communication (3) For a description of course topics see 403. Graduate-level requirements include an in-depth research paper on a single aspect of macrocommunication patterns in groups. May be convened with 403.

506. Theories of Mass Communication (3) For a description of course topics see 409. Graduate-level requirements include an in-depth theoretical paper on social effects of the mass media. May be convened with 409.

510. Struggle for the Presidency (3) For a description of course topics see 410. Graduate-level requirements include an in-depth research project. (Identical with POL 510). May be convened with 410.

511. Communication and Conflict Management (3) For a description of course topics see 411. Graduate-level requirements include an in-depth research paper of communication in some conflict situation. May be convened with 411.

514. Verbal Communication (3) For a description of course topics see 414. Graduate students will be required to write a final paper. May be convened with 414.

515. Nonverbal Communication (3) For a description of course topics see 415. Graduate-level requirements include an in-depth research project on nonverbal communication. May be convened with 415.

517. Relational Communication (3) For a description of course topics see 417. 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 417.

520. Communication and the Legal Process (3) For a description of course topics see 420. Graduate-level requirements include an in-depth research paper on a single aspect of communication in some legal context. (Identical with SOC 520). May be convened with 420.

521. Political Campaign Communication (3) For a description of course topics see 421. Graduate-level requirements include an in-depth research project or theoretical paper on some issue in a recent campaign. May be convened with 421.

522. Presidential Leadership and Communication (3) For a description of course topics see 422. Graduate-level requirements include an in-depth research paper or project. May be convened with 422.

523. Topics in Rhetorical Theory and Criticism (3) [Rpt/1 unit] For a description of course topics see 423. Graduate-level requirements include an in-depth research project or rhetorical criticism of a selected speaker or issue. May be convened with 423.

524. Media and Politics in America (3) For course descriptions see 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 424.

525. Scientific Argument in Public Discourse (3) For a description of course topics see 425. Graduate students are required to complete a controversy-centered literature review. May be convened with 425.

528. Communication Research Methods (3) For a description of course topics see 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 428.

541. Communication and Education (3) For a description of course topics see 451. 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 451.
tained from the college or departmental office.
APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

102a-102b. Human Geography (3-3) Introduction to the main fields of human geography, with emphasis on world patterns of distribution and regional examples. 102a is not prerequisite to 102b.

103a-103b. Physical Geography (3-3) 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.

104a-104b. Physical Geography Laboratory (1-1) Field observation and laboratory analysis of data and map interpretation.

106. Geographic Perspectives on People and the Environment (3) Introduction to the study of the relationships between people and the natural environment, with emphasis on social causes and consequences of environmental changes in different parts of the world.

110. Regional Land Use (3) (Identical with PLAN 110, which is home).

151. World Regional Geography (3) Geographic concepts and information organized by conventional region and nation. Appropriate for elementary and secondary teaching.

171. Introduction to Meteorology and Climatology (3) (Identical with ATMO 171).

171L. Introduction to Meteorology and Climatology Laboratory (1) (Identical with ATMO 171L).

195. Colloquium
a. Topics in Geography and Regional Development (1)

301. Introduction to Regional Planning (3) (Identical with PLAN 301, which is home).

305. Economic Geography (3) Analysis and modeling of the spatial structure of primary, secondary, and tertiary economic activities; location theory and regionalization in economic systems.


357. Geographical Research Methods (3) Formulation and solution of geographic problems; models, research design, and methods of gathering, analyzing, and portraying geographic data.


361. Principles and Practices of Regional Development (3) Introduction to basic concepts, objectives, practices and techniques of regional and industrial development as a professional activity, with emphasis on development problems and solutions.

363. Political Geography (3) Explores links between global economic and political processes, national affairs and local politics. Designed to foster participation; assessment is via essays and assignments. (Identical with POL 363).

365. Metropolitan Tucson (3) 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.

370. Urban Growth and Development (3) 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.

381. Cartography (3) Tools and techniques, properties and construction of projections, design and preparation of maps for publication.

401. Introduction to Planning (3) (Identical with PLAN 401, which is home). May be convened with 501.

404. The American Landscape (3) 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.

407. The American Landscape (3) 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. Field trips. (Identical with LAR 407). May be convened with 507.

408. Arizona and the Southwest (3) The changing character of the land and man's occupancy of it, with emphasis on Arizona; historically and problem oriented. Field trip. May be convened with 508.


411. Middle America (3) Land, people, and culture in the major natural and cultural regions of Mexico, Central America, and West Indies. (Identical with LA S 411). May be convened with 511.

412. South America (3) Physical and cultural bases of South America's geographic patterns, with emphasis on human settlement and problems of resource development. (Identical with LA S 412). May be convened with 512.

413. Africa (3) Physical and human bases of regional contrasts, with emphasis on tropical environmental systems and changing patterns of resource utilization and development.

414. Computer Cartography (3) 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 RNR 416 and PLAN 416). May be convened with 516.

415. Introduction to Natural Resources Policy (3) (Identical with HWR 415, which is home). May be convened with 515.

417. Geographic Information Systems for Natural Resources (3) (Identical with RNR 417, which is home). May be convened with 517.

420. Advanced Geographic Information Systems (3) (Identical with RNR 420, which is home). May be convened with 520.

421. Physical Climatology (3) (Identical with ATMO 421, which is home).

430. The Climate System (3) Systematic examination of processes and circulations comprising Earth's climate. Emphasis on circulations influencing geographic processes using examples of atmospheric environmental issues.

431. Global and Regional Climatology (3) 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.

446. Health and the Global Economy (3) The interconnection of the global economy, local so-
cial 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 546.

450. Geomorphology (4) (Identical with GEOS 450, which is home).

453. Locational Analysis (3) Industrial location theory and location factors, consumer travel behavior and market areas, geography of economic impacts, location of public facilities. (Identical with PLAN 453). May be convened with 553. Writing-Emphasis Course.*

454. Regional Analysis (3) 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 554.

456. The American City (3) An integrated approach to the built environment with special emphasis on the historical, social, and political aspects of American urban development. (Identical with PLAN 456). Writing-Emphasis Course.*

457. Statistical Techniques in Geography, Regional Development and Planning (3) 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 117R or 117S or equivalent preparation. (Identical with PLAN 457). May be convened with 557.

459. Land Use and Growth Controls (3) 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 559.

461. Environmental and Resource Geography (3) 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. (Identical with HWR 461, LA S 461 and PLAN 461). Writing-Emphasis Course.*

464. The Arid and Semiarid Lands (3) Past, present and future of settlement and resource utilization in the world’s arid lands; spatial interrelationships of environmental, demographic, socioeconomic and political systems. May be convened with 564. Writing-Emphasis Course.*

465. Physical Aspects of Arid Lands (3) The climate, landforms, hydrology, soils and vegetation of deserts, with special emphasis on processes and distribution at micro-to-macro scales. May be convened with 565. Writing-Emphasis Course.*

466. The Middle Eastern City and Islamic Urbanism (3) (Identical with NES 466, which is home). May be convened with 566.

471. Problems in Regional Development (3) Analysis of population growth trends, market areas, the role of transportation in development, regional specialization and economic structure, interregional migration, and regional policy issues. (Identical with AREC 471 and PLAN 471). May be convened with 571. Writing-Emphasis Course.*


478. Global Change (3) (Identical with GEOS 478, which is home). May be convened with 578.

483. Geographic Applications of Remote Sensing (3) 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. 2R, 3L. Field trip. P, two units of remote sensing or equivalent experience. (Identical with PLAN 483, RNR 483, SWES 483). May be convened with 583.

488. Governing Science and Technology (3) Historical, cross-cultural, and geographical assessment of strategies societies have deployed 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. (Identical with ANTH 488 and POL 488). Writing-Emphasis Course.*

496. Seminar a. Research (3) Open to majors and honors students. P, junior or senior standing in Geography plus 357, or honors standing. Writing-Emphasis Course.*

497. Workshop a. Geography for Teachers (3) May be convened with 597a. b. Projects and Regional Development (3) [Rpt.] P, 6 units geographic techniques. Open to majors in Geography or Regional Development only. May be convened with 597b.

*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).


501. Introduction to Planning (3) (Identical with PLAN 501, which is home). May be convened with 401.

505. Principles of Economic Geography (3) 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) For a description of course topics see 407. Graduate-level requirements include the completion of an essay and annotated bibliography on the work of a specific scholar, place, or region. Field trips. (Identical with L AR 507). May be convened with 407.

508. Arizona and the Southwest (3) For a description of course topics see 408. Graduate-level requirements include the completion of an original research paper on an approved topic. Field trip. May be convened with 408.

509. Russia and the Former Soviet Union (3) For a description of course topics see 409. Graduate-level requirements include two research projects. May be convened with 409.

510. Development of Regional Planning (3) (Identical with PLAN 510, which is home).

511. Middle America (3) For a description of course topics see 411. Graduate-level requirements include three tutorial sessions and a research-review paper. (Identical with LA S 511). May be convened with 411.

512. South America (3) For a description of course topics see 412. Graduate-level requirements include three tutorial sessions and a research-review paper. (Identical with LA S 512). May be convened with 412.

513. Africa (3) For a description of course topics see 513. Graduate-level requirements include the completion and oral presentation of an original research paper on an approved topic. May be convened with 413.

514. Analytic Methods in Planning and Management (3) (Identical with PA 514, which is home).

515. Introduction to Water Resources Policy (3) (Identical with HWR 515, which is home). May be convened with 415.

517. Geographic Information Systems for Natural Resources (3) (Identical with RNR 517, which is home). May be convened with 417.

519. Cartographic Modeling for Natural Resources (3) (Identical with RNR 519, which is home). May be convened with 419.

520. Advanced Geographic Information Systems (3) (Identical with RNR 520, which is home). May be convened with 420.

530. The Climate System (3) For a description of course topics see 430. Graduate-level requirements include the completion of a term paper. (Identical with ARL 530). May be convened with 430.

531. Global and Regional Climatology (3) For a description of course topics see 431. Graduate-level requirements include an additional term paper. May be convened with 431.

546. Health and the Global Economy (3) For a description of course topics see 446. Graduate-level requirements include a more substantive research paper. (Identical with W S 546). May be convened with 446.

550. Metropolitan and Regional Planning (3) (Identical with PLAN 550, which is home).

553. Locational Analysis (3) For a description of course topics see 453. Graduate-level requirements include the completion of an original research paper on an approved topic. (Identical with PLAN 553). May be convened with 453.
554. Regional Analysis (3) For a description of course topics see 454. Graduate-level requirements include a term paper. May be convened with 454.

557. Statistical Techniques in Geography, Regional Development and Planning (3) For a description of course topics see 457. Graduate-level requirements include the completion of several data-intensive research projects. (Identical with PLAN 557). May be convened with 457.

559. Land Use and Growth Controls (3) For a description of course topics see 459. Graduate-level requirements include the completion of a series of research projects. (Identical with PLAN 559). May be convened with 459.

561. Resource Management (3) Examination and critical appraisal of social and behavioral science aspects of resource management, with special emphasis on factors affecting decision making. (Identical with PLAN 561).

563. Perception of Environment (3) Examination of interdisciplinary research on environmental perception; consideration of social and behavioral variables at all scales of environmental perception and planning. (Identical with PLAN 563).

564. The Arid and Semi-arid Lands (3) For a description of course topics see 464. Graduate-level requirements include the completion of an original research paper on an approved topic. (Identical with ARL 564). May be convened with 464.

565. Physical Aspects of Arid Lands (3) For a description of course topics see 465. Graduate-level requirements include the completion of an oral presentation of an original research paper on an approved topic. (Identical with ARL 565). May be convened with 465.

566. The Middle Eastern City and Islamic Urbanism (3) (Identical with NES 556, which is home). May be convened with 466.


571. Problems in Regional Development (3) For a description of course topics see 471. Graduate-level requirements include the completion of an original research paper on an approved topic. (Identical with ARL 561). May be convened with 471.

576. The Land Development Process (3) [Rpt./1] For a description of course topics see 476. Graduate-level requirements include the completion of a series of research projects. (Identical with PLAN 576). May be convened with 471.

578. Global Change (3) (Identical with GEOS 578, which is home). May be convened with 478.

516. Computer Cartography (3) For a description of course topics see 416. Graduate-level requirements include the completion of a project report. (Identical with RNR 516 and PLAN 516). May be convened with 416.

583. Geographic Applications of Remote Sensing (3) For a description of course topics see 483. Graduate-level requirements include the completion of a project report. P, two units of remote sensing or equivalent experience. Field trip. (Identical with PLAN 583, RNR 583, SWES 583). May be convened with 483.

596. Seminar
a. Risk and Society (3) (Identical with ANTH 596k and HWR 596k).

597. Workshop
a. Geography for Teachers (3) May be convened with 497a.
b. Projects in Regional Development (3) [Rpt.] P, 6 units of geographic techniques. Open to majors in Geography or Regional Development only. May be convened with 497b.

605. Planning Theories and Perspectives (3) (Identical with PLAN 605, which is home).

611. Projects in Regional Planning (1 to 5) [Rpt./5 units] (Identical with PLAN 611, which is home).

657. Spatial Analysis (3) Formal analysis and modeling of spatial structures and processes; conceptual evaluation of point patterns, networks, surfaces and interaction. P, 457 or 557. (Identical with PLAN 657).


695. Colloquium
a. Current Research (3) [Rpt./7 units] Required of all graduate students each semester in residence.

696. Seminar
a. Economic Geography (3) [Rpt./2 units]
b. Cultural Geography (3) [Rpt./2 units]
c. Physical Geography (3) [Rpt./2 units]
e. Area Study (3) [Rpt./3 units]
f. Research Methods (3) [Rpt./2 units]
g. Urban Geography (3) [Rpt./2 units]

HISTORY (HIST)
Social Sciences Bldg., Rm. 215
The University of Arizona
PO Box 210027
Tucson, AZ 85721-0027
(520) 621-568; FAX: (520) 621-2422
e-mail: history@abelard.arizona.edu
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
History (B.A., M.A., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

101. History of Western Civilization: Backgrounds and Formation to 1648 (3) 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) 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./9 units] 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) 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) CDT Political, economic, and social history of the American people from the end of Reconstruction to the present.

117. History of England to 1603 (3) Survey of English history from pre-history to 1603, with emphasis on legal and constitutional history.

118. History of England from 1603 to the Present (3) Survey of English history from 1603 to present, with emphasis on political and social history.

160. Colonial Latin America (3) Survey of the history of Spanish America and Brazil from the Age of Discovery to Independence.

161. Modern Latin America (3) Survey of Latin American history from Independence to the present.

170. Indian Civilization (3) (Identical with NES 170, which is home).

171. Ancient Civilizations of the Near East (3) (Identical with NES 171, which is home).

172. Islamic Civilization: Traditional and Modern Middle East (3) (Identical with NES 172, which is home).

174. Chinese Civilization (3) (Identical with CHN 174, which is home).

190. Introduction to African History (3) Introduction to the major themes and social, political,
cultural, and economic developments in sub-Saharan African history. Will cover precolonial, colonial, and postcolonial periods. (Identical with AFAS 190).

195. Colloquium
a. Debates with Historians (2) Open to freshmen.

204. Ancient History: Greek History (3) 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) A survey of Roman civilization from the founding of the monarchy to the empire of Constantine the Great. (Identical with CLAS 205).

214a-214b. European Cultural History (3-3)
214a: Ancient Europe to Absolutism. 214b: Age of Revolution to Present. 214a is not prerequisite to 214b.

223. History of the Mexican American (3) Survey from the 16th century to the present, with emphasis on social, political and economic trends in their historical context. (Identical with MAS 233).

236. Indians in U.S. History (3) 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) Survey of the patterns of American expansion and settlement in the western United States.

245. Frontier America (3) Survey of the patterns of frontier expansion and settlement in the eastern and mid-western United States.

253a-253b. History of Women in the United States (3) Changing role of women in American society from colonial times to the present. (Identical with W S 253a-253b).

270. Modern East Asia (3) 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) 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) The study of the evolution of Japanese social values, esthetic expression, religion, and political institutions in order to understand Japan's cultural heritage and contemporary society. (Identical with JPN 272).

277a-277b. History of the Middle East (3-3)
(Identical with NES 277a-277b, which is home).

312. Economy and Society in Historical Discourse (3) Compares historical narratives about economic theories in their contexts.

314. Twentieth Century Europe (3) 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) 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) 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) Survey of the origins and development of the English common law from the Anglo-Saxons to the present.

320. Tudor-Stuart England (3) An intensive study of English history from the accession of Edward IV to the Hanoverian dynasty. (Identical with RELI 320).

321. History of Modern Britain (3) 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) 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) Traces the technological aspects of North Atlantic civilization and culture with emphasis on the role of technology in nineteenth and twentieth century capitalist development.

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) Social, economic, cultural and political history from Jamestown to Secession. (Identical with AFAS 347).

348. The South Since the Civil War (3) From the Civil War to the present. (Identical with AFAS 348).

351. Race and Class in Latin America (3) 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 and LA S 351).

352. Slavery in Latin America (3) A broadly comparative introduction to slavery in Latin America and the Caribbean. Exploration of slavery, the use of slave labor, and the daily lives of slaves and slave owners in different settings and different cultures. (Identical with LA S 352).

361. The U.S.-Mexico Border Region (3) Evolution of the borderlands since the mid-nineteenth century, with emphasis on bi-national interaction and interdependence. (Identical with MAS 361 and LA S 361).

368. Colonial Mexico (3) From discovery through the War for Independence. (Identical with LA S 368 and MAS 368).

369. Mexico Since Independence (3) Struggle for political, economic and social stability; international relations, cultural patterns. (Identical with LA S 369 and MAS 369).

370a-370b. History of the Jews (3-3) (Identical with JUS 370a-370b, which is home).

372a-372b. History and Religion of Israel in Ancient Times (3-3) (Identical with JUS 372a-372b, which is home).

374. The Holocaust (3) 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, RELI 374 and R SS 374).

375. History of China (3) (Identical with CHN 375, which is home).

376. History of China (3) (Identical with CHN 376, which is home).

377. Modern Israel (3-3) (Identical with JUS 377, which is home).

379. The Ottoman Turkish Empire, 1300-1924 (3) (Identical with NES 379, which is home).

381a-381b. History of Muslim Societies (3-3)
381a: Rise of Islam, creation of Islamic society, relationship of religion and politics. 381b: Evolution and global spread of Muslim societies, modernization and its problems (Identical with NES 381a-381b).

383. Religion and State in Islam (3) 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) Regional and/or thematic topics in precolonial, colonial and postcolonial 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
a. Nature and Practice of History (3) Open to majors only; exception by consent of department. Writing-Emphasis Course.*

396H. Honors Proseminar (3)

401. Ancient Mesopotamia (3) (Identical with NES 401, which is home). May be convened with 501.

403a-403b. History of Greece (3-3) 403a: From prehistoric times to the outbreak of the Peloponnesian War. 403b: From the outbreak of the Peloponnesian War to the end of the Hellenistic Age. 403a is not prerequisite to 403b. (Identical with CLAS 403a-403b).
404a-404b. History of Rome (3-3) 404a: The Republic to the death of Caesar. 404b: The Empire through the reign of Constantine the Great. 404a is not prerequisite to 404b. (Identical with CLAS 404a-404b). May be convened with 504a-504b.

405a-405b. Medieval Europe (3-3) Major institutions and trends in Europe from the breakup of the Roman World to the 14th century. 405a is not prerequisite to 405b. P, 3 units of lower-division European history. (Identical with RELI 405a-405b). May be convened with 505a-505b.

406. Medieval England (3) 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 506.


408. The Renaissance (3) 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 Monarchies and European exploration and imperialism. P, 3 units of European history. (Identical with RELI 408). May be convened with 508.

409. The Reformation (3) 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 509.

410. History of Hell in Early Europe (3) 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 510.

411. European Social and Intellectual History to 1750 (3) 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 511.

412. European Intellectual History: 1750 to 20th Century (3) Dominant themes in European intellectual history from about 1750 to the 20th century. Reading and discussions of texts from David Hume to Friedrich Nietzsche. P, 3 units of any history course. May be convened with 512.

414. Cultural History of Germany to 1714 (3) 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 514.

415. Cultural History of Germany 1714 to 1989 (3) 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 515.

418. France under the Old Regime, 1589-1789 (3) French political development, institutions, and culture from Henry IV to the eve of the French Revolution. May be convened with 518.

419. The French Enlightenment (3) Cultural history of France in the 18th century, with emphasis on the works of the philosophers. May be convened with 519.

420. The French Revolution and Napoleon (3) The origins and progress of the Revolution in France. May be convened with 520.


422. History of Russia: Modern Period (3) Political, socio-economic, and cultural history of Russia in the modern era until the Bolshevik Revolution. (Identical with R SS 422). May be convened with 522.

423. Intellectual History of Russia (3) Historical significance of social, political and scientific thought in 19th- and 20th-century Russia. P, 3 units of any history course. (Identical with R SS 423). May be convened with 523.

424. The Modernization of Russia, 1856-1935 (3) Social history of Russia from the emancipation of the serf to the establishment of the Stalinist system. P, 3 units of any history course. (Identical with R SS 424). May be convened with 524.


427. Work, Culture and Power (3) 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 527.

432. The Era of the American Revolution (3) 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 532.

433. Jefferson and the New Nation, ca. 1790-1828 (3) Major ideological, political, economic, and social conflicts and developments, North and South, during the first decades of the American nation. P, junior or senior standing and 3 units of any U.S. history course. May be convened with 533.

434. Jacksonian Era, 1828-1856 (3) 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 standing and 3 units of any U.S. history course. May be convened with 534.

435. The Coming of the Civil War, U.S. 1845-1861 (3) 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 535.

436. Civil War and Reconstruction, U.S. 1861-1878 (3) Political, constitutional, economic, and military developments in the U.S. and the Confederacy during and after the Civil War. (Identical with AFAS 436). May be convened with 536.

437. U.S. 1876-1919 The Gilded Age and Progressive Era (3) 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 history course. May be convened with 537.

438. U.S. 1918-1945 From World War I through World War II (3) Prosperity, Depression and the New Deal in peace and war. May be convened with 538.

440. United States: 1945 to Present (3) American society and the role of the United States in world affairs from the Yalta Conference to the present. P, 3 units of any history course. May be convened with 540.

442. History of American Society and Thought: Pre-Civil War (3) American political, religious, cultural and philosophical ideas as expressed in colonial, revolutionary, and pre-Civil War society. May be convened with 542.

443. History of American Society and Thought Since the Civil War (3) The transformation of American minds since the Civil War as expressed in literary, philosophical, religious, and other cultural forms. May be convened with 543.

445. Women in Islamic History (3) 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 and W S 445). May be convened with 545.

446. History of Arizona and the Southwest (3) Economic, social and political development of the state and region from Spanish times to present. May be convened with 546.

449. History of American Foreign Relations to 1914 (3) Examines the rise of America from a struggling colony to a world class power, including its relations with Europe, Latin America and
450. History of American Foreign Relations Since 1914 (3) Examines 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 history course. May be convened with 549.

451. The United States and East Asia: 1840 to the Present (3) 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 history course. May be convened with 550.

452. American Ethnic History (3) 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 history course. May be convened with 551.

453. History of Women and Work (3) History of women and work in western and non-western nations from prehistoric times to the present. P, 3 units of any history or women's studies course. (Identical with W S 453) May be convened with 553.

454. Spanish Inquisition (3) 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 and RELI 454). May be convened with 554.

455. History of Women in Europe (3) 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 standing. (Identical with W S 455). May be convened with 555.

456. The Mexican Revolution (3) 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 557.

458. Topics in Comparative Women's History (3) International history of a topic of the instructor's choice. P, 3 units of any history or women's studies course. (Identical with W S 458). May be convened with 558.

461. The Ethnohistory of Mesoamerica and the Andes (3) 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. 2R, 1D. P, (for undergraduates) 160 or 351 or 368. May be convened with 561.

464. History of Argentina (3) Survey of Argentine history and culture from the colonial era to the present. P, junior or senior standing and 3 units of any lower-division Latin American history course. (Identical with LA S 464) May be convened with 564.

465a-465b. History of Spain: Spanish Politics, Society, and Culture Since 711 (3-3) Salient features of Spanish history beginning with the conquest of the Iberian Peninsula by the Moors in 711 and concluding with the consolidation of democracy in the 1980s and 1990s. 465a is not a prerequisite to 465b. P, 102, or 160, or 3 units of any history course. May be convened with 565a-565b.

466. History of Brazil (3) History of Brazil from 1500 to the present. (Identical with LA S 466). May be convened with 566.

467. Contemporary Latin America (3) Revolution, social change and reaction in Latin America from 1930 to the present. P, junior or senior standing. (Identical with LA S 467). May be convened with 567.

468a-468b. Asia and the West (3-3) 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. (Identical with NES 468a-468b). May be convened with 568a-568b. Writing-Emphasis Course* for general major.

469. History of Women in Latin America (3) Women's history in Latin America from the Conquest to the present. P, junior or senior standing and 3 units of any lower-division Latin American history or women's studies course. (Identical with LA S 469). May be convened with 569.


472. History of Medieval India (3) Survey of Indian history from the 7th century to 1750. (Identical with NES 472). May be convened with 572.

473. History of Modern India and Pakistan: 1750-Present (3) Survey of political, social and economic developments in South Asia from the mid-18th century to the present. (Identical with NES 473). May be convened with 573. Writing-Emphasis Course* for India-Pakistan specialization.

474a-474b-474c. History of Japan (3-3-3) Social, cultural, economic and political history of Japan. 474a: From earliest times to 1500. 474b: 1500-1800. 474c: 1800-present. (Identical with JPN 474a-474b-474c). P, junior or senior standing and 3 units of any history course. May be convened with 574a-574b-574c.

475a-475b-475c-475d-475e. Periods in Chinese History (3-3-3-3-3) [Rpt.] (Identical with CHN 475a-475b-475c-475d-475e, which is home). May be convened with 575a-575b-575c-575d-575e.

476. Modern China (3) 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 576.

479. The Ottoman Empire to 1800 (3) 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 579.

480. The Middle East in the Twentieth Century (3) (Identical with NES 480). May be convened with 580.

481. Work, Motherhood and Female Identity in America: 1945 to the Present (3) (Identical with W S 481, which is home). May be convened with 581.

482. Social History of China (3) (Identical with CHN 482, which is home). May be convened with 582.

483. Gender and African History (3) 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 or consent of instructor. (Identical with W S 483). May be convened with 583.

484. History of the Arab-Israeli Conflict, 1800- Present (3) (Identical with NES 484, which is home). May be convened with 584.

485a-485b. Social, Cultural and Political History of Iran: The Plateau from the 7th Century to the Present (3-3) 485a: 600-1500. From Islamic invasions to the aftermath of the Mongol invasions. 485b: The Iranian plateau in the modern era of western imperialism and nationalist Islamic responses. P, NES 277a, 277b, or consent of instructor. (Identical with NES 485a-485b, which is home). May be convened with 585a-585b.

487. Islamic Mysticism (3) Origin and development of Sufism and its impact on Muslim and non-Muslim worlds. (Identical with NES 487). May be convened with 587.

488. History of Byzantium (3) Political, social, and cultural history of Byzantium from A.D. 325 to 1453, including the Byzantine legacy in Europe and the Middle East. (Identical with CLAS 488 and RELI 488). May be convened with 588.


490. Philosophy of History (3) 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 590.

495. Colloquium
a. Studies in Early Europe (3) [Rpt./] P, one semester of history.
b. Studies in Black America (3) (Identical with AFAS 495b).c. Topics in Modern European History (3) [Rpt/
2) P, 214a or 214b or consent of instructor.

r. Chinese History Since 1949 (3) (Identical with CHN 495r, which is home). May be convened with 595r.

496. Seminar

c. Women and the Literature of Identity in Modern Middle East and North Africa (3) (Identical with NES 496c, which is home). May be convened with 596c.

*Writing-Emphasis Courses. P. satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Guidelines section of this manual).

501. Ancient Mesopotamia (3) (Identical with NES 501, which is home). May be convened with 401.

504a-504b. History of Rome (3-3) For a description of course topics see 404a-404b. Graduate-level requirements include an additional in-depth research paper. May be convened with 404a-404b.

505a-505b. Medieval Europe (3-3) For a description of course topics see 405a-405b. Graduate-level requirements include additional work with primary and foreign language secondary sources. 505a is not prerequisite to 505b. May be convened with 405a-405b.

506. Medieval England (3) For a description of course topics see 406. Graduate-level requirements include additional work with primary and foreign language secondary sources. May be convened with 406.

507a-507b. Intellectual History of Medieval Europe (3-3) For a description of course topics see 407a-407b. Graduate-level requirements include additional work with primary and foreign language secondary sources. 507a is not prerequisite to 507b. May be convened with 407a-407b.

508. The Renaissance (3) For a description of course topics see 408. Graduate-level requirements include an in-depth research paper. May be convened with 408.

509. The Reformation (3) for a description of course topics see 409. Graduate-level requirements include an in-depth research paper. May be convened with 409.

510. History of Hell in Early Europe (3) For a description of course topics see 410. Graduate-level requirements include additional work with primary and foreign language secondary sources. May be convened with 410.

511. European Social and Intellectual History to 1750 (3) For a description of course topics see 411. Graduate-level requirements include more advanced readings and an in-depth research paper. May be convened with 411.

512. European Intellectual History: 1750 to 20th Century (3) For a description of course topics see 412. Graduate-level requirements include an in-depth research paper. May be convened with 412.

514. Cultural History of Germany to 1714 (3) For a description of course topics see 414. Graduate-level requirements include a research paper.

May be convened with 414.

515. Cultural History of Germany 1714 to 1989 (3) For a description of course topics see 415. Graduate-level requirements include a research paper. May be convened with 415.

518. France under the Old Regime, 1589-1789 (3) For a description of course topics see 418. Graduate-level requirements include substantial additional independent reading. May be convened with 418.

519. The French Enlightenment (3) For a description of course topics see 419. Graduate-level requirements include substantial additional independent reading. May be convened with 419.

520. The French Revolution and Napoleon (3) For a description of course topics see 420. Graduate-level requirements include substantial additional independent reading. May be convened with 420.

521. History of Russia: Early Period (3) For a description of course topics see 421. Graduate-level requirements include a research paper. May be convened with 421.

522. History of Russia: Modern Period (3) For a description of course topics see 422. Graduate-level requirements include a research paper. May be convened with 422.

523. Intellectual History of Russia (3) For a description of course topics see 423. Graduate-level requirements include a research paper. May be convened with 423.

524. The Modernization of Russia: 1856-1935 (3) For a description of course topics see 424. Graduate-level requirements include a research paper. May be convened with 424.

525. History of the Soviet Union (3) For a description of course topics see 425. Graduate-level requirements include a research paper. May be convened with 425.

527. Work, Culture, and Power (3) For a description of course topics see 427. Graduate-level requirements include additional readings and meetings with the instructor and more rigorous writing requirements. May be convened with 427.

531. Colonial America (3) For a description of course topics see 431. Graduate-level requirements include different, additional reading and reports thereon. May be convened with 431.

532. The Era of the American Revolution (3) For a description of course topics see 432. Graduate-level requirements include different, additional reading and reports thereon. May be convened with 432.

533. Jefferson and the New Nation, ca. 1790-1828 (3) 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 433.

534. Jacksonian Era, 1828-1856 (3) For a description of course topics see 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 434.

535. The Coming of the Civil War, U.S. 1845-1861 (3) For a description of course topics see 435. Graduate-level requirements include a research exercise. May be convened with 435.

536. Civil War and Reconstruction, U.S. 1861-1878 (3) For a description of course topics see 436. Graduate-level requirements include a research exercise. May be convened with 436.

537. U.S. 1876-1919 The Gilded Age and Progressive Era (3) For a description of course topics see 437. Graduate-level requirements include an in-depth research paper. May be convened with 437.

538. U.S. 1918-1945 From World War I through World War II (3) For a description of course topics see 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 undergraduate students over the assigned readings, providing questions from those readings for use by the professor in formulating quizzes for the undergraduates, and possibly presenting a lecture to the class if the student is nearing completion of graduate work. May be convened with 438.

540. United States: 1945 to Present (3) For a description of course topics see 440. Graduate-level requirements include an in-depth research paper on a topic approved by the instructor. May be convened with 440.

542. History of American Society and Thought: Pre-Civil War (3) For a description of course topics see 442. Graduate-level requirements include an in-depth research paper. May be convened with 442.

543. History of American Society and Thought Since the Civil War (3) For a description of course topics see 443. Graduate-level requirements include an in-depth research paper. May be convened with 443.

545. Women in Islamic History (3) For a description of course topics see 445. Graduate-level requirements include additional readings and meetings with the instructor and an additional research paper. (Identical with NES 445 and WS 545). May be convened with 445.

546. History of Arizona and the Southwest (3) For a description of course topics see 446. Graduate-level requirements include an in-depth research paper. May be convened with 446.

549. History of American Foreign Relations to 1914 (3) For a description of course topics see 449. Graduate-level requirements include an in-depth research paper and additional course readings. May be convened with 449.

550. History of American Foreign Relations since 1914 (3) For a description of course topics see 450. Graduate-level requirements include an in-depth research paper and additional course read-
ings. May be convened with 450.

551. The United States and East Asia: 1840 to the Present (3) For a description of course topics see 451. Graduate-level requirements include an in-depth research paper and additional course readings. (Identical with EAS 551). May be convened with 451.

552. American Ethnic History (3) For a description of course topics see 452. Graduate-level requirements include an in-depth research paper on a topic approved by the instructor. May be convened with 452.

553. History of Women and Work (3) For a description of course topics see 453. Graduate-level requirements include writing a lengthy research paper demonstrating a familiarity with basic secondary works as well as investigating primary sources on a pertinent topic. May be convened with 453.

554. Spanish Inquisition (3) For a description of course topics see 454. Graduate-level requirements include an in-depth research paper and additional course readings. May be convened with 454.

555. History of Women in Europe (3) For a description of course topics see 455. Graduate-level requirements include an additional historiographical project. (Identical with W S 555). May be convened with 455.

556. History of Women in Latin America (3) For a description of course topics see 456. Graduate-level requirements include an additional research paper and additional course readings. May be convened with 456.

557. The Ethnohistory of Mesoamerica and the Andes (3) For a description of course topics see 457. Graduate-level requirements include additional research or writing; see instructor for details. (Identical with LA S 569). May be convened with 457.

558. Topics in Comparative Women's History (3) For a description of course topics see 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 458.

559. History of Women in Europe (3) For a description of course topics see 459. Graduate-level requirements include an in-depth research paper on a topic approved by the instructor. (Identical with LA S 567). May be convened with 467.

560. History of Women in Latin America (3) For a description of course topics see 460. Graduate-level requirements include an in-depth research paper on a topic approved by the instructor. (Identical with LA S 567). May be convened with 467.

561. The Ethnohistory of Mesoamerica and the Andes (3) For a description of course topics see 461. Graduate-level requirements include an additional essay. May be convened with 461.

562. History of Argentina (3) For a description of course topics see 464. Graduate-level requirements include an in-depth research paper on an approved topic. (Identical with LA S 564). May be convened with 464.

563. History of Brazil (3) For a description of course topics see 466. Graduate-level requirements include a paper on the role of Carlos Lacerda. (Identical with LA S 566). May be convened with 466.

564. History of Brazil (3) For a description of course topics see 466. Graduate-level requirements include a paper on the role of Carlos Lacerda. (Identical with LA S 566). May be convened with 466.

565a-565b. History of Spain: Spanish Politics, Society, and Culture Since 711 (3-3) For a description of course topics see 465a-465b. Graduate-level requirements include additional readings and meetings with instructor to develop topics for a historiographic or bibliographic essay. 565a is not a prerequisite to 565b. P, 102 or 160 or 3 units of any history course. May be convened with 465a-465b.

566. History of Brazil (3) For a description of course topics see 466. Graduate-level requirements include a paper on the role of Carlos Lacerda. (Identical with LA S 566). May be convened with 466.

567. Contemporary Latin America (3) For a description of course topics see 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 467.

568a-568b. Asia and the West (3-3) For a description of course topics see 468a-468b. Graduate-level requirements include additional research or writing; see instructor for details. (Identical with NES 568a-568b). May be convened with 468a-468b.

569 History of Women in Latin America (3) For a description of course topics see 469. Graduate-level requirements include an in-depth research paper on a topic approved by the instructor. (Identical with LA S 567). May be convened with 469.

570. Religious History of India (3) For a description of course topics see 470. Graduate-level requirements include additional research or writing; see instructor for details. (Identical with NES 570). May be convened with 470.

571. History of Medieval India (3) For a description of course topics see 471. Graduate-level requirements include an in-depth research paper on a topic approved by the instructor. (Identical with LA S 567). May be convened with 471.

572. History of Medieval India (3) For a description of course topics see 472. Graduate-level requirements include an in-depth research paper on a topic approved by the instructor. (Identical with NES 572). May be convened with 472.

573. History of Modern India and Pakistan: 1750-Present (3) For a description of course topics see 473. Graduate-level requirements include an in-depth research paper on a topic approved by the instructor. (Identical with NES 573). May be convened with 473.

574a-574b-574c. History of Japan (3-3-3) For a description of course topics see 474a-474b-474c. Graduate-level requirements include an additional research paper. (Identical with JPN 574a-574b-574c). May be convened with 474a-474b-474c.

575a-575b-575c-575d-575e. Periods in Chinese History (3-3-3-3-3) [Rpt.] (Identical with CHN 575a-575b-575c-575d-575e). May be convened with 475a-475b-475c-475d-475e.

576. Modern China (3) For a description of course topics see 476. Graduate-level requirements include an in-depth research paper and additional readings. (Identical with CHN 576). May be convened with 476.

577. The Ottoman Empire to 1800 (3) For a description of course topics see 479. Graduate-level requirements include an in-depth research paper. (Identical with NES 579). May be convened with 479.

580. The Middle East in the Twentieth Century (3) (Identical with NES 580, which is home). May be convened with 480.

581. Work, Motherhood and Female Identity in America 1945 to the Present (3) (Identical with W S 581, which is home). May be convened with 481.

582. Social History of China (3) (Identical with CHN 582, which is home). May be convened with 482.

583. Gender and African History (3) For a description of course topics see 483. Graduate-level requirements will include a research paper and additional discussion sessions. (Identical with W S 583). May be convened with 483.

584. History of the Arab-Israeli Conflict, 1800-Present (3) (Identical with NES 584, which is home). May be convened with 484.

585a-585b. Social, Cultural and Political History of Iran and the Indian Subcontinent from the 7th Century to the Present (3-3) (Identical with NES 585a-585b, which is home). May be convened with 485a-485b.

587. Islamic Mysticism (3) For a description of course topics see 487. (Identical with NES 587). May be convened with 487.

588. History of Byzantium (3) For a description of course topics see 488. Graduate-level requirements include an additional research paper. (Identical with CLAS 588). May be convened with 488.

589. Women in East Asia (3) For a description of course topics see 489. Graduate-level requirements include an additional research paper. (Identical with EAS 589). May be convened with 489.

590. Philosophy of History (3) For a description of course topics see 490. Graduate-level requirements include an additional research paper. May be convened with 490.

591. Colloquium r. Chinese History Since 1949 (3) (Identical with CHN 595r, which is home). May be convened with 495r.

596. Seminar c. Women and the Literature of Identity in Modern Middle East and North Africa (3) (Identical with NES 596c, which is home). May be convened with 496c.

m. Mexican-American Heritage Bibliography - A Library Seminar (3) [Rpt./6 units] (Identical with NES 596m, which is home).

Certain colloquia and seminars in other departments may be used for history graduate credit.

595. Colloquia

a. Advanced Studies in United States History (3) [Rpt./10]

b. Advanced Studies in Latin American History (3) [Rpt./10] (Identical with LA S 695b)

c. Advanced Studies in European History (3) [Rpt./10]

d. Advanced Studies in Latin American History (3) [Rpt./10] (Identical with NES 695m, which is home). May be convened with 496c.

m. Advanced Studies in Ancient History (3) [Rpt./10] (Identical with CLAS 695f).

596. Seminar

a. Colonial U.S. History (3) [Rpt./10]

b. Nineteenth-Century U.S. History (3) [Rpt./10]

c. Twentieth-Century U.S. History (3) [Rpt./10]

d. Ancient History (3) [Rpt./10]

e. Medieval Europe (3) [Rpt./10]

f. Early Modern Europe (3) [Rpt./10] P, Latin and German required.
g. Nineteenth-Century Europe (3) [Rpt./10]
h. Twentieth-Century Europe (3) [Rpt./10]
j. Latin America: Modern Period (3) [Rpt./10] (Identical with LA S 696i).
k. Historical Writing and Editing (3) [Rpt./10]
l. Colonial Latin America (3) [Rpt./10] (Identical with LA S 696i).
m. Comparative Women's History (3) [Rpt./4] P, consult department before enrolling. (Identical with W S 696w, which is home).

n. History and Historiography of Colonial North Africa, c. 1800-1962 (3) (Identical with NES 696b, which is home).

o. Latin America: Modern Period (3) [Rpt./10] (Identical with JPN 696r).

Certain colloquia and seminars in other departments may be used for history graduate credit.

**JOURNALISM (JOUR)**
Franklin Bldg., Rm.101M
The University of Arizona
PO Box 210080
Tucson, AZ 85721-0080
(520) 621-7556; FAX: (520) 621-7557
e-mail: jourdept@ccit.arizona.edu
http://w3.arizona.edu/journal/uaj/

Bachelor of Arts (B.A.)

Graduate degree
Master of Arts (M.A.)

Major

Journalism (B.A., M.A.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html

For academic program requirements for graduate degrees, 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.

**151. News in Mass Communications (3)** Designed to acquaint the non-journalist with communications techniques used by newspapers, wire services, information agencies, news magazines and broadcast news; analysis of social and historical influence on the news media.

**195. Colloquium**

a. Good and Bad News (1)

**201. Photojournalism/Visual Communications (2)** Reporting the news through images and graphics using color and black and white photography, digital cameras, electronic darkrooms and image transfers.


**206. Advanced Reporting (3)** Comprehensive and accurate news presentation, with emphasis on interviewing techniques and coverage of major news stories. P. 205. Department consent required to enroll.


**300. Editing (2)** Theory and techniques of copy editing and headline writing; training on video display terminals. 1R, 3L. P, 208, 206 or CR. Department consent required to enroll.

**362. Writing for Media (3)** Identical with M AR 362, which is home).

**396H. Honors Proseminar (3)**

**403. Advanced Photojournalism (3)** Reporting and interpreting the news through photos, photo documentaries, and photo analysis. Open to majors only. P, 301, 302. May be convened with 503.

**405. The Study of News (3)** Critical study and problem analysis of the media. Field work may include publication of conclusions. May be convened with 505.

**406. Magazine Color Photography (3)** Techniques for taking and editing color photographs to illustrate magazine articles. Preparation of resumes and photo portfolios. Field trips. May be convened with 506.

**411. News Features (3)** Writing the basic news feature article; specialized reporting and rewriting techniques. P. 206. May be convened with 511. Department consent required to enroll. Writing-Emphasis Course.*

**413. Reporting Public Affairs (3)** Study and practice of gathering stories on executive, legislative, and judicial levels in city, county, state and federal governments, with emphasis on news sources and interpretive writing. P. 206, 208. Department consent required to enroll. May be convened with 513. Writing-Emphasis Course.*

**414. The News Agency: Arizona News Service (1) [Rpt.] 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. Field trips. P or CR, 411 or 413. Department consent required to enroll. May be convened with 514.

**417. Sports News Writing (3)** Students will cover sports events and write sports features. Interview and rewriting techniques. P, 206. May be convened with 517. Writing-Emphasis Course.*


**439. Ethics and the News Media (3)** 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 439). May be convened with 539.

**450. Community Journalism: The Tombstone Epitaph (3) [Rpt.]** Class members work as editorial staff to produce the local newspaper for Tombstone, Arizona. Intensive study of problems and responsibilities of community newspapers. P, 206, 208, discussion of preparation with instructor. May be convened with 550.

**451. Community Journalism: El Independiente (3) [Rpt.]** 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, 206, 208, discussion of preparation with instructor. May be convened with 551.

**470. The Press and Society (3)** Critical study of press performance in current affairs; changing requirements for socially responsible and professional journalism in a democracy. (Identical with M AR 470). May be convened with 570.

**471. International Communications (3)** Study of world news systems, including news gathering agencies, role of the foreign correspondent, the foreign press, the factors influencing international news flow. May be convened with 571.

**480. Reporting for Broadcast News (3) [Rpt./6]** (Identical with M AR 480, which is home).

**496. Seminar**

i. News Analysis (3)

m. Directions in News Technology (3) [Rpt./1] May be convened with 596m.

*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

**502. Freedom of Expression (3)** Analysis of access to information and communication at local, state, national and international levels; intensive study of the legal relationship between mass media and society. Open to majors only.

**503. Advanced Photojournalism (3)** For a description of course topics see 403. Graduate-level requirements include an intensive photo essay illustrating a social problem unique to the Southwest. Open to majors only. P, 301, 302. May be convened with 403.

**505. The Study of News (3) [Rpt.]** For a description of course topics see 405. Graduate-level requirements include a major research paper on an
aspect of the subject matter. May be convened with 405.

506. Magazine Color Photography (3) For a description of course topics see 406. Graduate-level requirements include additional readings and two additional photo assignments. Field trips. May be convened with 406.

511. News Features (3) For a description of course topics see 411. Graduate-level requirements include an in-depth profile of an Arizona newsmaker. P, 206. Department consent required to enroll. May be convened with 411.

513. Reporting Public Affairs (3) For a description of course topics see 413. 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, 206, 502. Department consent required to enroll. May be convened with 413.

514. The News Agency: Arizona News Service (1) [Rpt.] For a description of course topics see 414. Graduate-level requirements include a research paper. Field trips. P or CR, 411 or 413. Department consent required to enroll. May be convened with 414.

517. Sports News Writing (3) For a description of course topics see 417. Graduate-level requirements include a research paper concentrating on issues raised in class. P, 206. Department consent required to enroll. May be convened with 417.

521. Advanced Editing (3) For a description of course topics see 421. Graduate-level requirements include assuming leadership positions such as news editor or copy desk chief during lab simulations. P, 320. Department consent required to enroll. May be convened with 421.

522. Publications Layout and Design (3) For a description of course topics see 422. Graduate-level requirements include critically analyzing a major publication and redesigning it according to newest principles. P, consult department before enrolling. May be convened with 422.

539. Ethics and the News Media (3) For a description of course topics see 439. Graduate-level requirements include a research paper examining a major ethical issue and providing a critique regarding how the media resolved the issue. (Identical with LA S 539). May be convened with 439.

550. Community Journalism: The Tombstone Epitaph (3) [Rpt.] For a description of course topics see 450. Graduate-level requirements include assuming leadership roles, such as city editor or news editor, on the newspaper. P, 206, 208, discussion of preparation with instructor. May be convened with 450.

551. Community Journalism: El Independiente (3) [Rpt.] For a description of course topics see 451. Graduate-level requirements include assuming leadership roles, such as city editor or news editor, on the publication. P, 206, 208, discussion of preparation with instructor. May be convened with 451.

570. The Press and Society (3) For a description of course topics see 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 470.

571. International Communications (3) For a description of course topics see 471. Graduate students will be required to complete one extra research paper. May be convened with 471.


JUDAIC STUDIES (JUS)
Franklin Bldg., Rm. 308
The University of Arizona
PO Box 210080
Tucson, AZ 85721-0080
(520) 621-9114; FAX: (520) 621-7841
http://dizzy.library.arizona.edu/branches/judaic/home2.html

Baccalaureate degree
Bachelor of Arts (B.A.)

Major
Judaic Studies (B.A.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRPRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.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.

103a-103b. Elementary Modern Hebrew (5-5) 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).

203a-203b. Intermediate Modern Hebrew (5-5) CDT Instruction to achieve moderate fluency in conversation, reading and writing. P, 103b or qualification by an equivalency exam. (Identical with NES 203a-203b).

273. Introduction to Judaism (3) Exploration of Judaism in its diversity to its history and to proponents of its present forms, from Sephardi to Ashkenazi, and from Orthodoxy 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).


310. Apocalyptic Imagination (3) 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) 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 W S 321).

322. Modern Jewish Thought (3) Major currents in Jewish philosophy and religion from the seventeenth to the twentieth century, stressing aspects which most affect the state of Jewish ideas today. Including Haskalah, Musar, Neo-Kantianism, post-Holocaust theologies, and Zionism. P, 273. (Identical with RELI 322).


372a-372b. History and Religion of Israel in Ancient Times (3-3) Survey of the history and religion of ancient Israel. 372a: Biblical period through the Babylonian Exile; introduction to the Hebrew Bible. 372b: Ezra-Nehemiah to the Roman Empire, with emphasis on the formation of rabbinic Judaism. (Identical with HIST 372a-372b, NES 372a-372b and RELI 372a-372b).

374. The Holocaust (3) (Identical with HIST 374, which is home).

376. German-Jewish Writers (3) (Identical with GER 376, which is home).

377. Modern Israel (3-3) Evolution of the State of Israel from the rise of Zionism in 19th Century Europe to the present. Survey of the origins of the State of Israel from the rise of Zionism in 19th Century Europe to the Declaration of the State of Israel in 1948. Evolution of the State of Israel from 1949 to the present. Emphasis on interactive generative processes and understanding of the interplay between past processes and present sociopolitical realities. (Identical with HIST 377, NES 377 and POL 377).

382. Archaeology and the Bible (3) 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 and RELI 382).

409a-409b. Biblical Hebrew (3-3) (Identical with NES409a-409b, which is home). May be convened with 509a-509b.
430. Prophecy in Ancient Israel (3) 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 530.

435. Jewish Mysticism (3) 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 and RELI 435). May be convened with 535.

438. The Book of Psalms (3) 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 are considered. (Identical with NES 438 and RELI 438). May be convened with 538.

440. Jews and Judaism in German Culture (3) (Identical with GER 440, which is home).

454. Spanish Inquisition (3) (Identical with HIST 454, which is home).

455. Introduction to Rabbinic Literature (3) 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).

495. Colloquium f. Ancient Near East (3) [Rpt./4] (Identical with NES 495f, which is home).

496. Seminar k. Early Judaism and the Beginning of Christianity (3) (Identical with RELI 496k). May be convened with 496k.

Baccalaureate degree Bachelor of Arts (B.A.)
Graduate degree Master of Arts (M.A.)
Minor Latin American Studies (B.A., M.A.)

Program Requirements For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

102. Contemporary Latin American: 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 of the region. CR, 1L.

237. Survey of Mexican Folk Music (3) (Identical with MUS 237, which is home).

319. Mexican American Culture (3) (Identical with ANTH 319, which is home).

322. Introduction to Prehispanic, Hispanic and Chicano Art (3) (Identical with ARH 322, which is home).

325. Intermediate Grammar, Conversation and Writing Skills (3) (Identical with PORT 325, which is home).

330. Intermediate Conversation (3) P, 325. (Identical with SPAN 330, which is home).

331. Anthropology and Development (3) (Identical with ANTH 331, which is home).

350. Readings in the Literary Genres (3) (Identical with SPAN 350, which is home).

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

352. Slavery in Latin America (3) (Identical with HIST 352, which is home).

361. The U.S.-Mexico Border Region (3) (Identical with HIST 361, which is home).

368. Colonial Mexico (3) (Identical with HIST 368, which is home).

369. Mexico Since Independence (3) (Identical with HIST 369, which is home).

371a-371b. Commercial and Technical Spanish (3-3) (Identical with SPAN 371a-371b, which is home).

384. Sociology of Latin American Societies (3) (Identical with SOC 384, which is home).

388. Immigration and Refugee Policy (3) (Identical with POL 388, which is home).

401. Survey of Spanish-American Literature (3) (Identical with SPAN 401, which is home).

402. Survey of Mexican Literature (3) (Identical with SPAN 402, which is home).

403. Mexican-American Literature (3) (Identical with SPAN 403, which is home).

404. Architecture and Planning in Mexico (3) (Identical with ARCH 404, which is home). May be convened with 504.

406. Lasopahone Literature Since 1900 (3) (Identical with PORT 406, which is home). May be convened with 506.

409. Economic Anthropology (3) (Identical with ANTH 409, which is home). May be convened with 509.

411. Middle America (3) (Identical with GEOG 411, which is home). May be convened with 511.

412. South America (3) (Identical with GEOG 412, which is home). May be convened with 512.

415. Creative Writing in Spanish (3) (Identical with SPAN 415, which is home).

417. Cultures of Ancient Mexico (3) (Identical with ANTH 417, which is home). May be convened with 517.

422a-422b-422c. Pre-Hispanic Art (3-3-3) (Identical with ARH 422a-422b-422c, which is home). May be convened with 522a-522b-522c.
423. Anthropology of Rural Mexico (3) (Identical with ANTH 423, which is home). May be convened with 523.

425. Advanced Grammar and Composition (3) (Identical with SPAN 425, which is home).

429. The U.S.-Mexican Borderlands in Comparative Perspective (3) (Identical with POL 429, which is home). May be convened with 529.

430. Brazilian Civilization (3) (Identical with PORT 430, which is home).

431. Civilization in the Portuguese-Speaking World (3) (Identical with PORT 431, which is home). May be convened with 531.

433. Mexican and Mexican-American Civilizations Through Literature (3) (Identical with SPAN 433, which is home).

437. Democracies, Emerging and Evolving (3) (Identical with POL 437, which is home). May be convened with 537.

439. Ethics and the News Media (3) (Identical with JOUR 439, which is home). May be convened with 539.

441. Children’s Literature in Spanish (3) (Identical with SPAN 441, which is home).

444. Mexican and Mexican-American Prose Fiction (3) (Identical with SPAN 444, which is home).

445. Novel of the Mexican Revolution (3) (Identical with SPAN 445, which is home).

446. Mexican-American Theatre (3) (Identical with SPAN 446, which is home).

447. Latin-American Political Development (3) (Identical with POL 447, which is home). May be convened with 547.

448. Government and Politics of Mexico (3) (Identical with POL 448, which is home). May be convened with 548.

449. Brazilian Literature in Film (3) (Identical with PORT 449, which is home). May be convened with 549.

450. Religion and Politics (3) (Identical with POL 450, which is home). May be convened with 550.

451. Mesoamerican Media and Cultural Analysis (3) (Identical with MAR 451, which is home).

453a-453b. Mesoamerican Archaeology (3-3) (Identical with ANTH 453a-453b, which is home). May be convened with 553a-553b.

454. Andean Archaeology (3) (Identical with ANTH 454, which is home). May be convened with 554.

457. Inter-American Politics (3) (Identical with POL 457, which is home). May be convened with 557.

461. Environmental and Resource Geography (3) (Identical with GEOG 461, which is home).

463. * Topics in Luso-Brazilian Literature (3) (Identical with PORT 463, which is home). May be convened with 563.

464. History of Argentina (3) (Identical with HIST 464, which is home). May be convened with 564.

465. Women in International Development (3) (Identical with ANTH 465, which is home). May be convened with 565.

466. History of Brazil (3) (Identical with HIST 466, which is home). May be convened with 566.

467. Contemporary Latin America (3) (Identical with HIST 467, which is home). May be convened with 567.

469. History of Women in Latin America (3) (Identical with HIST 469, which is home). May be convened with 569.

495. Colloquium
   a. Latin American Studies (3) [Rpt.] P, Spanish or Portuguese proficiency. (Identical with POL 495a).
      May be convened with 595a. Writing-Emphasis Course.*
      *Writing-Emphasis Courses. P, Satisfaction of the upper-division writing-proficiency requirement (see “Writing-Emphasis Courses” in the Academic Policies and Graduation Requirements section of this manual).

504. Architecture and Planning in Mexico (3) (Identical with ARCH 504, which is home). May be convened with 404.

509. Economic Anthropology (3) (Identical with ANTH 509, which is home). May be convened with 409.

511. Middle America (3) (Identical with GEOG 511, which is home). May be convened with 411.

512. South America (3) (Identical with GEOG 512, which is home). May be convened with 412.

517. Cultures of Ancient Mexico (3) S (Identical with ANTH 517, which is home). May be convened with 417.

522a-522b-522c. Pre-Hispanic Art (3-3-3) (Identical with ARH 522a-522b-522c, which is home). May be convened with 422a-422b-422c.

523. Anthropology of Rural Mexico (3) (Identical with ANTH 523, which is home). May be convened with 423.

529. U.S.-Mexican Borderlands in Comparative Perspective (3) (Identical with POL 529, which is home).

530. Development of Spanish-American Literature from the Pre-Columbian Period to Independence (3) (Identical with SPAN 530, which is home).

531. Civilization in the Portuguese-Speaking World (3) (Identical with PORT 531, which is home). May be convened with 431.

537. Democracies, Emerging and Evolving (3) (Identical with POL 537, which is home). May be convened with 437.

539. Ethics and the News Media (3) (Identical with JOUR 539, which is home). May be convened with 439.

540. Development of Spanish American Nineteenth and Twentieth-Century Literature (3) (Identical with SPAN 540, which is home).

544. In the Wake of the Green Revolution (3) (Identical with ANTH 544, which is home).

547. Latin American Political Development (3) (Identical with POL 547, which is home). May be convened with 447.

548. Government and Politics of Mexico (3) (Identical with POL 548, which is home). May be convened with 448.

549. Brazilian Literature in Film (3) (Identical with PORT 549, which is home). May be convened with 449.

550. Religion and Politics (3) (Identical with POL 550, which is home). May be convened with 450.

553a-553b. Mesoamerican Archaeology (3-3) (Identical with ANTH 553a-553b, which is home). May be convened with 453a-453b.

554. Andean Archaeology (3) (Identical with ANTH 554, which is home). May be convened with 454.

557. Inter-American Politics (3) (Identical with POL 557, which is home). May be convened with 457.

563. Topics in Luso-Brazilian Literature (3) (Identical with PORT 563, which is home). May be convened with 463.

564. History of Argentina (3) (Identical with HIST 564, which is home). May be convened with 464.

565. Women in International Development (3) (Identical with ANTH 565, which is home). May be convened with 465.

566. History of Brazil (3) (Identical with HIST 566, which is home). May be convened with 466.

567. Contemporary Latin America (3) (Identical with HIST 567, which is home). May be convened with 467.

569. History of Women in Latin America (3) (Identical with HIST 569, which is home). May be convened with 469.

595. Colloquium
   a. Latin American Studies (3) [Rpt.] P, Spanish or Portuguese proficiency. May be convened with 495a.
   d. Latin American Studies Special Topics (3) [Rpt./1] (Identical with ANTH 595d, which is home).

596. Seminar
   a. Latin American Studies (3) [Rpt.] P, Spanish or Portuguese proficiency.
   b. Latin-American Press (3) (Identical with JOUR 596b).

631. Anthropology and Development (3) (Identical with ANTH 631, which is home).

695. Colloquium
   b. Advanced Studies in Latin American History (3) [Rpt./10] (Identical with HIST 695b, which is home).
LINGUISTICS (LING)  
Douglass Bldgs., Rm. 200E  
The University of Arizona  
Box 210002  
Tucson, AZ 85721-0028  
(520) 621-6897; FAX: (520) 621-9424  
e-mail: admin@linguistics.arizona.edu  
http://wacky.cit.arizona.edu/~ling/index.html

Baccalaureate degree
Bachelor of Arts (B.A.)

Graduate degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Majors
Linguistics (B.A., M.A., Ph.D.)  
Anthropology/Linguistics (Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/ oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

101. Introduction to Language (3) Survey of linguistic concepts and methods: communication among animals; physiology of human speech; elementary phonetics, syntax, and language change; language and the brain; language and thought.

102. Linguistics for Native American Communities (3) 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-104b. Beginning Navajo (3) 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)

195. Colloquium
   a. Learning Foreign Languages: Windows to the World (1) (Identical with GER 195a, which is home).

201. Introduction to Linguistics (3) Fundamentals of linguistics; phonetics, phonology, morphology, syntax, semantics and language acquisition; provides basis for further study in the field.

204a-204b. Intermediate Navajo (3-3) Continuation of vocabulary development, oral skills enhancement and mastery of Navajo verb paradigms. Native speakers undertake original research and writing in Navajo. P, LING 103b or AIS 103b. (Identical with AIS 204a-204b).

210. Native Languages of North America (3) 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) 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) (Identical with SP H 260, which is home).

285. Introduction to Humanities Computing (3) (Identical with GER 285, which is home).


303. Gender and Language (3) (Identical with ANTH 303, which is home).


310. Morphology and Morpho-syntactic Properties of the World’s Languages (3) 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, 101 or 201.

315. Introduction to Phonology (3) 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, 101 or 201.

320. Language and Social Issues (3) Focuses on the theme that individuals identify with groups (in part) on the basis of the language or dialect they use. Examines the role of the individual as a language-using being with the problems of self-identity and of social difference, not only in our multilingual-multicultural country, but in the world as well.

322. Word Meaning and Dictionaries (3) Lexicology and lexicography, the meaning interword relationships, meanings, structure of meanings, and etymology of words and information about them in monolingual and bilingual dictionaries—existing and future. (Identical with ENGL 322).

341. Language Development (3) (Identical with PSYC 341, which is home).

376. Introduction to the Philosophy of Language (3) (Identical with PHIL 376, which is home).

388. Symbolic Processing (3) Fundamentals of processing of natural language text, especially parsing and grammar development; includes programming in Prolog or other symbolic programming languages. P, LING 101 or 201, CS/EC 115 or equivalent programming background.

402. Gender and Language in Japan (3) (Identical with JPN 402, which is home). May be convened with 502.

403. Foundations of Syntactic Theory I (3) Introduction to fundamental issues in the theory of syntax. Familiarizes the student with the essentials of (1) government binding theory and its precursors, and (2) standard categorial grammar and its relatives. P, 300. May be convened with 503.

410. Foundations of Phonological Theory I (3) 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, 315. May be convened with 510.

411. Introduction to Japanese Linguistics (3) (Identical with JPN 411, which is home). May be convened with 511.

412. Advanced Japanese Linguistics (3) (Identical with JPN 412, which is home). May be convened with 512.

415. Phonological Phonetics (3) Study of the acoustic and articulatory 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, 315. May be convened with 515.

419. Linguistic Structure of Modern Chinese (3) (Identical with CHN 419, which is home). May be convened with 519.

420. Linguistic Structure of Modern Chinese (3) (Identical with CHN 420, which is home). May be convened with 520.

425. Language Variation (3) Study of geographical and social dialects, stylistic differences, and idiolect variation and the implications of variation for writing grammars and for understanding language change. P, one course in linguistics, preferably LING 101, 201 or ANTH 276. (Identical with ANTH 425). May be convened with 525.

426. Introduction to Arabic Linguistics (3) (Identical with ARB 426, which is home). May be convened with 526.
436. Japanese Sociolinguistics (3) [Rpt./1] (Identical with JPN 436, which is home). May be convened with 536.

438. Computational Linguistics (3) Fundamentals of formal language theory; syntactic and semantic processing; the place of world knowledge in natural language processing. P, 388 or a course in one of the following: formal languages, syntax, data structures, or compilers. (Identical with C SC 438 and PSYC 438). May be convened with 538.

441. Language Acquisition (3) (Identical with SP H 441, which is home). May be convened with 541.

442. Introduction to Hispanic Linguistics (3) (Identical with SPAN 452, which is home).

443. Lexical and Syntactic Development (3) (Identical with PSYC 443, which is home). May be convened with 543.

445a-445b. Structure of a Non-Western Language (3-3) [Rpt./2] 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, 101 or 201. (Identical with AIS 445a-445b). May be convened with 545a-545b.

452. Introduction to Hispanic Linguistics (3) (Identical with SPAN 452, which is home).

453. Theory of Spanish Morphosyntax (3) (Identical with SPAN 453, which is home).

457. Applied Linguistics (3) (Identical with SPAN 457, which is home).

462. Linguistics and the Study of Literature (3) (Identical with ENGL 462, which is home). May be convened with 562.

463. Philosophy of Language (3) (Identical with PHIL 463, which is home). May be convened with 563.

465. Pragmatics (3) (Identical with PHIL 465, which is home). May be convened with 565.

468. Speech Perception (3) (Identical with SP H 468, which is home). May be convened with 568.

474. Linguistic Perspectives on Mexican-American Spanish and Bilingualism (3) (Identical with SPAN 474, which is home). May be convened with 574.

476. Language in Culture (3) (Identical with ANTH 476, which is home). May be convened with 576.

477. Discourse and Text (3) (Identical with ANTH 477, which is home). May be convened with 577.

480. Historical Comparative Linguistics (3) (Identical with ANTH 480, which is home). May be convened with 580.

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


496. Seminar c. Topics in Japanese Linguistics (3) [Rpt./2] (Identical with JPN 496c, which is home). May be convened with 596c.

501. Formal Foundation of Linguistics (3) A survey of the aims of linguistic research and introduction to the basic mathematics of formal linguistics: logic, sets, algebras, graphs, feature structures, formal language theory.

502. Gender and Language in Japan (3) (Identical with JPN 502, which is home). May be convened with 402

503. Foundations of Syntactic Theory I (3) For a description of course topics see 503. Graduate-level requirements include a greater number of problems. May be convened with 403.

504. Government Binding Theory (3) Continuation of 503, focusing on government, control, binding, thematic relations, and the theory of logical form.


510. Foundations of Phonological Theory I (3) For a description of course topics see 410. Graduate-level requirements include a greater number of problems. May be convened with 410.

511. Introduction to Japanese Linguistics (3) (Identical with JPN 511, which is home). May be convened with 411.

512. Advanced Japanese Linguistics (3) (Identical with JPN 512, which is home). May be convened with 412.

514. Foundations of Phonological Theory II (3) 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) For description of course topics see 415. Graduate-level requirements include an additional project or research paper. May be convened with 415.

519. Linguistic Structure of Modern Chinese (3) (Identical with CHN 519, which is home). May be convened with 419.

520. Linguistic Structure of Modern Chinese (3) (Identical with CHN 520, which is home). May be convened with 420.

521. Linguistic Semantics and Lexicology (3) 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) For a description of course topics see 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 425.

526. Introduction to Arabic Linguistics (3) (Identical with ARB 526, which is home). May be convened with 426.

537. Psycholinguistics (3) Introduction to advanced psycholinguistics. The psychological mechanisms underlying the comprehension and production of words, sounds, and sentences. Other topics may include language breakdown and acquisition, brain and language, discourse processing, and bilingual processing. (Identical with PSYC 537 and PHIL 537).

538. Computational Linguistics (3) For a description of course topics see 438. Graduate-level requirements include a greater number of assignments and a higher level of performance. (Identical with C SC 538 and PSYC 538). May be convened with 438.

541. Language Acquisition (3) (Identical with SP H 541, which is home). May be convened with 441.

542. Topics in Psycholinguistics (3) (Identical with PSYC 542, which is home).

543. Lexical and Syntactic Development (3) (Identical with PSYC 543, which is home). May be convened with 443.

544. Syntactic Analysis (3) 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-545b. Structure of a Non-Western Language (3-3) [Rpt./2] For a description of course topics see 445a-445b. Graduate-level requirements include a higher level of performance. (Identical with AIS 545a-545b). May be convened with 445a-445b.

548. Topics in Language and Cognition (3) [Rpt./1] (Identical with PSYC 548, which is home).

562. Linguistics and the Study of Literature (3) (Identical with ENGL 562, which is home). May be convened with 462.
MEXICAN AMERICAN STUDIES (MAS)

Economics Bldg., Rm. 208
The University of Arizona
PO Box 210023
Tucson, AZ 85721-0023
(520) 621-7551; FAX: (520) 621-7966
http://w3.arizona.edu/~masrc

Baccalaureate degree
Bachelor of Arts (B.A.)

Major
Mexican American Studies (B.A.)

B.A. Options:
- social history & cultural studies
- applied public policy

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.

180. Research Topics in Mexican American Studies (3) Introduction to Mexican American studies from multidisciplinary perspectives.

233. History of the Mexican American (3) (Identical with HIST 233, which is home).

280. Introduction to Mexican American Studies (3) Introduction to Mexican American studies from various perspectives. Research issues and interpretation in the field; public policy and Mexican American population; social sciences and the professions and impact upon the Mexican American community.

319. Mexican American Culture (3) (Identical with ANTH 319, which is home).

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

332. Politics of the Mexican American Community (3) (Identical with POL 332, which is home).

350. The Chicano Movement (3) Exploration and analysis of the origin, nature, dynamics (political, social, cultural), ideology, activities, and effects of the Chicano movement of the 1960s. P, at least two MAS courses.

361. The U.S.-Mexican Border Region (3) (Identical with HIST 361, which is home).

368. Colonial Mexico (3) (Identical with HIST 368, which is home)

369. Mexico Since Independence (3) (Identical with HIST 369, which is home).

375. Mexican Americans in Contemporary Society (3) A survey of contemporary public policy issues facing Mexican Americans. Topics are critically evaluated from competing points of view. P, 180, 280 or consent of instructor.

380. Introduction to Research Methods (3) Examination of research methods in general, but with relevant applications to Hispanics residing in the southwestern United States. P, 280 or consent of instructor.

403. Mexican-American Literature (3) (Identical with SPAN 403, which is home).


429. The U.S.-Mexican Borderlands in Comparative Perspective (3) (Identical with POL 429, which is home).

433. Mexican and American Civilization (3) Introduction to Mexican American studies from multidisciplinary perspectives.

441. Children's Literature in Spanish (3) (Identical with SPAN 441, which is home).

444. Mexican and Mexican-American Prose Fiction (3) (Identical with SPAN 444, which is home).

446. Mexican and Mexican American Theater (3) (Identical with SPAN 446, which is home).

447. Contemporary Mexican Literature (3) (Identical with SPAN 447, which is home).

448. Government and Politics of Mexico (3) (Identical with SPAN 448, which is home).

453a-453b. Mesoamerican Archaeology (3-3) (Identical with ANTH 453a-453b, which is home).

459. Hispanic Linguistics (3) (Identical with SPAN 459, which is home).

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

473. Spanish for the Native Speaker of Spanish Classroom Teacher (3) (Identical with SPAN 473, which is home).

480. Advanced Research Methods (4) Designed to provide students with an exposure to qualitative and quantitative decision-making methods, focusing on the Mexican American population. P, 1L. P, 180, 280, 280. May be convened with 580.

485. Mexican/Chicana Women's History (3) CDT Historical survey and sociological analysis of past and present experiences of Mexicanas and Chicanas in the United States (Identical with W S 485). Writing-Emphasis Course.*

496. Seminar
- Advanced Topics in Chicano Studies (3) P, at least 15 units of core MAS courses. May be convened with 596a. Writing-Emphasis course.*

*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement
525. Topics in Latino Health (3) (Identical with PHL 525) May be convened with 425.

529. The U.S.-Mexican Borderlands in Comparative Perspective (3) (Identical with POL 529, which is home). May be convened with 429.

550. Development of Mexican and Mexican American Literature (3) (Identical with SPAN 550, which is home).

574. Linguistic Perspectives on Mexican-American Spanish and Bilingualism (3) (Identical with SPAN 574). May be convened with 474.

580. Advanced Research Methods (4) For description of course topics see 480. Graduate-level requirements include a research project. May be convened with 480.

585. Mexicana/Chicana Women's History (3) For a description of course topics see 485. Graduate-level requirements include a longer writing project and an additional class presentation. (Identical with W S 585). May be convened with 485.

596. Seminar
a. Advanced Topics in Chicano Studies (3). May be convened with 496a.

**NEAR EASTERN STUDIES (NES/ARB/PR/S)**

Franklin Bldg., Rm. 403
The University of Arizona
PO Box 210080
Tucson, AZ 85721-0080

(520) 621-8013; FAX: (520) 621-2333
e-mail: neareast@ccit.arizona.edu
http://www.u.arizona.edu/~barbarac/homep.html

Baccalaureate degree
Bachelor of Arts (B.A.)

Graduate degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major
Near Eastern Studies (B.A., M.A., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the **On Course! Academic Program Requirements Reports (APRRs).** APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

381a-381b. History of Muslim Societies (3-3) (Identical with HIST 381a-381b, which is home).

382. Archaeology and the Bible (3) (Identical with JUS 382, which is home).

383. Religion and State in Islam (3) (Identical with HIST 383, which is home).

386H. Honors Proseminar

401. Ancient Mesopotamia (3) Sumerian, Babylonian, and Assyrian civilization from the first cuneiform documents to the fall of the neo-Babylonian empire, with special attention to issues of sociopolitical organization. P. 171, ANTH 101, 110 or consult department before enrolling. (Identical with HIST 401). May be convened with 501.


435. Jewish Mysticism (3) (Identical with JUS 435, which is home). May be convened with 535.

438. The Book of Psalms (3) (Identical with JUS 438, which is home). May be convened with 538.

441. Arab-Israeli Conflict (3) (Identical with POL 441, which is home).

442. Transformation of Agrarian Societies in the Middle East (3) Dynamics, processes, and implications of rural change in the Middle East; focus on changes in peasant communities, nomadic pastoralists, rural-urban relations, and planned change. (Identical with POL 442). May be convened with 542.

445. Women in Islamic History (3) (Identical with HIST 445, which is home).

457. Prehistoric Mesopotamia (3) (Identical with ANTH 457, which is home). May be convened with 557.

466. The Middle Eastern City and Islamic Urbanism (3) Examines the physical and socioeconomic characteristics of the city in the Middle East and North Africa; the Islamic city model, the traditional and contemporary bazaar and Medina, urban evolution and transformation. P. 277a and 277b, or consent of instructor. (Identical with GEOG 466). May be convened with 566.

467. Population and Development in the Middle East (3) Review of theories and research in population resources and socioeconomic development, with emphasis on determinants and consequences of population growth and migration in contemporary Middle East. (Identical with POL 467). May be convened with 567.

468a-468b. Asia and the West (3-3) (Identical with HIST 468a-468b, which is home). May be convened with 568a-568b.

470. Religious History of India (3) (Identical with HIST 470, which is home). May be convened with 570.

472. History of Medieval India (3) (Identical with HIST 472, which is home). May be convened with 572.
473. History of Modern India and Pakistan: 1750-Present (3) (Identical with HIST 473, which is home). May be convened with 573.

474. Archaeometry: Scientific Methods in Art and Archaeology (3) (Identical with ANTH 474, which is home). May be convened with 574.

479. The Ottoman Empire to 1800 (3) (Identical with HIST 479, which is home).

480. The Middle East in the Twentieth Century (3) The modern Middle East in the age of imperialism, world wars, state formation, decolonization, and Islamic resistance. (Identical with HIST 480). P, 277b or consent of instructor. Writing-emphasis course. May be convened with 580.

481a-481b. Archaeology of Syria-Palestine in the Bronze and Iron Ages (3-3) Survey of the Bronze and Iron Age cultures of Syria-Palestine, ca. 3500-500 B.C., with emphasis on the use of archaeological materials in historical reconstruction. May be convened with 581a-581b.

484. History of the Arab-Israeli Conflict, 1800-Present (3) Origins of Zionism, and Palestinian and other Arab nationalisms from the nineteenth century and the post-1948 Arab-Israeli state conflict in the Cold War era. P. 277a or consent of instructor. (Identical with HIST 484). May be convened with 584.

485a-485b. Social, Cultural and Political History of Iranian Plateau from the 7th Century to Present (3-3) 485a: 600-1500. From Islamic invasions to the aftermath of the Mongol invasions. 485b: The Iranian plateau in the modern era of western imperialism and nationalistic Islamic responses. P, NES 277a, 277b, or consent of instructor. (Identical with HIST 485a-485b). May be convened with 585a-585b.

487. Islamic Mysticism (3) (Identical with HIST 487, which is home). May be convened with 587.

490. Women in Middle Eastern Society (3) (Identical with ANTH 490, which is home). May be convened with 590.

495. Colloquium

496. Seminar
b. Special Topics in Near Eastern Studies (3) [Rpt./4] May be convened with 596b.

c. Women and the Literature of Identity in Modern Middle East and North Africa (3) P, NES 480, 439, or consent of instructor. (Identical with HIST 496c and W S 496c). May be convened with 596c.

d. Mediterranean Cities in the 15th-16th Centuries: Cairo, Istanbul, Florence and Venice (3) (Identical with ARCH 496d and ARH 496d). May be convened with 596d. Newhall.

w. Feminist Approaches in the Bible (3) (Identical with JUS 496w, which is home). May be convened with 596w.

*Writing-Emphasis Courses. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).
ARABIC (ARB)


403. Advanced Arabic I (3) Continuation of 402 with emphasis on oral and written comprehension and expression. P, 402. May be convened with 503.

404. Advanced Arabic II (3) Continuation of 403 with emphasis on oral and written comprehension and expression. P, 403. May be convened with 504.

424a-424b. Conversational Levantine Arabic (3-3) Extensive oral drill with emphasis on the acquisition of facility in normal conversation and comprehension. P, 101. May be convened with 524a-524b.

425a-425b. Conversational Gulf Arabic (3-3) For a description of course topics see 425a-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. P, 101. May be convened with 425a-425b.

526. Introduction to Arabic Linguistics (3) For a description of course topics see 426. Graduate-level requirements include a research paper on any phonological, morphological, or syntactic structure of any variety of Arabic. P, 102, LING 526. May be convened with 426.

530. Contemporary Persian Literature in English (3) Historical, cultural and literary issues related to the readings will be discussed.

539a-539b. Egyptian Arabic (3-3) For a description of course topics see 439a-439b. Graduate-level requirements include a picture description, summary of taped dialogues, and short reports on Egyptian movies. May be convened with 439a-439b.

595. Colloquium a. Readings in Modern Arabic Prose (3) [Rpt./1] P, two years of Arabic. May be convened with 495a.
b. Readings in Classic Arabic Prose (3) [Rpt./1] P, two years of Arabic. May be convened with 495b.c. Readings in Classical Arabic Poetry (3) P, three years of Arabic for non-native speakers of Arabic. May be convened with 495c.

PERSIAN (PRS)


349. Classical Persian Literature in English (3) Historical, cultural and literary issues related to the readings will be discussed.

350. Contemporary Persian Literature in English (3) Historical, cultural and literary issues related to the readings will be discussed.

401. Intermediate Persian I (5) CDT Conversation in the dialect of contemporary Iran; extensive readings in classical and modern literature. P, 102.

402. Intermediate Persian II (5) CDT Conversation in the dialect of contemporary Iran; extensive readings in classical and modern literature. P, 401.

403. Advanced Persian I (3) [Rpt.] CDT Readings in Persian, with the objective of preparing the student for independent research. P, 402. May be convened with 503.

404. Advanced Persian II (3) [Rpt.] CDT Readings in Persian, with the objective of preparing the student for independent research. P, 403. May be convened with 504.

449. Classical Persian Literature in English (3) Historical, cultural and literary issues related to the readings will be discussed.

524a-524b. Conversational Levantine Arabic (3-3) For a description of course topics see 424a-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. P, 101. May be convened with 424a-424b.

525a-525b. Conversational Gulf Arabic (3-3) For a description of course topics see 425a-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. P, 101. May be convened with 425a-425b.

530. Contemporary Persian Literature in English (3) Historical, cultural and literary issues related to the readings will be discussed.

539a-539b. Egyptian Arabic (3-3) For a description of course topics see 439a-439b. Graduate-level requirements include a picture description, summary of taped dialogues, and short reports on Egyptian movies. May be convened with 439a-439b.

595. Colloquium a. Readings in Modern Arabic Prose (3) [Rpt./1] P, two years of Arabic. May be convened with 495a.
b. Readings in Classic Arabic Prose (3) [Rpt./1] P, two years of Arabic. May be convened with 495b.c. Readings in Classical Arabic Poetry (3) P, three years of Arabic for non-native speakers of Arabic. May be convened with 495c.

PHILOSOPHY (PHIL)

Social Sciences Bldg., Rm. 219
The University of Arizona
PO Box 210027
Tucson, AZ 85721-0027
(520) 621-3129; FAX: (520) 621-9599
e-mail: hickman@ccit.arizona.edu
http://phil.arizona.edu/

Baccalaureate degree
Bachelor of Arts (B.A.)

Graduate degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major
Philosophy (B.A., M.A., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

110. Logic and Critical Thinking (3) Designed to improve ability to reason and think critically; emphasis on evaluating and presenting arguments. Includes a basic introduction to logic and scientific reasoning.

111. Introduction to Philosophy (3) Selected basic philosophical areas and problems: knowledge, belief and truth; the world and God; nature
of persons; action and free will; the good life; the ideal community.

113. Introduction to Moral and Social Philosophy (3) Introduction to moral and political theory, and problems of practical ethics. Readings from representative moral and social philosophers.

121. Philosophical Foundations of Western Civilization: Justice and Virtue (3) Classical, medieval and modern moral and political thought; theories of human nature, human rights, political obligation, relation of individual and state, class conflict.

122. Philosophical Foundations of Western Civilization: Mind, Matter, and God (3) Classical, medieval and modern metaphysical questions: What am I-l, body, or both? Is the nature of the world ultimately physical? What is God? How may we know?

123. Philosophical Foundations of Western Civilization: Science and Inquiry (3) Classical, medieval, and modern approaches to science, mathematics and knowledge; philosophical problems raised by discovery and change.

145. Science, Technology and Human Values (3) Nature of science, technology, pseudo-science, and their relation to philosophy and culture; impact of science and technology on society and its values and religion.

196. Proseminar
   a. Topics in Philosophy (1)

202. Introduction to Symbolic Logic (3) Truth-functional logic and quantification theory; deductive techniques and translation into symbolic notation. (Identical with MATH 202).

213. Contemporary Moral Problems (3) Issues and arguments arising in contemporary moral debates. Topics will vary but are likely to include abortion, mercy killing, the nature of economic justice, racism, sexism, pornography, animal rights, the death penalty, terrorism, the morality of war, and nuclear deterrence.

222. African American Studies: History of Ideas (3) [Rpt./2] (Identical with AFAS 222, which is home).

233. Philosophy of Religion (3) Nature of religion; existence and nature of God; religion and meaning, values and knowledge. (Identical with RELI 233).

238. Philosophy in Literature (3) Philosophical analysis of selected literary works.

245. Existential Problems (3) Exploration of central problems of the human condition, such as meaning of life; death; self-deception; authenticity, integrity and responsibility; guilt and shame; love and sexuality. (Identical with RELI 245).

260. Ancient Philosophy (3) Survey of Greek philosophy, from the pre-Socratic philosophers through Plato and Aristotle to post-Aristotelian philosophers. (Identical with CLAS 260).

262. Early Modern Philosophy (3) Survey of major 17th and 18th century British and European philosophers, chosen from Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant.

263. From Hegel to Nietzsche: 19th Century Philosophy (3) Survey of influential 19th century philosophers, including Hegel, Marx, J.S. Mill, Kierkegaard, and Nietzsche. Their views on the individual and society, and human nature.

305. Introduction to the Philosophy of Science (3) Basic issues in the logic of science: scientific concepts and their meaning, testing of hypotheses, explanation, measurement, role of mathematics, truth versus convention, limits of science.

321. Medical Ethics (3) Ethical issues that arise in relation to medicine and health care: abortion, euthanasia, the allocation of scarce medical resources, socialized medicine, doctor-patient confidentiality, paternalism, etc.

322. Business Ethics (3) Selected ethical issues in business, including corporate responsibility, preferential hiring and reverse discrimination, advertising practices, environmental responsibility.

344. Issues and Methods in Analytic Philosophy (3) Designed to improve ability to think analytically, with emphasis on analytic methodology. Selected readings on the nature of mental states, the analytic/synthetic distinction, personal identity, the concept of knowledge and justified belief, the theory of reference, and the distinction between science and pseudo-science. Writing Emphasis Course.*

346. Minds, Brains, and Computers (3) [Rpt.] An introduction to cognitive science; current issues relating to minds as computers, neuroscience, vision and language. (Identical with PSYC 346).

376. Introduction to the Philosophy of Language (3) A survey of basic issues in the philosophy of language. (Identical with LING 376).

402. Mathematical Logic (3) (Identical with MATH 402, which is home). May be convened with 502.

403. Foundations of Mathematics (3) (Identical with 502.

409a-409b. Symbolic Logic (3-3) 409a: Intermediate propositional logic and quantification theory, natural deduction, axiom systems, elementary metatheorems, introduction notions of modal logic, selected topics in philosophy of logic. 409b: Advanced propositional logic and quantification theory; metatheorems on consistency, independence and completeness; set theory, number theory, and modal theory; recursive function theory and Goedel's incompleteness theorem. (Identical with MATH 409a-409b and C SC 409a-409b). May be convened with 509a-509b. Credit allowed for only one of 402 and 411a.

410a-410b. History of Moral and Political Philosophy (3-3) Reading and analysis of selected texts from the Greeks to the present. 410a focuses on the history of moral philosophy and 410b on the history of social and political philosophy. May be convened with 510a-510b.

412. Readings in Greek Philosophy (3) [Rpt./1] (Identical with GRK 412, which is home). May be convened with 512.

414. Philosophical Logic (3) Introduction to modal logic; problems of interpretation and application; extensions to such areas as tense logic, epistemic logic, deontic logic. May be convened with 514.


419. Induction and Probability (3) Basic philosophical problems concerning justification of induction, confirmation of scientific hypotheses, and meaning of probability concepts. May be convened with 519.


423a-423b. Philosophy of the Physical Sciences (3-3) 423a: Philosophical problems of space, time, and motion. Topics may include the nature of geometrical knowledge, the philosophical impact of relativity theory, absolute versus relative conceptions of space and time. 423b: Theories and models. Measurement, experimentation, testing hypothesis. Philosophical problems concerning explanation, causation, and law of nature. May be convened with 523a-523b.

424. Philosophy of Social Sciences (3) Theories, concepts, and forms of understanding in the social sciences. Possible topics: rational choice and decision at the individual and social levels; democracy, and market mechanisms. P, one course in philosophy. May be convened with 524.

425. Philosophical Issues in Feminism (3) Issues in philosophy raised by feminism and recent studies of gender. Possible topics: the source of gender differences; gender and the nature of knowledge; gender differences in conceptions of morality; feminist political theories; the nature of mothering. May be convened with 525.

430a-430b. Ethical Theory (3-3) 430a: Metaethics-meaning of moral terms, relativism, subjectivism, ethics and science, social contract theory. 430b: Normative ethics-Utilitarianism, egoism, rights, natural law, justice, deontological duties, blameworthiness and excuses. May be convened with 530a-530b.

432. Psychology of Language (3) (Identical with LING 432, which is home).

433. Aesthetics (3) Classical and contemporary theories of art; the esthetic experience, form and content, meaning, problems in interpretation and criticism of works of art.

434. Social and Political Philosophy (3) Fundamental concepts of politics; leading social and political theories, such as anarchism, social contract, Marxism. May be convened with 534.
436. Games and Decisions (3) 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 536.

438a-438b. Philosophy of Law (3-3) 438a: Nature and validity of law; law and morality, judicial reasoning, law and liberty. 438b: Problems about justice, compensation and contracts and/or responsibility and punishment. (Identical with POL 438a-438b). May be convened with 538a-538b.

440. Metaphysics (3) Topics include free will and determinism; causation; personal identity; necessity and essence; truth, realism and ontology. May be convened with 540.

441. Theory of Knowledge (3) Critical examination of some of the major problems concerning evidence, justification, knowledge, memory, perception and induction. May be convened with 541.

442. Knowledge and Cognition (3) Issues in philosophy and psychology of knowledge, with emphasis on cognitive mechanisms. Perception, memory, concepts, mental representation, problem-solving, reasoning and rationality. P, two philosophy courses. May be convened with 542.


445. Neural Network Modeling: What and Why (3) (Identical with PSYC 445, which is home). May be convened with 545.

450. Philosophy of Mind (3) 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 550.

451. Philosophy and Psychology (3) Investigations of philosophical issues arising from current work in psychology including perception, reasoning, memory, motivation and action. May be convened with 551.

455. Philosophy and Artificial Intelligence (3) Interdisciplinary problems lying at the interface of philosophy and artificial intelligence. (Identical with PSYC 455). May be convened with 555.

463. Philosophy of Language (3) 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 563.

465. Pragmatics (3) 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 565.

467. Early Analytic Philosophy (3) The 50 year rise of analytic philosophy from Frege through early Russell to Wittgenstein's Tractatus. May be convened with 567.

470. Greek Philosophy (3) [Rpt./1] Topics in Greek philosophy. May be selected from the pre-Socrates, Socrates, Plato, Aristotle and post-Aristotelian philosophy. (Identical with CLAS 470). May be convened with 570.

471a-471b. Rationalism and Empiricism (3-3) 471a: Rationalists of the 17th and 18th centuries: Descartes, Spinoza, Leibniz, and Kant. 471b: Empiricists of the 17th and 18th centuries: Locke, Berkeley, Hume. May be convened with 571a-571b.

472a-472b. Ancient Philosophy (3-3) [Rpt.] 472a: A philosophical introduction to the major works of Plato. 472b: A philosophical introduction to the major works of Aristotle. (Identical with CLAS 472a-472b). May be convened with 572a-572b.

472b. Ancient Philosophy (3-3) May be convened with 572b.

502. Mathematical Logic (3) (Identical with MATH 502, which is home). May be convened with 402.

503. Foundations of Mathematics (3) (Identical with MATH 503, which is home). May be convened with 403.

509a-509b. Symbolic Logic (3-3) For a description of course topics see 409a-409b. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. (Identical with MATH 509a-509b and C SC 509a-509b). May be convened with 409a-409b.

510a-510b. History of Moral and Political Philosophy (3-3) For a description of course topics see 410a-410b. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with 410a-410b.

512. Readings in Greek Philosophy (3) [Rpt.] (Identical with GRK 512, which is home). May be convened with 412.

514. Philosophical Logic (3) For a description of course topics see 414. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with 414.

516. Philosophy of Mathematics (3) For a description of course topics see 416. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with 416.

519. Induction and Probability (3) For a description of course topics see 419. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with 419.

521. Philosophy of the Biological Sciences (3) For a description of course topics see 421. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. (Identical with ECOL 521). May be convened with 421.

522. Linguistic Semantics and Lexicology (3) (Identical with LING 522, which is home).

523a-523b. Philosophy of the Physical Sciences (3-3) For a description of course topics see 423a-423b. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with 423a-423b.

524. Philosophy of Social Sciences (3) For a description of course topics see 424. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. P, one course in philosophy. May be convened with 424.

525. Philosophical Issues in Feminism (3) For a description of course topics see 425. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with 425.

530a-530b. Ethical Theory (3-3) For a description of course topics see 430a-430b. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with 430a-430b.

533. Aesthetics (3) For a description of course topics see 433. Graduate-level requirements include an in-depth research project on a central theme or topic of the course.

534. Social and Political Philosophy (3) For a description of course topics see 434. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with 434.

536. Games and Decisions (3) For a description of course topics see 436. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. P, MATH 119. May be convened with 436.

537. Psycholinguistics (3) (Identical with LING 537, which is home).

538a-538b. Philosophy of Law (3-3) For a description of course topics see 438a-438b. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. (Identical with POL 538a-538b). May be convened with 438a-438b.

540. Metaphysics (3) For a description of course topics see 440. Graduate-level requirements include an in-depth research project on a central theme or topic of the course. May be convened with 440.

541. Theory of Knowledge (3) For a description of course topics see 441. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with 541.

542. Knowledge and Cognition (3) For a description of course topics see 442. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with 442.

543. Knowledge and Society (3) For a description of course topics see 443. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. (Identical with LIS 543). May be convened with 443.
1. Philosophy of Language (3) [Rpt./2]

k. Philosophy of Mind (3) [Rpt./2]

h. Philosophy of Physical Science (3) [Rpt./2]

g. Philosophy of Law (3) [Identical with

f. Social and Political Philosophy (3) [Rpt./2]

c. Epistemology (3) [Rpt./2]

a. Ethics (3) [Rpt./2]

596. Seminar

(Identical with CLAS 572a- 572b). May be con-

paper on a central theme or topic of the course. May be convened with 545.

555. Philosophy and Artificial Intelligence (3) For a description of course topics see 455. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with 455.

563. Philosophy of Language (3) For a description of course topics see 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 463.

564. Formal Semantics (3) (Identical with LING 564, which is home).

565. Pragmatics (3) For a description of course topics see 465. Graduate-level requirements include a greater number of assignments and a higher level of performance. (Identical with LING 565). May be convened with 465.

567. Early Analytic Philosophy (3) For a description of course topics see 467. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with 467.

570. Greek Philosophy (3) [Rpt./1] For a description of course topics see 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 470.

571a-571b. Rationalism and Empiricism (3-3)

For a description of course topics see 471a-471b. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. May be convened with 471a-471b.

572a-572b. Ancient Philosophy (3) [Rpt.] For a description of course topics see 472a-472b. Graduate-level requirements include an in-depth research paper on a central theme or topic of the course. (Identical with LING 572a-572b). May be convened with 472a.

596. Seminar

a. Ethics (3) [Rpt./2]

b. Metaphysics (3) [Rpt./2]

c. Epistemology (3) [Rpt./2]

f. Social and Political Philosophy (3) [Rpt./2]

g. Philosophy of Law (3) [Rpt./2] (Identical with LAW 596g).

h. Philosophy of Physical Science (3) [Rpt./2] (Identical with PHYS 596h).

i. Philosophy of Mind (3) [Rpt./2]

l. Philosophy of Language (3) [Rpt./2]

315. Political Sociology (3) (Identical with SOC 315, which is home).

321. Ancient and Medieval Political Theory (3) Development of Western political theory from the Greeks through Machiavelli. P, 102, 160 or PHIL 110, 113, or 121. Writing-Emphasis Course.*

322. Early Modern Political Theory (3) Western political theory from the Reformation to the French Revolution. P, 102, 160 or PHIL 110, 113, or 121. Writing-Emphasis Course.*

323. Late Modern Political Theory (3) Western political theory from the Utilitarians through the 1930s. P, 102, 160 or PHIL 110, 113, or 121. Writing-Emphasis Course.*

326. American Political Thought (3) American political ideas from colonial times to the present. P, 102, 160 or PHIL 110, 113, or 121. Writing-Emphasis Course.*

330. Minority Groups and American Politics (3) 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 and MAS 330).

332. Politics of the Mexican-American Community (3) 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) 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) Examination of politics through the lens of gender hierarchy. Emphasis on how constrictions of masculinity and feminity 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) 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, 140.

350. Politics and the Health Care System (3) 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) 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, 120.
443. Soviet and Post-Soviet Politics (3) 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, 120. (Identical with RSS 443). May be convened with 533.

444. East European Politics (3) Divergent models of Communist development, from East Germany to Yugoslavia; political, economic, social, and cultural reform. P, 140. May be convened with 544.

445. Comparative Political Revolution (3) Examination of the causes and consequences of 20th-century revolutions and the revolutionary process, with emphasis on contemporary events. P, 140. May be convened with 545. Writing-Emphasis Course.*

447. Latin-American Political Development (3) Presentation of strategies for development in Latin America; examination of case studies from Cuba, Brazil, Chile, Guatemala, and other countries. Open to juniors and seniors only. P, 140. (Identical with LA S 447). May be convened with 547. Writing-Emphasis Course.*

448. Government and Politics of Mexico (3) Description and analysis of Mexico's political economy, its political system, and its foreign policy, with emphasis on Mexican-U.S. relations. P, 140. (Identical with LA S 448 and MAS 448). May be convened with 548.

449. The Politics of Cultural Conflict (3) Comparative examination of the approaches of different types of political systems to domestic conflict of a racial, religious, linguistic, and/or ethnic nature. P, 140. May be convened with 549.


454. Theories of International Relations (3) 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, 102, 120. May be convened with 554.

455. American Foreign Policy (3) Analysis of the Cold War; Congressional-Executive clashes over foreign policy control; approaches to policy analysis. P, 102. May be convened with 555.

456. International Law (3) The international state system; legal-political problems, including territory, environment, seas. P, 120. May be convened with 556. Writing-Emphasis Course.*

457. Inter-American Politics (3) Survey and analysis of the leading political and economic issues at controversy between the United States and Latin America. P, 102 or 140. (Identical with LA S 457). May be convened with 557.


460. Modern Chinese Foreign Relations (3) 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, 120. (Identical with CHN 460). May be convened with 560.

461. Feminist and IR Theories (3) 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 250. (Identical with W S 461). May be convened with 561.

462. International Relations of East Asia (3) National interests, issues and conflicts, relations, and influence of domestic politics in interstate relations in East Asia. P, 120. (Identical with EAS 464). May be convened with 564.

467. Population and Development in the Middle East (3) P, 120. (Identical with NES 467, which is home). May be convened with 567.


471. Constitutional Law: Civil Liberties (3) Analysis of the constitutional guarantees of civil liberties in the U.S. P, 102. May be convened with 571.


474. Administrative Law (3) Law governing the organization, powers, and procedures of the executive and administrative establishment, with emphasis on the limitations imposed by the American constitutional system. P, 102. May be convened with 574.

476. Women and the Law (3) Legal status of women in America, including constitutional protections, marriage and family relationships, educational and vocational opportunities, political rights, criminal law. P, 102. (Identical with W S 476). May be convened with 576.

478. American Indians and the Supreme Court (3) Examination of the U.S. Supreme Court as a policy-making institution; with analysis of major court opinions affecting tribal sovereignty and individual Indian rights in such areas as tribal status and federal relations, treaty law, Indian land title, jurisdiction. P, 334. (Identical with AIS 478). May be convened with 578.

480. Formation of Public Policy (3) Needs and demands for public action on policy issues; organization and nature of political support; processes and problems of decision making in the formation of public policy at the national, state, and local levels. P, 102. (Identical with PA 480). Writing-Emphasis Course.*

481. Environmental Policy (3) Role of government in management of energy, natural resources and environment; process and policy alternatives; special attention to the Southwest. P, 102. (Identical with HWR 481, PA 481 and RNR 481). May be convened with 581.


487a-487b. Race and Public Policy (3) Examination of the race issue in the context of American politics. 487a focuses primarily on the African American experience in America from 1619, when the first slaves were led onto the beach at Jamestown, to approximately 1910 when segregation had replaced slavery. P, 102. 487b focuses on race-related events and policies during the urban/industrial transformation, the Depression and New Deal, World War to the Brown Decision in 1954, the Civil Rights years to the present. P, 487a. (Identical with AFAS 487a-487b and AIS 487a-487b). May be convened with 587a-587b.

488. Governing Science and Technology (3) (Identical with GEOG 488, which is home).

489. Public Choice (3) (Identical with ECON 489, which is home). May be convened with 589.

490. Colloquium (3) (Identical with ECON 489, which is home). May be convened with 589.

491. Seminar (3) (Identical with ECON 489, which is home). May be convened with 589.

495. Colloquium (3) (Identical with GEOG 488, which is home).

496. Seminar (3) (Identical with GEOG 488, which is home).

497. Seminar (3) (Identical with GEOG 488, which is home).

499. Colloquium (3) (Identical with ECON 489, which is home).

500. Colloquium (3) (Identical with ECON 489, which is home).

507. Congress and American Politics (3) A description of course topics see 407. Graduate-level requirements include an additional research paper. (Identical with PA 506). May be convened with 406.
level requirements include a much higher level of performance on term paper or research paper, and/or an additional paper of 8-10 pages. May be convened with 407.

510. Struggle for the Presidency (3) (Identical with COMM 510, which is home). May be convened with 410.

512. Local Government and Administration (3) For a description of course topics see 412. Graduate-level requirements include a reading assignment of at least two additional textbooks and writing an essay on each. May be convened with 412.

525. Liberalism and its Critics (3) For a description of course topics see 425. Graduate-level requirements include additional essays in greater depth. May be convened with 425.

527. The Marxist Legacy (3) For a description of course topics see 427. Graduate-level requirements include a research term paper of 15-25 pages with a bibliography, as well as a beginning research bibliography. P, junior standing, 160 or PHIL 110, 113 or 121. May be convened with 427.

528. Problems in Contemporary Political Theory (3) For a description of course topics see 428. Graduate-level requirements include an additional research paper and readings. May be convened with 428.

529. The U.S.-Mexican Borderlands in Comparative Perspective (3) For a description of course topics see 429. Graduate-level students are required to do an additional research paper and reading. (Identical with LA S 529, MAS 529). May be convened with 429.

531. Political Culture and the Dynamics of Change in American Society (3) For a description of course topics see 431. Graduate-level requirements include additional research and paper. May be convened with 431.

532. Pressure Groups (3) For a description of course topics see 432. Graduate-level requirements include a much higher level of performance of term paper or research paper. Additional readings and essays on those readings may also be required. May be convened with 432.

533. Feminist Political Theory (3) For a description of course topics see 433. Graduate-level requirements include an additional research paper and readings! P, 160 and W S 100. (Identical with W S 533). May be convened with 433.

535. Public Opinion and Voting Behavior (3) For a description of course topics see 435. Graduate-level requirements include additional research, readings, and paper(s). May be convened with 435.

536. Violent Crime and Political Order (3) For a description of course topics see 436. Graduate-level requirements include an extensive research paper. May be convened with 436.

537. Democracies, Emerging and Evolving (3) For a description of course topics see 437. Graduate-level requirements include extensive reading and a research paper. (Identical with LA S 537). May be convened with 437.

538a-538b. Philosophy of Law (3-3) (Identical with PHIL 538a-538b, which is home). May be convened with 438a-438b.

541. Arab-Israeli Conflict (3) For a description of course topics see 441. Graduate-level requirements include an additional research paper. May be convened with 441.

542. Transformation of Agrarian Societies in the Middle East (3) (Identical with NES 542, which is home). May be convened with 442.

543. Soviet and Post-Soviet Politics (3) For a description of course topics see 443. Graduate-level requirements include additional readings, research, and paper(s). (Identical with RSS 543). May be convened with 443.

544. East European Politics (3) For a description of course topics see 444. Graduate-level requirements include additional readings, research, and paper(s). May be convened with 444.

545. Comparative Political Revolution (3) For a description of course topics see 445. Graduate-level requirements include extensive reading and a research paper. May be convened with 445.

547. Latin-American Political Development (3) For a description of course topics see 447. Graduate-level requirements include additional course readings. (Identical with LA S 547). May be convened with 447.

548. Government and Politics of Mexico (3) For a description of course topics see 448. Graduate-level requirements include a book review and related discussion with the instructor. (Identical with LA S 548). May be convened with 448.

549. The Politics of Cultural Conflict (3) For a description of course topics see 449. Graduate-level requirements include additional readings, research, and paper(s). May be convened with 449.

550. Religion and Politics (3) For a description of course topics see 450. Graduate-level requirements include additional readings, research, and paper(s). May be convened with 450.

551. Soviet and Post-Soviet Foreign Policy (3) For a description of course topics see 451. Graduate-level requirements include extensive reading plus a research paper. May be convened with 451.

554. Theories of International Relations (3) For a description of course topics see 454. Graduate-level requirements include additional assignment/paper. May be convened with 454.

555. American Foreign Policy (3) For a description of course topics see 455. Graduate-level requirements include additional assignment/paper. May be convened with 455.

556. International Law (3) For a description of course topics see 456. Graduate-level requirements include research readings and paper(s). May be convened with 456.

557. Inter-American Politics (3) For a description of course topics see 457. Graduate-level requirements include a book review and related discussion with the instructor. (Identical with LA S 557). May be convened with 457.

558. Civil-Military Relations in the Third World (3) For a description of course topics see 458. Graduate-level requirements include an extensive research paper. May be convened with 458.

560. Modern Chinese Foreign Relations (3) For a description of course topics see 460. Graduate-level requirements include an additional research paper. (Identical with CHN 560). May be convened with 460.

561. Feminist and IR Theories (3) For description of course topics see 461. Graduate students will do a classroom presentation, an additional paper, or more extensive writing on papers. (Identical with W S 561). May be convened with 461.

564. International Relations of East Asia (3) For a description of course topics see 464. Graduate-level requirements include an additional research paper. (Identical with EAS 564). May be convened with 464.

567. Population and Development in the Middle East (3) (Identical with NES 567, which is home). May be convened with 467.

568. Government and Politics of Africa (3) For a description of course topics see 468. Graduate-level requirements include an additional paper and readings. May be convened with 468.

570. Constitutional Law: Federalism (3) For a description of course topics see 470. Graduate-level requirements include an additional paper and readings. May be convened with 470.

571. Constitutional Law: Civil Liberties (3) For a description of course topics see 471. Graduate-level requirements include an additional paper and reading. May be convened with 471.

573. Government and Economic Well-being (3) For a description of course topics see 473. Graduate-level requirements include additional reading assignments and a more detailed paper. (Identical with PA 573). May be convened with 473.

574. Administrative Law (3) For a description of course topics see 474. Graduate-level requirements include an additional paper and readings. May be convened with 474.

576. Women and the Law (3) For a description of course topics see 476. Graduate-level requirements include additional research, readings, and paper(s). May be convened with 476.

578. American Indians and the Supreme Court (3) For a description of course topics see 478. Graduate level requirements include additional research, readings, and paper(s). (Identical with AIS 578). May be convened with 478.

579. Research Design (4) 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) Systematic examination of problems of scope and methods of inquiry in the discipline of political science; intended to acquaint students with the discipline and to prepare them for scholarly research in the field.
with emphasis on word learning and grammatical development. P, 101 or LING 101 or consult department before enrolling. (Identical with LING 341).

346. Minds, Brains and Computers (3) [Rpt.] (Identical with PHIL 346, which is home).


358. Psychology of Consciousness (3) 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, 101, 230, and 290.

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, 101 or 8 units of biological laboratory science.

364. Human Sexuality (3) Socio-psychological and developmental aspects of human sexuality. Examples of topics include: courtship, pregnancy and delivery, sexual health, and sex education.

374. Environmental Psychology (3) Basic concepts in environmental psychology; the relationship between the individual and the large-scale environment. P, 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, 101.

381. Abnormal Psychology (3) 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, 101.

401a. Principles of Psychophysiology (3) Overview, principles, theory, and applications of physiological assessment; an introduction to theory and research in major areas of human psychophysiology with a particular emphasis on psychophysiological correlates and physiological substrates of cognition, affect, and psychopathology. May be taken alone or concurrently with 401b. P, 290, 302, and 490. CR, 401b. May be convened with 501a.

401b. Psychophysiology Laboratory (1) Provides a pragmatic "hands-on" experience in psychophysiological recording and analysis. Involves learning all facets of psychophysiological signal acquisition and analysis. P, 290 and 302. Writing-Emphasis Course.


403a. Principles of Mammalian Systems Neurophysiology (3) 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. P, NRSC 588, CR, PSYC 403b. (Identical with NRSC 403a). Open only to psychology majors and IDS majors with a psychology subject area. May be convened with 503a. Writing-Emphasis Course.*

403b. Laboratory in Mammalian Systems Neurophysiology (1) Neurophysiology laboratory including stereotactic surgery, microelectrode recording of neural signals, electrical and chemical stimulation, and principles of analog and digital signal processing. P, 290, 302, CR 403a. (Identical with NRSC 403b). Open only to psychology majors and IDS majors with a psychology subject area. May be convened with 503b. Writing-Emphasis Course.*

406. Neural Encoding, Memory, and Computation in the Mammalian Brain (3) Theoretical principles and biological mechanisms by which information is represented, categorized, stored, and recalled in specific central nervous system (CNS) circuits in the course of adaptive behavior. P, one advanced course in neurobiology, biological or cognitive psychology, one advanced course in math or computer science. May be convened with 506. Writing-Emphasis Course.*

411. Animal Behavior (3) Systematic study of animal behavior. Analysis of environmental and genetic determinants of behavior, special behavioral adaptations in animals, and sociobiological concepts. P, 290. Open only to psychology majors and IDS majors with a psychology subject area. May be convened with 511. Writing-Emphasis Course.*

412. Animal Learning (3) Animal learning with emphasis on interspecies comparisons. P, 290. Open only to psychology majors and IDS majors with a psychology subject area. May be convened with 512. Writing-Emphasis Course.*

413. Drugs, Brain and Behavior (3) 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, 101, 230, 290, 302. May be convened with 513. Writing-Emphasis Course.*

415. The Design of the Mind: Genes, Adaptation, and Behavior (3) Part I: Basic mechanisms of behavioral evolution, genetics, and natural selection, as well as other factors impinging on the evolutionary process. 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. P, 230, 290, 240 or 340, or consent of instructor. Students should ideally also have some background in cognitive psychology, e.g., 325. (Identical with FS 415) May be convened with 515 Writing-Emphasis Course.*

417. Invertebrate Behavior Laboratory (3) Animal behavior laboratory in behavioral manipulation, observation, and data recording with invertebrate animals. 3L, 2R. P, 101, 230 and 290. May be convened with 517. Writing-Emphasis Course.*


424. Gerontology: A Multidisciplinary Perspective (3) Biological, psychological, and social issues in aging, including brain changes with age, cognitive change with age, and the social impact of increasingly older population demographics. (Identical with GERO 424). May be convened with 524. Writing-Emphasis Course.*

426. Advanced Human Memory (3) Examines the processing systems that underlie human learning, memory and cognition; emphasizing cognitive, neuroscientific and computational approaches to research and theory. P, 290, 325. May be convened with 526. Writing-Emphasis Course.*


432. Psychology of Language (3) P, 101 or PSYC 325. (Identical with LING 432, which is home). Writing-Emphasis Course.*

438. Computational Linguistics (3) (Identical with LING 438, which is home). May be convened with 538. Writing-Emphasis Course.*

439. Animal-Human Communication (3) (Identical with ECOL 439, which is home.) May be convened with 539.

440. Advanced Cognitive Development (3) [Rpt./1] 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.

441. Language Acquisition (3) (Identical with SP H 441, which is home). May be convened with 541. Writing-Emphasis Course.*

443. Advanced Language Development (3) 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. P, senior standing or consult department before enrolling; one lower-division course in cognitive psychology, developmental psychology, or linguistic theory. (Identical with LING 443). May be convened with 543. Writing-Emphasis Course.*

445. Neural Network Modeling: What and Why (3) 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, 325 or 346 or 402 or graduate standing, college-level algebra skills, familiarity with either Macintosh or PC compatible microcomputers. (Identical with PHIL 445). May be convened with 545.

447. Psychology of Values and Preference (3) [Rpt./1] Variable content (consult schedule): learning, cognition, perception, psycholinguistics, emotion, others. P, 290 and 6 units of upper-division psychology; or graduate standing. Open only to psychology majors and IDS majors with a psychology subject area. May be convened with 547. Writing-Emphasis Course.*


455. Philosophy and Artificial Intelligence (3) (Identical with PHIL 455, which is home). May be convened with 555. Writing-Emphasis Course.*

456. 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. P, 290 or graduate standing. May be convened with 556. Writing-Emphasis Course.*

458. Violence and Youth (3) 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, 101 and 381; 290. (Identical with SOC 458 and F S 458). May be convened with 558.

459. Adult Development and Aging (3) Change and continuity in cognition, personality, and adjustment during adulthood, with emphasis on aging processes and late life. P, 290 or 101 and two courses in gerontology or human development; or graduate standing. (Identical with GERO 459). May be convened with 559. Writing-Emphasis Course.*

460. Advanced Social Psychology (3) Social psychology, with emphasis on theory and method. P, 290. Open only to psychology majors and IDS majors with a psychology subject area. May be convened with 560. Writing-Emphasis Course.*

461. Social Cognition (3) [Rpt./6 units] Analysis of social phenomenon from a cognitive perspective; perception, memory, thought and language concerning self, others, and social situations. P, 290, 325, 360 or consent of instructor. May be convened with 561. Writing-Emphasis Course.*

462. Mental Health Law & Policy (3) [Rpt./3] Theory, research and practice in law and mental health interactions and in the delivery of mental health services. P, upper-division standing or honors student. May be convened with 562. Writing-Emphasis Course.*

463a-463b. Forensic Assessment: Intervention and Treatment (3-3) Theory, research and prac-

467. Social Psychology and the Cinema (3) 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. P, 101, 360. (Identical with HUMS 467).

468. Speech Perception (3) (Identical with SP H 468, which is home). May be convened with 568.

473. Stress, Coping, and Health/Performance (3) 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. May be convened with 573.

474. Field Methods in Environmental Psychology (3) Behavior and man-made or managed environments, with emphasis on objective methods; designed for students having a professional interest in environmental design or management. P, 374 or graduate standing. (Identical with ARCH 474 and I. AR 474). Writing-Emphasis Course.*

476. Environmental Cognition (3) [Rpt./1] Recent advances in the area of environmental cognition, with an emphasis on cognitive aspects of environmental psychology. May be convened with 576. Writing-Emphasis Course.*

477a-477b. Psychology, Law and Social Policy (3) Critical review of theory, methods and research in the psychology, law and social policy interface. P, 360, 6 units of a social science, or graduate standing. May be convened with 577a-577b. Writing-Emphasis Course.*

478. Sleep and Sleep Disorders (3) Topics include sleep-wake rhythms, sleep deprivation, dreams, and the diagnosis and treatment of sleep disorders. P, 290, 302. May be convened with 578.

481. Psychopathology (3) In-depth study of current theoretical and research formulations in psychological disorders; various approaches to behavior change. P, 290, 381. May be convened with 581. Writing-Emphasis Course.*

482. Biological Bases of Psychopathology (3) 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, 101, 230, 290, 302, 381 or graduate standing. May be convened with 582.

483. Advanced Health Psychology (3) [Rpt./1] Current research and theory concerning psychological contributions to health maintenance, illness prevention and treatment, and the organization of health services. May be convened with 584. Writing-Emphasis Course.*

485. Contemporary Issues in Psychology (3) [Rpt./1] Variable content (consult schedule): major topical problems in psychological research, theory, and applications. P, 290 and 6 units of upper-division psychology. Open only to psychology majors and IDS majors with a psychology subject area. May be convened with 585. Writing-Emphasis Course.*

486. Ethical Issues in Psychology (3) A consideration of issues in the derivation of ethical criteria, selection of the appropriate subset of criteria to guide ethical decision-making, and utilization of the criteria when making a decision in psychological research or practice. P, upper-division standing or honors student. May be convened with 586. Writing-Emphasis Course.*

489. History of Psychology (3) 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. P, 290 and 6 upper-division units in psychology. May be convened with 589. Writing-Emphasis Course.*


496H. Honors Seminar (3) *Writing-Emphasis Seminar. P, satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

500a-500b. Current Issues in Psychological Theory and Research (3-3) Intensive examination of a range of content areas addressed in contemporary psychological theory and research. Open to psychology graduate students only.

501a. Principles of Psychophysiology (3) For a description of course topics see 401a. Graduate-level requirements include a more comprehensive literature review. P, graduate status or 290, 302 and 490. CR, 501b. May be convened with 401a.

501b. Psychophysiology Laboratory (1) For a description of course topics see 401b. Graduate-level requirements include more sophisticated data analysis and statistics. P, graduate status or 290, 302. CR, 501a. May be convened with 501b.

502. Principles of Neuroanatomy (4) (Identical with CBA 502, which is home).

503a. Principles of Mammalian Systems Neuropsychology (3) For a description of course topics see 403a. Graduate-level requirements include an additional term paper pertinent to current topics in neuropsychology of sensation, perception, cognition, and action in mammals illustrating the application of modern research methods to the understanding of higher brain function. P, NRSC 588; CR, PSYC 503b. (Identical with NRSC 503a).

503b. Laboratory in Mammalian Systems Neuropsychology (1) For a description of course topics see 403b. Graduate-level requirements include an in-depth research paper on a single aspect of a current problem in neuropsychological psychology. (Identical with NRSC 503b). May be convened with 403b.

506. Neural Encoding, Memory, and Computation in the Mammalian Brain (3) For a description of course topics see 406. Graduate-level requirements include an in-depth research paper on a single aspect of neural encoding. (Identical with NRSC 506). May be convened with 406.

507a-507b. Statistical Methods in Psychological Research (3-3) Statistical research design, methods and metascience. 507a: 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: 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) 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) Development of psychology as a science; schools, systems, theories, major advances, famous investigators. Open to majors only.

511. Animal Behavior (3) For a description of course topics see 411. Graduate-level requirements include an in-depth research paper on a single aspect of animal behavior. P, 290. May be convened with 411.

512. Animal Learning (3) For a description of course topics see 412. Graduate-level requirements include an in-depth research paper on an aspect of animal learning. P, 290. May be convened with 412.

513. Drugs, Brain and Behavior (3) For a description of course topics see 413. Graduate-level requirements include an additional term paper pertinent to the course topic. P, 101, 230, 290, 302. May be convened with 413.

515. The Design of the Mind: Genes, Adaptation, and Behavior (3) For a description of course topics see 415. Graduate-level requirements include in-class oral presentations. (Identical with FS 515) May be convened with 415.

517. Invertebrate Behavior Laboratory (3) For a description of course topics see 417. Graduate-level requirements include an additional paper or presentation to the class. May be convened with 417.

519. Field-Based Human Learning (3) For a description of course topics see 419. Graduate-level requirements include advanced research applications in psychology or related areas. P, 101, 319. May be convened with 419.

520. Psychology of Death and Loss (3) For a description of course topics see 456. Graduate-level requirements include an in-depth research paper on an aspect of psychological study. P, 290 or graduate standing. May be convened with 456.

524. Gerontology: A Multidisciplinary Perspective (3) For a description of course topics see 424. Graduate-level requirements include an in-depth research paper on a single aspect of gerontology. (Identical with GERO 524 and NRSC 524). May be convened with 424.

526. Advanced Human Memory (3) For a description of course topics see 426. Graduate-level requirements include an additional research paper on human memory and cognition. P, 290, 325 or graduate standing. May be convened with 426.

528. Cognitive Neuroscience (3) [Rpt./3] Recent advances in analysis of the neural bases of cognitive functions, such as learning, memory, and thinking.

529. Advanced Perception (3) [Rpt./2] For a description of course topics see 429. Graduate-level requirements include an additional paper on a particular issue. P, 230, 290. May be convened with 429.

536. Visual Cognition (3) [Rpt./1] Recent advances in the area of perception and attention, with emphasis on visual process.

537. Psycholinguistics (3) (Identical with LING 537).

538. Computational Linguistics (3) (Identical with LING 538, which is home). May be convened with 438.

539. Animal-Human Communication (3) (Identical with ECOL 539, which is home.) May be convened with 439.

540. Advanced Cognitive Development (3) For a description of course topics see 440. Graduate-level requirements include an in-depth research paper on an aspect of cognitive development. May be convened with 440.

541. Language Acquisition (3) (Identical with SP H 541, which is home). May be convened with 441.

542. Topics in Psycholinguistics (3) [Rpt./1] Recent advances in the area of psycholinguistics, with an emphasis on sentence processing and the contribution of linguistic theory to understanding of psychological mechanisms. (Identical with LING 542).

543. Lexical and Syntactic Development (3) For a description of course topics see 443. Graduate-level requirements include a written paper on a subject pertinent to topic area. (Identical with LING 543). May be convened with 443.

545. Neural Network Modeling: What and Why (3) For a description of course topics see 445. Graduate-level requirements include a more substantial modeling project. (Identical with PHIL 545). May be convened with 445.

547. Psychology of Values and Preference (3) [Rpt./1] For a description of course topics see 447. Graduate-level requirements include an in-depth research paper on an aspect of cognitive and affective bases of behavior. P, 290 and 6 units of upper-division psychology; or graduate standing. May be convened with 447.

548. Topics in Language and Cognition (3) [Rpt./1] Variable content, including language acquisition, the relation between language and spatial cognition, and the evolution of mind. P, graduate majors in linguistics and psychology; others consult with department before enrolling. (Identical with LING 548).

550. Psychological Assessment and Testing (3) For a description of course topics see 450. Graduate-level requirements include an in-depth research paper on psychological assessment and testing. May be convened with 450.

552. Advanced Personality (3) For a description of course topics see 452. Graduate-level requirements include an in-depth research paper on an aspect of personality study. P, 352. May be convened with 452.

555. Philosophy and Artificial Intelligence (3) (Identical with PHIL 555, which is home). May be convened with 455.

556. Psychology of Death and Loss (3) For a description of course topics see 456. Graduate-level requirements include an in-depth research paper on an aspect of psychology of death or loss. P, 290 or graduate standing. May be convened with 456.

558. Violence and Youth (3) For a description of course topics see 458. Graduate-level requirements include a research paper. P, 101 and 381; 290. (Identical with FS 558). May be convened with 458.

559. Adult Development and Aging (3) For a description of course topics see 459. 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 460.

561. Social Cognition (3) [Rpt./6 units] For a description of course topics see 461. Graduate-level requirements include a research paper pertinent to the topic of social cognition. May be convened with 461.

562. Mental Health Law & Policy (3) [Rpt./3] For a description of course topics see 462. 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). May be convened with 462.

563a-563b. Forensic Assessment: Intervention and Treatment (3-3) For a description of course
topics see 463a-463b. Graduate-level requirements include a different grading system for class participation and exams. May be convened with 463a-463b.

564. Methods for Psychosocial Research (3)
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)
(Identical with SP H 567, which is home).

568. Speech Perception (3)
(Identical with SP H 568, which is home). May be convened with 468.

573. Stress Coping, and Health/Performance (3)
For a description of course topics see 473. Graduate-level requirements include an extra term paper, and a project in connection with another student. May be convened with 473.

574. Field Methods in Environmental Psychology (3)
For a description of course topics see 474. Graduate-level requirements include an in-depth research paper on an aspect of environmental psychology field methods. P, 374 or graduate standing. (Identical with ARCH 574 and L AR 574). May be convened with 474.

576. Environmental Cognition (3) [Rpt./1]
For a description of course topics see 476. Graduate-level requirements include an in-depth research paper on a single aspect of environmental cognition. May be convened with 476.

577a-577b. Psychology, Law and Social Policy
(3-3) For a description of course topics see 477a-477b. May be convened with 477a-477b.

578. Sleep and Sleep Disorders (3)
For a description of course topics see 478. Graduate-level requirements include a critical review of the research literature of a relevant topic. P, 290, 302. May be convened with 478.

579. Issues in Rural Health (3)
(Identical with NURS 579, which is home).

580. Clinical Neuropsychology (3)
Cognitive and affective sequelae of human central nervous system disease/damage, with emphasis on clinical evaluation, management, and rehabilitation.

581. Psychopathology (3)
For a description of course topics see 481. Graduate-level requirements include an in-depth research paper on psychopathology. May be convened with 481.

582. Advanced Psychopathology (3) [Rpt./1]
Advanced survey of current theory and research in symptoms, causes and treatment of the major psychological disorders.

583. Biological Bases of Psychopathology (3)
For a description of course topics see 483. Graduate-level requirements include presentations and an in-depth research paper on an aspect of biological bases of psychopathology. May be convened with 483.

584. Advanced Health Psychology (3) [Rpt./1]
For a description of course topics see 484. Graduate-level requirements include an additional paper pertaining to the course topic. May be convened with 484.

585. Contemporary Issues in Psychology (3) [Rpt./1]
For a description of course topics see 485. Graduate-level requirements include an in-depth research paper on an aspect of contemporary psychological research. P, 290 and 6 units of upper-division psychology; or graduate standing. May be convened with 485.

586. Ethical Issues in Psychology (3)
For a description of course topics see 486. Graduate-level requirements include an in-depth research paper on a single aspect of the course topic. May be convened with 486.

589. History of Psychology (3)
For a description of course topics see 489. Graduate-level requirements include an in-depth research paper on an aspect of history of psychology. P, 290 and 6 upper-division units in psychology. May be convened with 489.

596. Seminar
   c. Developmental Psychology (3) [Rpt./1]
   e. Biopsychology (3) [Rpt./1]
   f. Cognitive Psychology (3) [Rpt./1] May be convened with 496f.
   g. Clinical Psychology (3) [Rpt./4]
   h. Law, Psychology, and Policy (3) [Rpt./4] (Identical with LAW 596h, which is home).
   i. Quantitative Methods (3) [Rpt./1]
   k. Psychopolitics (2) [Rpt./4 units]
   u. Interdisciplinary Environment-Behavior-Design (3) [Rpt./1] (Identical with ARCH 596u, GEG 596u, L AR 596u, and PLAN 596u).

597. Workshop
a. Statistical Models for Psychological Research (3) CR, 507a -507b. Open to majors only.
   b. Statistical Models for Psychological Research (3) CR, 507a -507b. Open to majors only.
   c. Advanced Statistical Methods (3) [Rpt./12 units] CR, 507a -507b.
   d. Program Evaluation (1-3) [Rpt./6 units] P, graduate standing. Consent of the instructor is required.

612. Clinical Assessment Methods (3) Theory and practice in interview techniques and cognitive and personality assessment. Open to majors only.

625a-625b. Psychosocial Interventions (4-4)
625a: Introduction to psychotherapy and psychotherapy research. Principles of behavior therapy. Marital and family therapy. 625b: Issues of therapy integration and factors common to all treatments. P, graduate standing.

694. Practicum
a. Clinical Interviewing and Assessment (1-3) [Rpt./1] Open to clinical psychology students only.
   b. Psychotherapy (3) [Rpt./1] Open to clinical psychology students only.
   c. Advanced Psychotherapy (1) [Rpt./1] Open to clinical psychology students only.
   d. Clinical Neuropsychology (3) [Rpt./1] Open to clinical psychology students only.

695. Colloquium
a. Motor Control (2) (Identical with PSIO 695a, which is home).

696. Seminar
f. Linguistic Investigations and Applications (3) [Rpt./3] (Identical with LING 696f, which is home).

SOCIETY (SOC)
Social Sciences Bldg., Rm. 400
The University of Arizona
PO Box 210027
Tucson, AZ 85721-0027
(520) 621-3531; FAX: (520) 621-9875
http://wacky.csit.arizona.edu/~soc/

Baccalaureate degree
Bachelor of Arts (B.A.)

Graduate degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major
Sociology (B.A., M.A., Ph.D.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

101. Introduction to Sociology (3) Sociological concepts and principles, with special reference to contemporary society.


160. Minority Relations and Urban Society (3) 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 (Study of Mexican Americans (Chicanos) as an ethnic-cultural group in American society, analysis of their present problems as a minority group, focus on Chicano-Anglo relations in southwestern U.S.
189. **World Population** (3) 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. The University as Sociology (1)

195H. **Honors Colloquium** (2)

201. **American Social Problems** (3) An examination of current theoretical perspectives and research on social problems.

220. **Introduction to African American Studies** (3) (Identical with AFAS 220, which is home).

221. **Social Welfare Policy** (3) (Identical with PA 221, which is home).

251. **Sociology of Education** (3) Educational system as a basic social institution; its structure, impact on society, and effects on students; consideration of alternative structures.


275. **Social Research Methods** (3) Problems of conceptualization and measurement of social phenomena; design of research projects; techniques of data collection and analysis. P, 274.

277. **Law and Society** (3) (Identical with PSYC 277, which is home).

300. **Sources of Sociological Theory** (3) Critical review of the works of leading sociologists. Writing-Emphasis Course.*

303. **Medical Sociology** (3) 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 Movements** (3) Study of riots, panics, crazes, reform and revolutionary movements; their origins, social bases, careers and consequences.

315. **Political Sociology** (3) Current competing theories of socio-political institutions. (Identical with POL 315).

317. **The Sociology of Popular Culture** (3) 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) Analysis of modern families and households and their characteristics in various social and historical settings.

322. **Sociology of Religion** (3) Religion as a social institution with special reference to industrial societies. (Identical with RELI 322).

324. **Sociology of Sexuality** (3) Impact of individual and community sexual attitudes and behaviors on other sociological and psychological functioning. Credit is allowed for this course or HLTH 330, but not for both.

326. **Sociology of Work and the Professions** (3) 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) 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) Study of the social origins of criminal law, criminal behavior, and reactions to crime. (Identical with PA 342).

343. **The Crime Problem** (3) (Identical with PA 343, which is home). Open to sociology majors and IDS majors with a sociology subject area.

344. **Legal Aspects of the Criminal Justice Process** (3) (Identical with PA 344, which is home).

367. **Population Geography** (3) (Identical with GEOG 367, which is home).

384. **Sociology of Latin American Societies** (3) Analysis of their social structures and institutions, including government, religion, family, education, stratification, urban and rural development, economies, migration. (Identical with ANTH 384 and LA S 384).

396H. **Honors Proseminar** (3)

412. **Peasants and Peasant Societies** (3) (Identical with ANTH 412, which is home).

420. **Communication and the Legal Process** (3) (Identical with COMM 420, which is home).

421. **Health, Ethics and Public Policy** (3) (Identical with PA 421, which is home).

422. **Complex Organizations** (3) Theories and research regarding large-scale organizations and their relations to the individual and society.

434. **Kinship and Social Organization** (3) (Identical with ANTH 434, which is home).

436. **Social Structure and The Self** (3) Relation between the person and the group; social factors in character formation.

441. **Women and Youth in the Justice System** (3) (Identical with PA 441, which is home). Open to sociology majors and to IDS majors with a sociology subject area.

442. **Crime and Public Policy** (3) (Identical with PA 442, which is home). Open to sociology majors and to IDS majors with a sociology subject area.

444. **Group-Process Methods in Management** (3) (Identical with MAP 444, which is home). Open to sociology majors and to IDS majors with a sociology subject area.

450. **Social Inequality** (3) Theories of social class, caste, and rank; social mobility in contemporary society. (Identical with ANTH 450).

457. **Bio-Social Determinants of Socialization** (3) (Identical with FS 457, which is home).

458. **Violence and Youth** (3) (Identical with PSYC 458, which is home).

459. **Sociology of Gender** (3) 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) Social processes involved in minority groups in terms of race, caste, class, ethnicity, politics, and religion. (Identical with AFAS 467, ANTH 467, AIS 467 and MAS 467).

*Writing-Emphasis Course. P, satisfaction of the upper-division writing-proficiency requirement (see “Writing-Emphasis Courses” in the Academic Policies and Graduation Requirements section of this manual).


505. **World-System Theory and Research** (3) Theory and research on the modern world-system.

508. **Sociology of Culture** (3) Theory and research on the nature of cultural systems, cultural production and consumption, and strategies of interpretive analysis. P, consult with department before enrolling.

509. **Objects and Methods of Cultural Analysis** (3) From content analysis to statistical analysis, means of gathering and analyzing data on cultural objects.

510. **Political Sociology** (3) Basic approaches in political sociology, with emphasis on the relationship of economic and political processes.

511. **Rational Choice Sociology** (3) 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) 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) 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 departmental approval.

520. **Communication and the Legal Process** (3) (Identical with COMM 520, which is home).
521. Social Policy (3) (Identical with PA 521, which is home).

524. Organization Ecology (3) 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, evolutionary dynamics.

525. Organization Theory (3) Basic review of classic and contemporary approaches to the study of complex organizations; formation, development, and internal processes.

527. Social Networks (3) The logic and methods of social network analysis. Emphasis on theoretical underpinnings and applications to sociological research.

530. Theories and Research in Social Psychology (3) A comprehensive introduction to the major theoretical perspectives, methodologies, research areas, issues in contemporary social psychology.

532. Structured Approaches to Role and Identity (3) 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, 530, or consult department before enrolling.

533. Social Relations, Groups, and Networks (3) 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, 530, or consult department before enrolling.


540. Theories of Crime and Public Policy (3) (Identical with PA 540, which is home).

541. Deviance and Social Control (3) Theory and research on the origins of various forms of deviant behavior, and on the consequences of efforts to control them. P, 201, 341 or 342. (Identical with PA 541).

542. Criminology (3) A comprehensive review of classic and contemporary approaches to crime, its nature, causes and consequences.

543. White Collar and Organizational Crime (3) (Identical with PA 543, which is home).

545. Law and Society (3) [Rpt./1] Comprehensive survey of major theoretical perspectives, methodologies, and empirical works on the origins, operations, development, and social consequences of legal and quasi-legal institutions.

551. Stratification and Class (3) 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] In-depth study of one contemporary area of research in stratification. Topics will vary.

556. Gender Issues in Organizational Behavior (3) (Identical with MAP 556, which is home).

557. Gender and Labor (3) Sources and consequences of gender differentiation and inequality, with attention to occupations, earnings, labor markets, household work, and the family. P, 3 graduate credits in women's studies, sociology, or economics; or undergraduate major in one of these three fields.

558. Gender Identities and Interactions (3) 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 graduate credits in sociology, social psychology or women's studies. (Identical with W S 558).

559. Sociology of Gender and the State (3) Gender and construction of state institutions, social 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) Analysis of recent research on the relations among racial and ethnic groups in society, with special attention to current empirical and theoretical issues.

569. Basic Quantitative Methods (3) An introduction to basic quantitative methods for professional sociologists, including computer, mathematical, and statistical concepts.

570a-570b. Social Statistics (3-3) 570a: Probability, distributions, estimation and hypothesis testing. 570b: Ordinary least squares regression, generalized least squares regression, structural equation models (path analysis and non-regressive systems).


576. Field and Observational Methods (3) 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 departmental approval. (Identical with COMM 576).

577. Experimental Methods (3) 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, 575 or consult department before enrolling.

580. Population Studies (3) 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) 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 (3) (Identical with MAP 595, which is home).

596. Seminar (3) (Identical with PA 596, which is home).

WOMEN'S STUDIES (W S)

Communications Bldg., Rm. 108
The University of Arizona
PO Box 210025
Tucson, AZ 85721-0025
(520) 621-7338; FAX: (520) 621-1533
E-mail: stonojo@u.arizona.edu

http://w3.arizona.edu/~ws/

Baccalaureate degree
Bachelor of Arts (B.A.)

Graduate degree
Master of Arts (M.A.)

Major
Women's Studies (B.A., M.A.)

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs) or contact the department listed above. APRRs for the major listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

100. Introduction to Women's Studies (3) 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) (Identical with SOC 150, which is home).
216. Psychology of Gender (3) (Identical with PSYC 216, which is home).

225. Introduction to Women and Religion (3) (Identical with RELI 225, which is home).

253a-253b. History of Women in the United States (3) (Identical with HIST 253a-253b, which is home).

303. Gender and Language (3) (Identical with ANTH 303, which is home).

305. Feminist Theories (3) 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. P, 6 units in women's studies, or consult department before enrolling.

306. African-American Autobiographies: Women and Their Histories (3) (Identical with AFAS 306, which is home).

310. Feminist Ethics (3) Exploration of diverse feminist ethical languages and value systems and the enactment of these languages and values through the activism surrounding contemporary social issues. Assignments and class discussions directed toward students' understanding various moral positions and articulation of their own positions. P, 3 units of women's studies or consent of instructor.

311. Women and Sexuality: 1870- (3) 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 themes and issues in the field of history of sexuality.

321. Women in Judaism (3) (Identical with JU S 321, which is home).

324. Women and Religion in the U.S. (3) (Identical with RELI 324, which is home).

325. Gender and Science (3) 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 to co-lead a class discussion. P, 3 units in W S at 200-level or above, or 3 units of sciences at 200-level or above.

328. Women in Russian Literature and Culture (3) (Identical with RUS 328, which is home).

330. Women in Antiquity (3) (Identical with CLAS 330).

335. Gender and Politics (3) (Identical with POL 335, which is home).

342. Writers, Women and the Gods: The Caribbean Novel (3) (Identical with AFAS 342, which is home).

351a-351b. Introduction to Lesbian/Gay Literature (3-3) (Identical with ENGL 351a-351b, which is home).

373. Women's Fictions in Twentieth-Century Germany (3) (Identical with GER 373, which is home).

380. Nature, the Great Mother, and Woman (3) (Identical with HUMS 380, which is home).

396H. Honors Proseminar (3) [Rpt./9 units] Course is primarily for honors students. Repeatable if topic is different.

400. Special Topics in Women's Studies (3) [Rpt./1] Topics will vary. May be convened with 500.

402. Gender and Language in Japan (3) (Identical with JPN 402, which is home).

406. Gender and Social Identity (3) (Identical with ANTH 406, which is home).

418. Women and Literature (3) [Rpt./1] (Identical with ENGL 418, which is home).

423. Representation of Gender in the Media (3) (Identical with M AR 423, which is home).

425. Theoretical Issues in the Study of Women and Religion (3) (Identical with RELI 425, which is home). May be convened with 525.

430. Lesbian/Bisexual Women's Theories/Lives/Activisms (3) 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. P, 3 units of women's studies, preferably 305, or consent of instructor. May be convened with 530.

433. Feminist Political Theory (3) (Identical with POL 433, which is home). May be convened with 533.

440. Engendering the Past (3) (Identical with ANTH 440, which is home). May be convened with 540.

444. Women and the Body (3) 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. P, 6 units in women's studies. May be convened with 544.

445. Women in Islamic History (3) (Identical with HIST 445, which is home). May be convened with 545.

446. Health and the Global Economy (3) (Identical with GEOG 446, which is home). May be convened with 546.

450. American Indian Women (3) (Identical with AIS 450, which is home).

453. History of Women in Europe (3) (Identical with HIST 453, which is home).

455. History of Women in the Caribbean (3) (Identical with HIST 455, which is home). May be convened with 555.

458. Topics in Comparative Women's History (3) (Identical with HIST 458, which is home).

459. Sociology of Gender (3) (Identical with SOC 459, which is home).

461. Feminist and IR Theories (3) (Identical with POL 461, which is home). May be convened with 561.

464. Women in American Architecture (3) (Identical with ARCH 464, which is home). May be convened with 564.

465. Women in International Development (3) (Identical with ANTH 465, which is home).

468. Women in China (3) (Identical with CHN 468, which is home).

476. Women and the Law (3) (Identical with POL 476, which is home).

480. Men, Women and Work (3) Open only to students who meet the requirement for Advanced Standing as specified in the College of Business and Public Administration. (Identical with MAP 480, which is home).

481. Work, Motherhood and Female Identity in America: 1945 to the Present (3) History of women in the U.S. since 1945. Will explore a variety of topics including employment, sexuality, motherhood, 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. P, 2 women's studies courses or one women's history course (Identical with HIST 481). May be convened with 581.

483. Gender and African History (3) (Identical with HIST 483, which is home). May be convened with 583.

485. Mexican Chicana Women's History (3) (Identical with MAS 485, which is home). May be convened with 585.

489. Women in East Asia (3) (Identical with HIST 489, which is home).

490. Women in Middle Eastern Society (3) (Identical with ANTH 490, which is home).

492. Interpretations of Women's Health (3) Examines a broad array of women's health issues,
with a focus 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 ANTH 492).

496. Seminar
a. Women’s Studies (3) [Rpt./2]
c. Women and the Literature of Identity in Modern Middle East and North Africa (3) (Identical with NES 496c, which is home). May be convened with 596c.
195w. Feminist Approaches to the Bible (3) (Identical with JU S 496w, which is home). May be convened with 596w.

500. Special Topics in Women’s Studies (3) [Rpt./1] For a description of course topics see 400. Graduate-level requirements include additional readings, a book review, and a paper. May be convened with 400.

502. Gender and Language in Japan (3) (Identical with JPN 502, which is home).

525. Theoretical Issues in the Study of Women and Religion (3) (Identical with RELI 525, which is home). May be convened with 425.

530. Lesbian/Bisexual Women’s Theories/Lives/Activisms (3) For description of course topics see 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 430.

533. Feminist Political Theory (3) (Identical with POL 533, which is home). May be convened with 433.

539. History of Feminist Theory (3) 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) (Identical with ANTH 540, which is home). May be convened with 440.

544. Women and the Body (3) For a description of course topics see 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 444.

545. Women in Islamic History (3) (Identical with HIST 545, which is home). May be convened with 445.

546. Health and the Global Economy (3) (Identical with GEOG 546, which is home). May be convened with 446.

550. Modern Theories of Cultural Studies (3) (Identical with CCLS 550, which is home).

554. Contemporary Feminist Theories (3) 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. P, consult the committee before enrolling. (Identical with ENGL 554)

555. History of Women in Europe (3) (Identical with HIST 555, which is home). May be convened with 455.

558. Gender Identities and Interactions (3) (Identical with SOC 558, which is home).

559. Sociology of Gender and the State (3) (Identical with SOC 559, which is home).

561. Feminist and IR Theories (3) (Identical with POL 561, which is home). May be convened with 461.

564. Women in American Architecture (3) (Identical with ARCH 564, which is home). May be convened with 464.

571. Counseling Women (3) (Identical with FS 571, which is home).

574. Work, Motherhood and Female Identity in America: 1945 to the Present (3) For a description of course topics see 481. Graduate-level requirements include a longer more comprehensive research paper. (Identical with HIST 574). May be convened with 481.

583 Gender and African History (3) (Identical with HIST 583, which is home). May be convened with 483.

584. Feminist Research Methodologies (3) Considers some epistemological assumptions underlying research and theoretical projects of traditional disciplines; explores feminist adaptations and critiques of these assumptions.

585. Mexican/Chicana Women’s History (3) (Identical with MAS 585, which is home). May be convened with 485.

586. Gender, Difference, and Power (3) Focuses on gender as it has intersected in varied ways with other cultural distinctions of difference based on class, race, sexual identity, and religion.

590. Women in Middle Eastern Society (3) (Identical with ANTH 590, which is home). May be convened with 490.

596. Seminar
c. Women and the Literature of Identity in Modern Middle East and North Africa (3) (Identical with NES 596c, which is home). May be convened with 496c.
r. Research in Women’s Studies (3) [Rpt./1] P, consent of instructor.
w. Women’s Studies (3) [Rpt./2] (Identical with ENGL 596w). May be convened with 496w.

606. Women’s Health in the United States (3) (Identical with ANTH 606, which is home).

695. Colloquium
b. Feminist Jurisprudence (2) (Identical with Law 695b, which is home).

695. Seminar
n. Comparative Women’s History (3) [Rpt./4] P, consult committee before enrolling. (Identical with HIST 695n, which is home).

SCHOOL OF INFORMATION RESOURCES AND LIBRARY SCIENCE (LIS)

Ph.D.

Graduate degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major
Information Resources and Library Science (M.A., Ph.D.)

Program Requirements
For academic program requirements for graduate degrees, 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.

116. Introduction to Microcomputers (3) Examination of microcomputers in the information environment. Emphasis on hardware and software concepts.

195a. Freshman Colloquium (1)

400. Social Constructs of Information (3) Introduction to information as it is used and defined by society. Geography of information, economics of information, and intellectual property concerns.

401. Knowledge Structures I (3) 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 501.

404. Foundations of Library and Information Services (3) Elements of librarianship, historical backgrounds, types of libraries, the role of the library in American life, current issues. May be convened with 504.

411. Information Storage and Retrieval (3) 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 524.

441. Children’s Literature in Spanish (3) (Identical with SPAN 441, which is home).

443. Knowledge and Society (3) (Identical with PHIL 443, which is home). May be convened with 543.
460. Information Resource Development (3)
Principles of identifying, selecting, acquiring, managing, and evaluating information resources for particular demographic areas. May be convened with 460.

481. School Library Administration and Organization (3)
Services, finances, personnel, evaluation, quarters, organization and technical services in the school library. May be convened with 581.

500. Social Constructs of Information (3)
For a description of course topics see 400. Graduate-level requirements involve extra readings and in-depth exams. May be convened with 400.

501. Knowledge Structures I (3)
For description of course topics see 401. Graduate-level requirements include additional assignments and a higher level of performance. May be convened with 401.

504. Foundations of Library and Information Services (3)
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 404.

506. Research Methods I (3)
Research methodology, research design, and elementary statistics.

509. 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 424. Graduate-level requirements involve extra readings and in-depth exams. May be convened with 424.

526. Bibliography (3)

543. Knowledge and Society (3)
(Identical with PHIL 543, which is home). May be convened with 443.

560. Information Resource Development (3)
For a description of course topics see 460. Graduate-level requirements involve extra readings and in-depth exams. May be convened with 460.

575. Human Factors in Information Systems (3)
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)
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 481.

588. Issues in Information Resources (3) [Rpt./3]
Examines problems associated with current issues in information resources and other information centers.

589. Scholarly Communication (3)
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).

600. Introduction to Graduate Study in Music (3)
(Identical with MUS 600, which is home).

601. Knowledge Structures II (3)
Theory of classification, subject approaches to information, and advanced data coding.

606. Research Methods II (3)
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)
The planning/evaluation cycle as an approach to assessing various information center services.

612. Expert Systems in Information Resources (3)
Examines the role and place of expert systems. Emphasis on development of knowledge-based systems.

613. Systems Analysis and Evaluation (3)
Introduction to quantitative methods for the design, analysis and control of library systems.

614. Information Theory and Transfer (3)
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)
Analysis of information needs of subjects specialists. Approaches to evaluation of information exchanges and sources.

624. Health and Medical Informatics (3)
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]
Topics vary. Problems associated with current issues in information resources and information centers.

695. Colloquium (3)
Theory of Classification (1-3)
Children's and Youth Services and Literature (2-3) [Rpt.]

696. Seminar (3)
Current Research Trends (1-4) [Rpt.]
Current Resources in School Libraries (3)
Information Resources (3)

796. Seminar (3)
Advanced Topics in Information Resources (3) [Rpt./2]

UNIVERSITY COLLEGE

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

University College administers the interdisciplinary studies major and a number of pre-professional programs. The college provides general education advising to students enrolled in the Colleges of Humanities, Science, and Social and Behavioral Sciences, and to all pre-medical, pre-nursing, and pre-law students. The college is also administrative home for undecided students and sponsors the new Freshman Year Center, located in Bear Down Gym.

For more information about the Freshman Year Center, call (520) 621-7763.

Baccalaureate degree
Bachelor of Arts (B.A.)

Majors and degrees
Interdisciplinary Studies (B.A.)
Pre-Education
Pre-Health Education
Pre-Medical Technology
Pre-Nursing
Pre-Pharmacy
Pre-Physiological Sciences
Undecided

The interdisciplinary studies (IDS) program
The IDS major is an alternative to a traditional major/minor program, allowing a student to design a program that reflects unique educational interests and career goals. During the sophomore or junior year, students submit proposals to University College outlining their intended course of study. For more information about the program and application process, contact the Office of Academic Services at 621-3336.

General education program
All undergraduate students are required to complete a 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 specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the undergraduate majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on line at http://www.arizona.edu/academic/oncourse/aprr.html.

For academic requirements for graduate degrees 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.

1 Contact the College of Education to obtain additional information about the program.
2 Contact the School of Health Related Professions to obtain additional information about the program.
3 Contact the College of Nursing to obtain additional information about the program.
4 Contact the College of Pharmacy to obtain additional information about the program.

University-wide general education structure
The following courses, listed by study area, are pilot courses for the proposed university wide gen-
eral education structure. For information about the proposed program and a list of available pilot courses, consult the General Information section of this manual.

Individuals and Societies (I&S)

101. Individuals and Societies: Individuals (3) Examines the central questions about the nature of human beings, focusing on the individual experience. Course topics may include basic human thought processes (e.g., conceptual systems, symbolic representation of the world, judgment and decision making), personal identity, individual freedom and social control, ethical and moral principles, and others.

102. Individuals and Societies: Societies (3) Examines 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.

Natural Sciences (NSC)

101. Natural Sciences: Physical Sciences (3) 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.

102. Natural Sciences: Biological Sciences (3) Introduction to the study of biology and its application to events in the everyday world. Areas examined include 1) the evolution and diversity 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.

103. Natural Sciences: Planetary and Geophysical Sciences (3) 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 geophysical sciences.

Traditions and Cultures (T&C)

101. Traditions and Cultures: Nonwestern (3) 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.

102a. Traditions and Cultures: Ancient Times to the Renaissance (3) 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.

102b. Traditions and Cultures: The Renaissance to the Present (3) 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.

103. Traditions and Cultures: Topics in Culture (3) Examines 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.

SCHOOL OF HEALTH RELATED PROFESSIONS

Gittings Building, Room 102
The University of Arizona
PO Box 210093
Tucson, AZ 85721-0093
Phone: (520) 621-6990; FAX: 621-8170
http://www.shrp.arizona.edu

The School of Health Related Professions, a division of the College of Medicine, educates students for careers in health professions in the university, community, and commercial sectors. Its programs offer science-based preparation for researchers, technicians 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.

Advanced standing
Pre-health majors are admitted to University College. Admission to the pre-health major does not guarantee admission to advanced standing. Admission to the School of Health Related Professions is required of all undergraduates and is contingent upon admission into a specific major. Applicants must have completed a minimum of 56 units of college credit, applicable to a baccalaureate degree, and must have a GPA of 2.25 or higher to be considered for admission. Contact the school at the address above for additional admissions requirements.

Baccalaureate degrees
Bachelor of Science in Health Science (B.S.H.S.)
Graduate degrees
Master of Arts (M.A.)
Master of Science (M.S.)

Majors and degrees
Health Education (B.S.H.S.)
Medical Technology (B.S.H.S.)
Physiological Sciences (B.S.H.S., M.A., M.S.)*

Undergraduate minors
No minor is required.

For specific information about the major in Physiological Sciences, contact the office listed above. Courses for the major in Physiological Sciences are listed in this manual under the College of Medicine, Department of Physiology.

General education program
All undergraduate students are required to complete a 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 specific academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the undergraduate majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available online at http://www.arizona.edu/academic/undergraduate/aprr.html.

For academic requirements for graduate degrees 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.

EXERCISE AND SPORT SCIENCES (EXSS)

Professional Activity Courses - Open to physical education majors and minors only.

208. Aerobic Dance Fitness (1) *
211. Badminton (1) *
213. Basketball (2) *
214. Cooperative Activity Learning (1)*
217. Folk Dance (1) *
218. Football (1) *
219. Golf (1) Fee*
221. Women's Gymnastics (2) *
223. Handball-Racquetball (1)*
225. Soccer (2) *
227. Softball (1) *
228. Strength and Conditioning Training (1) *
229. Swimming-Life Guard Training (2) *
230. Tennis (2) *
231. Track and Field (2) *
232. Volleyball (2) *
260. Water Safety Instructor (2) American Red Cross Water Safety Instructor Certificate will be issued to those students qualifying. P, current advanced lifesaving certificate.

261. Advanced First Aid and Emergency Care (2) Instruction in first-aid and emergency care procedures. The American Red Cross Advanced First Aid and Emergency Care Certificate will be awarded to those students qualifying.


267. Controlling Stress and Tension (2) Psychophysiology of stress and its relationship to health, with emphasis on identifying and 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) Examines approaches to psychological training which lead to peak performance in sport and other endeavors. Develops individualized training procedures for maintaining optimal arousal, motivation, concentration, and confidence.


285. Principles of Teaching Physical Activities (3) General principles and practical experiences related to analysis of movement skills, correction of movement errors, and pre-instructional planning applied specifically to teaching physical activities.

286. Sports Officiating (1) Guiding principles and standards; rules, mechanics and procedures for officiating sports common to secondary school interscholastic and community club programs. Consult department before enrolling.

287. Psychological Foundations for Exercise and Sport (3) Examines principles of motor learning and performance; psychological factors such as personality, anxiety, and motivation which influence learning and performance; and psychology of exercise. P, PSYC 101.

350. Movement Experiences for Elementary School Children (2) Development of knowledge and skill competencies necessary for teaching fundamental movements, rhythms, and dance; gymnastics, games and sports to children. Open to physical education majors only.

351. Elementary School Physical Education (2) Purposes and practices of physical education at the elementary school level; instruction in recommended activities; teaching and evaluation techniques; class organization.


365. Physical Education Instruction Strategies (2) Analysis of alternative models of teaching physical education; research of teaching physical education; and systematic analysis of physical education teacher effectiveness. Open to majors only. P, 285, 394b or CR.

366. Functional Kinesiology (3) Anatomical and mechanical factors affecting human movement, particularly in sport and exercise situations. Open to physical education majors only. P, PSIO 201, 202, MATH 117R/S.

371. Special Physical Education (3) Designed to provide the knowledge and experience necessary for the physical education and recreation of persons having various handicaps. Three hours per week of related experiences by arrangement required. P, PSIO 201, 202.

373. Physiological Basis of Physical Education and Athletics (3) Physiological responses and adaptations to physical activity in various populations and environments; emphasizes fitness evaluation and application of training principles for exercise and sport. Open to physical education majors only. P, CHEM 103a-103b, 104a-104b, PSIO 201, 202.

374. Physiological Basis of Physical Education and Athletics Laboratory (1) P CR 373.


381. Measurement and Evaluation (3) Tests and measurements in physical education; data analysis techniques for test evaluation, test construction, and grading; experience with tests of fitness, sport skills, and sociometric measurements.

385. Principles of Athletic Coaching (3) Duties, responsibilities and ethics of the athletic coach; the role of interscholastic sport in public school settings with emphasis on administrative functions, legal liability, facilities coordination, and game and contest management. P, 8 units of 200- or 300-level EXSS course work.

394. Practicum
b. Physical Education Teaching (1) P, 285 and professional activities requirement.

410. Sport in Contemporary Society (3) Study of contemporary sport from the perspectives of its personal, social, cultural, economic and educational dimensions. May be convened with 510.

452. Teaching Physical Education in the Elementary School (3) Theory and methods of providing movement experiences for young children; emphasis placed upon curriculum development, methods of teaching, class organization, and management. Practical experiences at the elementary level. Open to physical education majors only. P, 221, 231, 285, 350.

477. Advanced Sport Injury Management (3) Advanced techniques in recognition, evaluation, treatment, rehabilitation and prevention of athletic injuries. 2R, 3L. P, 377 and a minimum of 300 clinical hours in athletic training or physical therapy.

495. Colloquium

497. Workshop
a. Physical Education Student Teaching Forum (1) Open to physical education majors only. CR, TTE 493a or 493b.

*Writing-Emphasis Courses. P, Satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

510. Sport in Contemporary Society (3) For a description of course topics see 410. Graduate-level requirements include an in-depth research paper on one issue of contemporary sport. May be convened with 410.
529. Psychological Interventions and Ergogenic Aids for Peak Performance (3) The application and effectiveness of ergogenic aid mechanisms, particularly psychological interventions, in enhancing performance.

536. Administration of Sports Programs (3) Designed to provide a theoretical framework for students pursuing sports management careers and others interested in various functions involved in the conduct of sport programs.

566. Physical Activity in Aging and Chronic Diseases: Psychosocial Aspects (3) Psychosocial dimensions of exercise programs designed for populations with chronic diseases as well as for older populations.


582. Anatomical Basis of Sport Injuries (3) Comprehensive survey of bones, ligaments, muscles, nerves, and vessels of the trunk and upper and lower extremities, with emphasis on their relationship to sport injuries. 2R, 3L, P, CR 580.


584. Rehabilitation of Athletic Injuries (3) Principles in the planning and implementation of rehabilitation programs for injured athletes with emphasis on application of contemporary therapeutic exercise techniques. P, 580.


586. Physical Education and the Law (3) Investigation and analysis of legal parameters within which the physical educator and coach operate; negligence theory; common defenses; product liability; insurance; legal implications for program development and methodology.

588. Legal Aspects of Sports Administration (3) Development of administrative and coaching techniques from the legal perspective. Analysis of personnel procedures, purchase of equipment, athletic associations, certification, transportation, medical procedures, officiating, and the handicapped athlete as influenced by litigation. P, 586.

593. Internship

b. Sport Psychology (1-3) [Rpt/6 units] P, 529.

g. Kinesiology (2) [Rpt/1] P, 562. Graduate-level requirements include leading discussion of one of the colloquium topics and preparation of a minor proposal on a colloquium topic. May be convened with 495g.

597. Workshop
a. Biofeedback: Theory and Application (1)

793. Internship
a. Sport Psychology (1-3) [Rpt/12 units] P, 529.

HEALTH EDUCATION (HLTH)
Arizona Health Sciences Center, Rm. 1115
The University of Arizona
PO Box 245033
Tucson, AZ 85724
(520) 626-3200; FAX: (520) 626-3206

Baccalaureate degree
Bachelor of Science in Health Sciences (B.S.H.S.)

Major
Health Education (B.S.H.S.)
Options: community health education school health education

Program Requirements
For academic program requirements for undergraduate degrees, consult the On Course! Academic Program Requirements Reports (APRRs). APRRs for the majors listed above may be obtained from the college or departmental office. APRRs for all undergraduate majors are available on-line at http://www.arizona.edu/academic/ oncourse/aprr.html.

For academic program requirements for graduate degrees, 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.

178. Personal Health and Wellness (3) Introduces and analyzes basic personal and community health problems, with emphasis on current scientific information essential to health promotion and maintenance of individual health. Credit for this course or 278, but not for both.

200. Introduction to Health Education (3) Determinants of health behavior, the process of health education, and the practice of health education. Open to majors/minors only. P, HLTH 178 or CR.

278. Health Science Promotion (2) 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. Credit is allowed for this course or 178, but not for both.


330. Human Sexuality (3) Discussion of the basic aspects of human sexuality, including male and female reproductive physiology, congenital defects, venereal disease, myths and fallacies, variations of sexual response. Credit is allowed for 330 or SOC 324, but not for both.

381. Health Education Intervention Methods (3) Emphasis on health education methods and strategies that can be applied in health education and health promotion interventions. Prepares students who will teach in school settings or work in community interventions. P, 200.

393. Internship

a. Introductory Internship in Health Careers (1-3)

400. Contemporary Community Health Problems (3) 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, 178, 200, 381. Writing Emphasis Course.*

433. Global Health (3) 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, 178, 200, 381.

435. Safety Education and Accident Prevention (3) 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) Review of the nature and ramifications of behavioral health problems, as well as analysis of physical, psychological and social implications.

493. Internship

a. Field Work in Health Education (1-6) Open to health education majors only.

*Writing-Emphasis Courses. P, Satisfaction of the upper-division writing-proficiency requirement (see "Writing-Emphasis Courses" in the Academic Policies and Graduation Requirements section of this manual).

530. Theory-based Approaches in Health Education/Health Promotion (3) 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) Principles for planning, implementing, administering and evaluating health education programs utilizing the "PRECEDE Model" as a framework.
535. Multicultural Health Beliefs (3) Designed to provide sensitivity by health professiona-
list to the varying multicultural health beliefs
and needs of our society. Special emphasis on eth-
nic characteristics of minority populations in Ari-
zona with recommendations for programming
strategies.

540. Survey of Health Education/Health Pro-
motion Literature (3) Examination of health edu-
cation/promotion literature from ancient societies
to present, including an analysis of current health
literature from various professional, community,
voluntary, public and international health organi-
izations.

**MEDICAL TECHNOLOGY (MEDT)**

1435 N. Fremont Avenue, Rm. 124
The University of Arizona
PO Box 210468
Tucson, AZ 85721-0468
(520) 626-4084; FAX: (520) 622-4656
e-mail: hlpotter@u.arizona.edu
http://www.ahsc.arizona.edu/shrp.shtml

**Baccalaureate degree**
Bachelor of Science in Health Sciences (B.S.H.S.)

**Major**
Medical Technology (B.S.H.S.)

**Program Requirements**
For academic program requirements for under-
graduate degrees, consult the On Course! Aca-
demic Program Requirements Reports (APRRs).
APRRs for the majors listed above may be ob-
tained from the college or departmental office.
APRRs for all undergraduate majors are available
on-line at http://www.arizona.edu/academic/
oncourse/aprr.html.

For academic program requirements for graduate
degrees, 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.

195. Colloquium
a. Introduction to Clinical Laboratory Medicine
(1) Course offered superior/pass/fail.

387. Contemporary Perspectives of the Med-
ical Technology Professions (3) [Rpt./1] History
and current social and economic issues facing
the profession of medical technology. Effects of re-
cent legislation on laboratory management. P, con-
sumption, program director before enrolling.

471R. Lectures in Clinical Hematology (5) [Rpt./
1] Lectures in basic hematology and hematolog-
cal procedures including cell structure and func-
tion, inherited and acquired anomalies, hemosta-
sis, cell enumeration and differentiation, cytoge-
netics. P, consult program director before enrolling. May be convened with 571R.

471L. Fundamental Laboratory Techniques in
Clinical Hematology (2) [Rpt./1] Basic labora-
tory techniques in clinical hematology with em-
phasis on manual and automated hematological
procedures. Instruction includes proper procedural
methodologies, quality control, the use of controls
and standards, and interpretation of laboratory test
results. P, CR, 471R/571R, consult program di-
rector before enrolling. May be convened with
571L.

472R. Lectures in Clinical Immunology and
Immunohematology (4) [Rpt./1] Lectures in se-
erological methods used in the clinical laboratory
and interpretation of results; blood banking pro-
dcedures. P, consult program director before enrolling.
May be convened with 572R.

472L. Fundamental Laboratory Techniques in
Clinical Immunology and Immunohematology
(2) [Rpt./1] Basic laboratory techniques in sere-
ological procedures and blood banking. Emphasis
will be placed on procedural methodologies, qual-
ity control, the use of controls and standards, and
interpretation of laboratory test results. P, CR,
472R/572R, consult program director before enrolling.
May be convened with 572L.

473R. Lectures in Clinical Chemistry (5) [Rpt./
1] Lectures encompassing the fundamental con-
cepts of clinical laboratory chemistry including
pathophysiology and clinical correlations. P, con-
sult program director before enrolling. May be convened with 573R.

473L. Fundamental Laboratory Techniques in
Clinical Chemistry (2) [Rpt./1] Basic laboratory
techniques in clinical chemistry. Emphasis will be
placed on procedural methodologies, quality con-
trol, the use of controls and standards, and inter-
pretation of laboratory test results. P, CR,
473R/573R, consult program director before enrolling.
May be convened with 573L.

474R. Lectures in Clinical Bacteriology (5) [Rpt./
1] Lectures relating to laboratory techniques
used to safely isolate and identify pathogenic bac-
teria. Special media/tests, organismal virulence
factors, pathohelial effects occurring within the
host and antibiotic susceptibility testing of bacte-
ria are covered. P, consult program director before
enrolling. May be convened with 574R.

474L. Fundamental Laboratory Techniques in
Clinical Bacteriology (2) [Rpt./1] Basic labora-
tory techniques used in the isolation and identifi-
cation of bacteria pathogenic for humans. Stan-
dard and specialized media/biochemical tests are
utilized. P, CR 474R/574R, consult program di-
rector before enrolling. May be convened with
574L.

475a-475b-475c. Topics in Clinical Microbiol-
ogy (2-1-1) [Rpt./1] 475a: Clinical Parasitology.
Diagnostic methodologies with emphasis on the
laboratory identification of clinically relevant para-
sites. 475b: Clinical Virology. Diagnostic meth-
odologies with emphasis on the laboratory identi-
fication of clinically relevant viruses. 475c: Clini-
cal Mycology and Mycobacteriology. Diagnostic
methodologies with emphasis on the laboratory
identification of clinically relevant fungi and My-
cobacterium sp. P, consult program director before
enrolling. May be convened with 575a-575b-
575c.

476. Principles of Laboratory Science (3) [Rpt./
1] Basic principles of laboratory mathematics, bio-
statistics, body fluids analysis, urinalysis, quality
control and laboratory safety. P, consult program
director before enrolling. May be convened with
576.

481. Clinical Laboratory Hematology (4) [Rpt./
1] Clinical laboratory rotation in hematology. P,
572L, 473R/573R, 473L/573L, 474R/574R, 474L/
574L, 475a/575a, 475b/575b, 475c/575c, 476/576,
496a, consult program director before enrolling.
May be convened with 581.

482. Clinical Laboratory Immunology and Im-
munohematology (5) [Rpt./1] Clinical laboratory
rotation in serology and blood banking. P, 387,
471R/571R, 471L/571L, 472R/572R, 472L/572L,
473R/573R, 473L/573L, 474R/574R, 474L/574L,
475a/575a, 475b/575b, 475c/575c, 476/576, 496a,
consult program director before enrolling. May be convened with 582.

483. Clinical Laboratory Chemistry (5) [Rpt./
1] Clinical laboratory rotation in chemistry. P,
572L, 473R/573R, 473L/573L, 474R/574R, 474L/
574L, 475a/575a, 475b/575b, 475c/575c, 476/576,
496a, consult program director before enrolling.
May be convened with 583.

484. Clinical Laboratory Microbiology (5) [Rpt./
1] Clinical laboratory rotation in microbiology. P,
572L, 473R/573R, 473L/573L, 474R/574R, 474L/
574L, consult program director before enrolling.
May be convened with 584.

496. Seminar
a. Topics for Medical Technology Interns (1) Writ-
ing-Emphasis Course. Consult with committee
before enrolling.

571R. Lectures in Clinical Hematology (5) [Rpt./
1] For a description of course topics see 471R.
Graduate-level requirements include a research paper on selected topics related to clinical labora-
tory hematology. P, consult program director before
enrolling. May be convened with 471R.

571L. Fundamental Laboratory Techniques in
Clinical Hematology (2) [Rpt./1] For a descrip-
tion of course topics see 471L. Graduate-level re-
quirements include a research paper relating to new
laboratory methodologies applicable to clinical
hematology. P, CR, 471R/571R, consult program
director before enrolling. May be convened with
471L.

572R. Lectures in Clinical Immunology and Im-
munohematology (4) [Rpt./1] For a description
of course topics see 472R. Graduate-level re-
quirements include a research paper on selected
topics related to clinical laboratory serology or
blood banking. P, consult program director before
enrolling. May be convened with 472L.

572L. Fundamental Laboratory Techniques in
Clinical Immunology and Immunohematology
(2) [Rpt./1] For a description of course topics see
472L. Graduate-level requirements include a re-
search paper relating to new laboratory method-
ologies...
ologies applicable to clinical serology or blood banking. P, CR, 472R/572R, consult program director before enrolling. May be convened with 472L.

573R. Lectures in Clinical Chemistry (5) [Rpt./1] For a description of course topics see 473R. Graduate-level requirements include a research paper on selected topics relating to clinical laboratory chemistry. P, consult program director before enrolling. May be convened with 473R.

573L. Fundamental Laboratory Techniques in Clinical Chemistry (2) [Rpt./1] For a description of course topics see 473L. Graduate-level requirements include a research paper relating to new laboratory methodologies applicable to clinical chemistry. P, CR, 473R/573R, consult program director before enrolling. May be convened with 473L.

574R. Lectures in Clinical Bacteriology (5) [Rpt./1] For a description of course topics see 474R. Graduate-level requirements include a research paper on selected topics relating to clinical laboratory bacteriology. P, consult program director before enrolling. May be convened with 474R.

574L. Fundamental Laboratory Techniques in Clinical Bacteriology (2) [Rpt./1] For a description of course topics see 474L. Graduate-level requirements include a research paper relating to new laboratory methodologies applicable to clinical bacteriology. P, CR, 474R/574R, consult program director before enrolling. May be convened with 474L.

575a-575b-575c. Topics in Clinical Microbiology (2-1-1) [Rpt./1] For a description of course topics see 475a-475b-475c. Graduate-level requirements include a research paper on selected topics relating to clinical microbiology, virology, mycology or mycobacteriology. P, consult program director before enrolling. May be convened with 475a-475b-475c.

576. Principles of Laboratory Science (3) [Rpt./1] For a description of course topics see 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. P, consult program director before enrolling. May be convened with 476.


582. Clinical Laboratory Immunology and Immunohematology (5) [Rpt./1] For a description of course topics see 482. Graduate-level requirements include a research paper relating to advanced laboratory methodologies in clinical serology or blood banking. P, 387, 471R/571R, 471L/571L, 472R/572R, 472L/572L, 473R/573R, 473L/573L, 474R/574R, 474L/574L, 475a/575a, 475b/575b, 475c/575c, 476/576, 496a, consult program director before enrolling. May be convened with 481.


584. Clinical Laboratory Microbiology (5) [Rpt./1] For a description of course topics see 484. Graduate-level requirements include a research paper relating to advanced laboratory methodologies in clinical microbiology. P, 387, 471R/571R, 471L/571L, 472R/572R, 472L/572L, 473R/573R, 473L/573L, 474R/574R, 474L/574L, 475a/575a, 475b/575b, 475c/575c, 476/576, 496a, consult program director before enrolling. May be convened with 484.

**OCCUPATIONAL SAFETY AND HEALTH (OSH)**

402. Industrial Hygiene Instrumentation and Analysis (2-4) Introduction to field sampling instruments and strategies, quality control, and statistical analysis, with emphasis on instrument selection and calibration. 2R, 3L, P, 486, CHEM 322, 323. Writing-Emphasis Course.*


435. Industrial Toxicology and Chemical Exposures (2-4) Principles of Toxicology related to industrial contaminants. P, 486. May be convened with 587.

453. Industrial Toxicity and Chemical Exposures (3) Recognition, evaluation, and control of physical exposures, including radiation, noise, vibration, and heat stress. P, CR 486. (Identical with PCOL 502).

502. Environmental Monitoring and Analysis (2-4) Introduction to air sampling instruments and strategies, quality control, and statistical analysis, with emphasis on instrument selection and calibration. P, 586. (Identical with PCOL 510).

100. Introduction to American Indian Studies (3) Examines diversity of American Indian tribes, successive colonization waves, conflict between Native Americans and colonizing nations.

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

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

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

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

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

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

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

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

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

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


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

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

396H. Honors Proseminar (3)

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

416. Contemporary Indian America (3) (Identical with ANTH 416, which is home). May be convened with 516.

423. Anthropology of Rural Mexico (3) (Identical with ANTH 423, which is home). May be convened with 523.

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

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

445A-445B. Structure of a Non-Western Language (3-3) (Rpt./2) (Identical with LING 445A-445B, which is home). May be convened with 545A-545B.

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

450. American Indian Women (3) 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 class standing or approval of instructor. (Identical with W S 450).

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

477. Studies in American Indian Literature (3) (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 578.

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

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

489. Area Survey of Native North American Language (3) (Identical with ANTH 489, which is home). May be convened with 589.

490. Indian Religions and Spirituality (3) Examines the positive (curing, harmony with the natural world, etc.) aspects of Indian religions. Indian medicine men may participate in the course at various junctions. (Identical with RELI 490). May be convened with 590.

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

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

516. Contemporary Indian America (3) (Identical with ANTH 516, which is home). May be convened with 416.

523. Anthropology of Rural Mexico (3) (Identical with ANTH 523, which is home). May be convened with 423.

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

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

545A-545B. Structure of a Non-Western Language (3-3) (Rpt./2) (Identical with LING 545A-545B, which is home). May be convened with 445A-445B.

549A-549B. Folklore (3-3) (Identical with ENGL 549A-549B, which is home). May be convened with 449A-449B.

577. Studies in American Indian Literature (3) (Identical with ENGL 577, which is home).
meeting the needs of native students; (2) current research in the area of American Indian/Alaskan native education and its implications for future research.

679. American Indian Higher Education (3) Development of higher education for American Indian/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 tribally controlled colleges and universities, and the development of American Indian studies programs in higher education institutions.

688. Energy and Natural Resources (3) GRD (Identical with LAW 688, which is home).

696. Seminar
a. American Indian Policy (3) [Rpt./2]
b. Languages and Literature (3) [Rpt./2]
c. Sociology and Culture (3) [Rpt./2]
d. American Indian Education (3) [Rpt./2]

697. Workshop
a. College Teaching Methods (3).

**APPLIED MATHEMATICS**

Mathematics Bldg.
The University of Arizona
PO Box 210089
Tucson, AZ 85721-0089
(520) 621-2016; FAX: (520) 621-8322
e-mail: applmath@ccci.arizona.edu
http://www.math.arizona.edu/applmath/

Graduate Interdisciplinary Program

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

Major
Applied Mathematics (M.S., Ph.D.)

Program Requirements
For academic program requirements for graduate degrees, 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.

512. Economic Policy in Developing Countries (3) (Identical with AREC 512, which is home).

521. Physical Climatology (3) (Identical with ATMO 521, which is home).

523. Hydrology (3) (Identical with CE 523, which is home).

530. The Climate System (3) (Identical with GEOG 530, which is home).

535. Water Management in Dryland Ecosystems (3) (Identical with WS M 535, which is home).

541. Economic Botany of Arid Lands (3) (Identical with PL S 541, which is home).

550. Geomorphology (4) (Identical with GEOS 550, which is home).

564. The Arid and Semiarid Lands (3) (Identical with GEOG 564).

565. Physical Aspects of Arid Lands (3) (Identical with GEOG 565).

575. Economics of Natural Resource Policy (3) (Identical with AREC 575, which is home).

590. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 590, which is home).

595. Colloquium
a. Current Research (1) [Rpt./8 units]

631. Anthropology and Development (3) (Identical with ANTH 631, which is home).

641. Natural and Human Impacts on Arid Lands (3) 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) 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
which will determine the fate 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) 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) Feasibility of these concepts are studied thoroughly with the aim to explore the changing global community. Multi-media presentations, videos, selected readings and textbook material will be used to explore the political, economic, and ecological impacts on the environment and health of our entire ecosystem.

696. Seminar
b. Cultural Anthropology (1-3) [Rpt./3] (Identical with ANTH 696b, which is home).

BIOMEDICAL ENGINEERING
Arizona Health Sciences Center, Rm. 5334
The University of Arizona
PO Box 245084
Tucson, AZ 85724-5024
(520) 626-4707; FAX: (520) 626-2890
e-mail: skwill@aruba.ccit.arizona.edu
http://www.ahsc.arizona.edu/bmeidp/index.shtml

No biomedical engineering degrees are currently offered. The University Committee on Biomedical Engineering coordinates options available to students in the College of Engineering and Mines and in other colleges.

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 (C BIO)
Department of Radiation Oncology
Arizona Cancer Center
The University of Arizona
PO Box 245024
Tucson, AZ 85724-5024
(520) 626-4797; FAX: (520) 626-4480
e-mail: acione@azcc.arizona.edu
http://www.azcc.arizona.edu/idps/cbio/cbio.html

Graduate Interdisciplinary Program

Graduate degree
Doctor of Philosophy (Ph.D.)

Major
Cancer Biology (Ph.D.)

Program Requirements
For academic requirements for graduate degrees, 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.

505. Eukaryotic DNA Replication (3) [Rpt./1] Biochemical and molecular aspects of DNA replication in mammalian cells will be described in conjunction with discussions of recent journal articles on selected topics. Includes the regulation of S phase within the eukaryotic cell cycle; nuclear organization during DNA synthesis; DNA replication enzymes; viral, yeast and embryo models of DNA replication; the initiation of DNA replication; DNA replication origins and the reconstitution of DNA replication complexes. P, BIOM 462b. (Identical with BIOM 505, MCB 505, and MBIM 505).

515. Basic Human Pathology (4) Identical with PATH 515, which is home.

550. Drug Disposition and Metabolism (2) [Identical with PHCL 550, which is home].

551. Molecular Mechanisms of Carcinogenesis (3) Physical and chemical carcinogenesis. Special emphasis will be upon molecular aspects of the interaction of the carcinogenic agents with mammalian cells and the subsequent mutagenic and metabolic consequences of such interactions. The topics of oncogene activation and tumor suppressor gene inactivation induced by carcinogens during multi-stage carcinogenesis will be emphasized. The molecular biology techniques used in the study of carcinogenesis will also be covered. P, consult program before enrollment. (Identical with MBIM 551 and RONC 551).

555. Cancer Therapeutics (3) Fundamental biological aspects of physical, chemical and biological therapies for cancer. (Identical with CBA 555, MEDI 555, MBIM 555 and RONC 555).

560. Clinical Cancer Biology (1) Explores three areas of clinical cancer biology: Cancer Diagnostics and Pathology, Radiation and Surgical Oncology, and Medical Oncology. A practical experience for non-medical students investigating the problems of clinical cancer prevention, diagnosis, treatment, and medical management. One on one interaction of the students with practicing physician specialists in selected areas of oncology. A minimum of sixteen hours of experience will be provided. Enrollment is limited to three students. P, consent of instructor.

562. Tumor Immunology (3) [Identical with MBIM 562, which is home].


595. Colloquium
a. Oncogenes and Signal Transduction (1) [Rpt./2] Open to graduate students in biological disciplines, exceptionally qualified undergraduates (Identical with BIOM 595a, which is home).

596. Seminar
h. Cancer Biology Series (1) (Identical with RONC 596h).

602a. Biotoxicology (3) (Identical with PCOL 602a, which is home).

681. Introduction to Cancer Biology Research (2) Supervised research experience in the laboratories of individual faculty members.

889. Cancer Genomics and Cytogenetics (3) For a description of course topics see 589.

COGNITIVE SCIENCE
Psychology Bldg., Rm. 312
The University of Arizona
PO Box 210431
Tucson, AZ 85721-0068
(520) 621-2177; FAX: (520) 621-4300
e-mail: garrett@ccit.arizona.edu
http://grad.admin.arizona.edu/idps/cogn/cogn.html

Graduate Interdisciplinary Program

Minor
The program offers a Doctor of Philosophy minor only.

Program requirements
For information about the graduate minor consult the Graduate Catalog or 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 CULTURAL & LITERARY STUDIES (CCLS)
1239 N. Highland Ave.
The University of Arizona
PO Box 210431
Tucson, AZ 85721-0431
(520) 626-8693; FAX: (520) 626-8694
e-mail: kultur@u.arizona.edu
http://grad.admin.arizona.edu/idps/ldphome.html

Graduate Interdisciplinary Program

Graduate degrees
Master of Arts (M.A.)
Doctor of Philosophy (Ph.D.)

Major
Comparative Cultural & Literary Studies (M.A., Ph.D.)
Program Requirements
For academic program requirements for graduate degrees, 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.

125. Critical Concepts in Western Culture (3) [Rpt./9 units] analyzes concepts in art, literature, and other cultural forms that have shaped western thought. Juxtaposes traditional and nontraditional, elite and popular, western and nonwestern materials. (Identical with ENGL 215).

195. Colloquium
a. Encounters in Cultural Studies (1) Interpretations of culture, in its broadest sense, from local to global perspectives. Topics vary.

205. Introduction to Feminist Literary Theory (3) (Identical with W S 205, which is home).

248a-248b. Introduction to Folklore (3-3) (Identical with ENGL 248a-248b, which is home).

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

462. Linguistics and the Study of Literature (3) (Identical with ENGL 462, which is home). May be convened with 562.

486. Topics in American Literature (3) (Identical with ENGL 486, which is home).

503. Introduction to Comparative Cultural and Literary Studies (3) Strategies of interpretation taught through practical critique.

549a-549b. Folklore (3-3) (Identical with ENGL 549a-549b, which is home).

550. Modern Theories of Cultural Studies (3) focuses on key topics, issues and theorists in cultural studies. Subject varies. (Identical with ENGL 550).

562. Linguistics and the Study of Literature (3) (Identical with ENGL 562, which is home). May be convened with 462.

596. Seminar
a. Basic Principles of Epidemiology (3) [Rpt./1] (Identical with PHL 596a).

596. Seminar
b. Psychosocial Epidemiology (3)

610. Biostatistics for Research (3) Descriptive and inferential statistics 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. P, MATH 509.

650. Quantitative Epidemiology (3) study of methods for epidemiologic methods used in human populations to the rise of disease. 2R, 1L. P, 596a, 596b.

660. Infectious Disease Epidemiology (3) [Rpt./1] Introduction to epidemiologic methods used in infectious disease investigations. An emphasis will be placed on understanding the relationships between the host, the parasite and the environment as they relate disease causation. P, 596a, 596b. (Identical with ENTO 660, PHL 660, and V SC 660).

670. Chronic Disease Epidemiology (3-4) Nutritional epidemiology, pharmacoepidemiology, occupational epidemiology and environmental epidemiology. P, 596a, 596b.

680. Respiratory and Environmental Epidemiology (3) Epidemiological methods and research in respiratory diseases and environmentally related diseases, with emphasis on adult and childhood chronic lung diseases, effects of air pollution and occupational exposures. P 596a, 596b, PHL 576.

EPIDEMIOLOGY (EPI)
Arizona Health Sciences Center, Rm. 4411
The University of Arizona
PO Box 245163
Tucson, AZ 85724-5163
(520) 626-6379; FAX: (520) 626-6093
e-mail: epiadmitt@resp-sci.arizona.edu
Program: lebowitz@resp-sci.arizona.edu

Graduate Interdisciplinary Program

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

Major
Epidemiology (M.S., Ph.D.)

Minor
Epidemiology (Ph.D.)

Program Requirements
For academic program requirements for graduate degrees, 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.

515. Subspecialty
i. Cancer Epidemiology and Prevention (3) P, none; statistics helpful. (Identical with RONC 515a).

596. Seminar
a. Basic Principles of Epidemiology (3) [Rpt./1] (Identical with ENGL 596a).

596. Seminar
b. Psychosocial Epidemiology (3)

896. Seminar
a. Basic Principles of Epidemiology (3) [Rpt./1]
b. Epidemiologic Methods (3)
c. Psychosocial Epidemiology (3)

GENETICS (GENE)
Forbes Bldg., Rm. 319A
The University of Arizona
PO Box 210036
Tucson, AZ 85721-0036
(520) 621-7511; FAX: (520) 718-6

e-mail: khill@u.arizona.edu
http://eebweb.arizona.edu/genet/genweb/home.htm

Graduate Interdisciplinary Program

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

Majors
Genetics (M.S., Ph.D.)

Program requirements
For information about graduate majors and minors consult the Graduate Catalog or 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.

416. Bioinformatics and Genomic Analysis (3) (Identical with MCB 416, which is home). May be convened with 516.

423. Cytogenetics (3) (Identical with ECOL 423, which is home). May be convened with 523.

424. Theoretical Population Genetics (3) (Identical with ECOL 424, which is home). May be convened with 524.

433. Human Genetics (3) Genetic theory and technique, as applied to man; methods of analysis of genetically determined cytological and biochemical differences in individuals and populations. 2R, 3L, P, ECOL 320. (Identical with ECOL 433). May be convened with 533.

435. Evolution II (4) (Identical with ECOL 435). May be convened with 535.

473. Recombinant DNA Methods and Applications (4) (Identical with MCB 473, which is home).

501. Molecular and Medical Genetics (3) (Identical with PED 501, which is home).

509. Statistics for Research (4) (Identical with MATH 509, which is home).

512. Medical Ethics (1) [Rpt./9] Ethical issues in genetic counseling, genetics testing and gene therapy. The student will prepare a paper suitable for publication on a selected topic.

513. Quantitative Genetics (3) 97 (Identical with AN S 513, which is home).

516. Bioinformatics and Genomic Analysis (3)
666. Human Microevolution (3) [Rpt.] (Identical with ANTH 666, which is home).
670. Recent Advances in Genetics (2) [Rpt./10] Recent advances in the field of genetics. (Identical with ECOL 670).
695. Colloquium on Ethics and Socio-Ethical Issues (1) (Identical with MCB 695c, which is home).

**GERONTOLOGICAL STUDIES (GERO)**

Gerontology Program

Graduate degree
Master of Science (M.S.)

**Certificate Program**
A certificate in gerontology is available. Contact the department listed above for more information.

Program Requirements
For academic program requirements for graduate degrees, contact the Graduate Catalog and the department office listed above.

To learn more about majors, minors and other departmental information, contact the department at one of the addresses above.

413. Issues in Aging (3) (Identical with FS 413, which is home).
424. Gerontology: A Multidisciplinary Perspective (3) (Identical with PSYC 424, which is home). May be convened with 524.
427. Aging and Public Policy (3) (Identical with PA 527, which is home). May be convened with 527.
448. Perspectives in Geriatrics (2) (Identical with PHSC 548, which is home). May be convened with 548.
557. Law of the Elderly (2) For a description of course topics see 457. Graduate-level requirements include an in-depth research paper utilizing legal material and a class report on that research. (Identical with PA 557). May be convened with 457.
559. Adult Development and Aging (3) (Identical with PSYC 559, which is home). May be convened with 459.
560a-560b. Methods in Aging Research (3-3) 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. 560a is prerequisite to 560b.
570a. Human Adaptability (3) (Identical with ANTH 570a, which is home). May be convened with 470a.
576. Communicative Aspects of Aging (1) (Identical with SP H 576, which is home).
589. Health of the Older Adult (3) (Identical with NURS 589, which is home).
595. Colloquium on Ethics and Socio-Ethical Issues (1) (Identical with MCB 595c, which is home).
613. Family Issues in Aging (3) (Identical with FS 613, which is home).
Program Requirements
For academic program requirements for graduate degrees, consult the Graduate Catalog and the departmental office listed above.

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

NEUROSCIENCE (NRSC)
Gould-Simpson Bldg., Rm. 611
The University of Arizona
PO Box 210077
Tucson, AZ 85721-0077
(520) 621-8380; FAX: (520) 621-8282
e-mail: neurosci@neurobio.arizona.edu
http://arl.arizona.edu/cn/

Graduate Interdisciplinary Program

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

* Applicants accepted for the Doctor of Philosophy degree only. The Master of Science degree is offered only in rare instances when students who have already passed the M.S. evaluation requirements are unable to continue in the doctoral program.

Program Requirements
For academic requirements for graduate degrees, 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.

195H. Honors Colloquium (1) Introduction to the multidisciplinary field of neuroscience and scientific ways of knowing and the methods and standards for discovering new knowledge. Limited to honors freshmen.

282. Biology of Sensation (3) 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 SPH 282). 2R, 1D.

403a. Mammalian Systems Neurophysiology (3) (Identical with PSYC 403a, which is home). May be convened with 503a.

403b. Laboratory in Mammalian Systems Neurophysiology (3) (Identical with PSYC 403b, which is home). May be convened with 503b.


495. Colloquium
b. Developmental Neurobiology (1) [Rpt./6 units]. May be convened with 595b.

d. Brain, Behavior and Computation (1) [Rpt./6 units]. May be convened with 595d.
503a. Principles of Mammalian Systems Neurophysiology (3) (Identical with PSYC 503a, which is home). May be convened with 403a.

503b. Laboratory in Mammalian Systems Neurophysiology (3) (Identical with PSYC 503b, which is home). May be convened with 403b.

506. Neural Encoding, Memory and Computation in the Mammalian Brain (3) (Identical with PSYC 506, which is home).

524. Gerontology: A Multidisciplinary Perspective (3) (Identical with PSYC 524, which is home).

582. Topics in Neural Development (2) 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 and PSIO 582).

583. Topics in Neural Plasticity (2) (Identical with MCB 583, which is home).

584. Cellular Neurobiology (2) (Identical with CBA 584, which is home).

585. Neural Mechanisms of Behavior (2) 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) 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, 588, or consent of instructor. (Identical with BIOC 586 and MCB 586).

587. Biology of Neurological Disease (3) Emphasis on reading, discussing and presenting the primary literature pertaining to scientific investigation of neurological diseases, e.g., multiple sclerosis, stroke, epilepsy. For graduate and medical students. Contact program office before enrolling. (Identical with MCB 587).


595. Colloquium
b. Developmental Neurobiology (1) [Rpt./6 units]. May be convened with 495b.

d. Brain, Behavior and Computation (1) [Rpt./6 units]. May be convened with 495b.

695. Colloquium
a. Motor Control (2) (Identical with PSIO 695a, which is home).

e. Science, Society and Ethics (1) (Identical with MCB 695e, which is home).

700. Methods in Neuroscience (2-4) [Rpt.] Research rotations in the laboratories of faculty members within the neuroscience program. Consult neuroscience program office before enrolling.

701. Communication in Neuroscience (2) Preparation of an essay, and instruction in scientific writing. Open to majors only. P, consult neuroscience program office before enrolling.

**NUTRITIONAL SCIENCES (NUSC)**

Shantz Bldg., Rm. 308
The University of Arizona
PO Box 210038
Tucson, AZ 85721-0038
(520) 621-5630: FAX: (520) 621-9446
e-mail: nusc@ag.arizona.edu
http://grad.admin.arizona.edu/idps/nusc/nusc.html

**Graduate Interdisciplinary Program**

**Graduate degree**
Doctor of Philosophy (Ph.D.)

**Major**
Nutritional Science (Ph.D.)

**Program Requirements**
For academic program requirements for graduate degrees, 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.**

**596. Seminar**

v. Alcohol, Drugs: Biology to Treatment (3) (Identical with FCM 596v, which is home).

**605. Methods in Nutritional Research (3)** 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./6 units] (Identical with N SCS 696b, which is home).

**OPTICAL SCIENCES (OPTI)**

Optical Sciences Center, Rm. 401
The University of Arizona
PO Box 210094
Tucson, AZ 85721-0094
(520) 621-4111; FAX: (520) 621-6778
e-mail: didi.lawson@opt-sci.arizona.edu
http://www.opt-sci.arizona.edu

**Graduate Interdisciplinary Program**

**Baccalaureate degree**
Bachelor of Science in Optical Engineering (B.S.Op.E.)*

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

**Major**
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 academic program requirements for graduate degrees, 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.

**210. Geometrical Optics** (3) 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).


**342. Optical Systems Analysis** (3) 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, MATH 223, PHYS 142 or 241.

**350. Radiometry, Sources and Detectors** (3) Symbols, units and nomenclature, geometrical radiation transfer, radiometric instruments and measurement, black body radiation, practical radiation sources, noise and its effects, point and array detectors, detector interfacing. P, 226. (Identical with ECE 350).


**412. Optical Instrumentation** (3) Microscopes, telescopes, cameras, high-speed photography, diffraction gratings, fiber optics, ophthalmic instru-


434. Electrical and Optical Properties of Materials (3) (Identical with MSE 434, which is home).

470a-470b. Optics Laboratory (3-3) 470a: 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 412. 470b: 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, 470a, CR 416. (Identical with ECE 470a-470b).

473. Atomic and Molecular Spectroscopy for Experimentalists I (3) (Identical with PHYS 473, which is home). May be convened with 573.

474. Atomic and Molecular Spectroscopy for Experimentalists II (3) (Identical with PHYS 474, which is home). May be convened with 574.

487. Fiber Optics Laboratory (3) 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 587.

490. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 490, which is home). May be convened with 590.


502. Introduction to Optical Design (3) Rays and wavefronts, 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 142, or 241.


504. Mathematical Methods for Optics (3) 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, MATH 223; PHYS 142 or 241.


505L. Fundamentals of Physical Optics Laboratory (1) Laboratory in support of 501 and 505. P, 501 or 505.

506. Radiometry and Detectors (3) 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, 502.

507. Solid-State Optics (3) 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, 503, 511 or PHYS 371.


510L. Fundamentals of Applied Optics Laboratory (1) Optical systems; (2A) Gaussian optics, aberrations, radiometry, sources, detectors, optical engineering. P, 506.


512. Introduction to Fourier Optics (3) Mathematical background, convolution, the Fourier transform, linear filtering, two-dimensional operations, diffraction, image formation. P, MATH 223; PHYS 241 or PHYS 142.

512L. Mathematical Optics Laboratory (1) Laboratory in support of 504, 508 and 512. P, 504 or 512 and C SC 227 or SIE 270.

513. Optical Testing (3) Fringe analysis, wavefront aberrations and analysis, measurement of optical components, surface figure, surface finish, length, refractive index and transfer functions. P, 505, 506.


514. Aberration Theory (3) Aberration theory; geometrical image formation; diffraction; pupil, spread, and transfer functions; random wavefront perturbations; system effects; image evaluation; image processing. P, 506.

517. Lens Design (4) Fundamentals of optical system layout and design; exact and paraxial ray tracing; aberration theory; chromatic and monochromatic aberrations; use of computer programs in lens design. 2R, 6L. P, 506.


527. Holography (3) Historical background; the Gabor hologram; the hologram as a zone plate; Fresnel, image, Fourier-transform, and reflection holograms; practical holography; limitations. P, 505. (Identical with ECE 527).


531. Image Processing Laboratory for Remote Sensing (3) (Identical with ECE 531, which is home).

532. Computer Vision (3) (Identical with ECE 532, which is home).

533. Digital Image Processing (3) (Identical with ECE 533, which is home).

534. Advanced Topics in Electronic Materials (3) [Rpt./2] (Identical with MSE 534, which is home).

538. Medical Optics (3) 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, 512.


545. Nonlinear Optics (3) Review of linear optics, quantum theory of optical susceptibilities; second-order nonlinearities, second-harmonic generation, three-wave mixing; third-order nonlinearities, Kerr-type nonlinearities, self-phase modulation, two-photon absorption, phase-conjunction, self-focusing, optical solitons, nonlinear fiber optics; stimulated scattering, Rayleigh wing,
550. Fundamentals of Remote Sensing (3) 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) Units and nomenclature; Planck’s law; black bodies; gray bodies; spectral emitters; Kirchhoff’s law; flux concepts; axial and off-axis irradiance; radiative transfer; normalization; coherent illumination; radiometric instruments. P, 501.

559. Imaging and Infrared Techniques (3) 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 the Solid State (3) (Identical with PHYS 561, which is home).


568. Solid State Imaging Devices (3) Charge transfer devices, monolithic and hybrid focal planes, photoductive, 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, 507.

573. Atomic and Molecular Spectroscopy for Experimentalists I (3) (Identical with PHYS 573, which is home). May be convened with 473.

574. Atomic and Molecular Spectroscopy for Experimentalists II (3) (Identical with PHYS 574, which is home). May be convened with 474.


577. Optics of Thin Films (2) Dielectric interference films; semiconductor and metallic films; planar wave guide films; design methods for multi-layer interference filter coatings; thin film components for integrated optical circuits. P, 505.

587. Fiber Optics Laboratory (3) For a description of course topics see 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 487.

590. Remote Sensing for the Study of Planet Earth (3) (Identical with REM 590). May be convened with 490.

595. Colloquium a. Current Subjects in Optical Sciences (1) [Rpt./6 units] (Identical with PHYS 596e, which is home).

596. Seminar e. Issues in Science and Technology Policy (3) [Rpt./6 units] (Identical with PHYS 596e, which is home).


637. Principles of Image Science (3) 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, 504 or 512, 508.

656a-656b. Atmospheric Radiation and Remote Sensing (3-3) (Identical with ATMO 656a-656b, which is home).

670. Principles of Optical Data Storage (3) Optics of polarized light in systems of numeric and concentration; automated focusing and tracking schemes; interaction of light with magnetic medium; readout enhancement through multilayering; physical mechanisms of optical recording in ablative, phase-change, thermomagnetic and dye-polymer media; sources of noise in optical recording; data encoding schemes. P, consent of instructor.

674. Optical Analysis with DIFFRACT (1) How to use the DIFFRACT program for the design and analysis of optical systems that are beyond the capabilities of ordinary ray-trace programs. P, familiarity with theory of diffraction, polarized light optics, thin-film multilayer structures, and the theory of Fourier-transforms


Case Studies in Pharmacology (1) 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. Open to majors only. CR. 436.

Mechanisms of Disease (4) (Identical with VSC 423, which is home). May be convened with 523

Introduction to Immunology and Hema-

435. Introduction to Immunology and Hema-
tology (2) Molecular, cellular, and organismal aspects of immune systems protection and destruction; new strategies for pharmacologic interventions; effects of current medical treatments. Open to majors only.

Medicinal Chemistry and Pharmacology I (4) General principles of medicinal chemistry and pharmacology, and comprehensive survey of anti-infective and antineoplastic drugs.

Pharmacology II & III (3-2) 437a: 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, 436. 437b. Continuation of the comprehensive survey of the medicinal chemistry of drugs, including agents acting on the endocrine and central nervous systems. P, 436, 437a. May be convened with PHSC 537a-537b.

Pharmaceutical Analysis (3) Modern methods, test kits, and instrumentation used for qualitative and quantitative analysis of drug metabolites and biochemicals in biological samples. P, organic chemistry, CHEM 243a.

Drugs of Abuse (3) 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. P, ECOL 182. (Identical with PHCL 445). May be convened with 545.

Biochemistry (3) (Identical with PHCL 445). May be convened with 545.

Physiology Laboratory (3) (Identical with ECOL 466, which is home). May be convened with 566.

Phytochemistry (2) Introduction to chemistry, pharmacology, botanical sources, safety and efficacy issues of commonly used herbal drugs with emphasis on pharmaceutical applications. P, 437a-437b.

Pharmacology II & III (4-2) 471a: Continuation of the comprehensive survey of the pharmacology of drugs, including agents acting on the autonomic, cardiovascular, hematopoietic, and inflammatory systems. P, 436. 471b: Continuation of the comprehensive survey of the pharmacology of drugs, including agents acting on the endocrine and central nervous systems. P, 436, 471a. May be convened with 571a-571b.

Nursing Pharmacology (3) 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. Only open to nursing majors or with consent of the course coordinator. May be convened with 572.

Clinical Toxicology (2) Prevention, characteristics, diagnosis and rational management of diseases caused by drug overdose, toxic household products, poisonous plants, venomous animals, environmental and industrial toxicants. May be convened with 574.

Human Physiology (5) (Identical with PSIO 480, which is home).

Fundamentals of Industrial and Environmental Health (3) (Identical with OSH 484, which is home). May be convened with 584.

Industrial Ventilation (3) (Identical with OSH 485, which is home). May be convened with 585.

Advanced Industrial and Environmental Health (3) (Identical with OSH 487, which is home).

The Pharmacological Basis of Therapeutics (6) 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 601 and course equivalent to BIOC 462a.

Environmental Monitoring and Analysis (2-4) (Identical with OSH 502, which is home).

Insect Toxicology (3) (Identical with ENTO 508, which is home). May be convened with 408.

Statistics for Research (4) (Identical with Math 509, which is home).

Physical Exposures (3) (Identical with OSH 510, which is home). May be convened with 410.

Toxicokinetics (3) (Identical with PHSC 515, which is home).

Mechanisms of Disease (4) (Identical with VSC 523, which is home). May be convened with 423.

Introduction to Medicinal Chemistry and Pharmacology II (4) For a description of course topics see 436. Graduate-level requirements include a term paper. (Identical with PHSC 536). May be convened with 436.

Drugs of Abuse (3) For a description of course topics see 445. Graduate-level requirements include a term paper. (Identical with PHCL 545). May be convened with 445.

Drug Disposition and Metabolism (2) Principles of absorption, distribution and excretion of drugs, with emphasis on mechanisms of drug metabolism. P, 602a. (Identical with CBJO 550 and PHCL 550).

Molecular Biology of Pharmacological Agents (3) Molecular mechanism of drugs and toxins at the cellular and subcellular level, including effects on control mechanisms, cell-cell interaction, organelles, and nucleic acid and protein synthesis. P, BIOC 462a and 462b, or 411 and 511.

Toxicology and Chemical Exposures (2-4) (Identical with OSH, which is home).


Physiology Laboratory (3) (Identical with ECOL 566, which is home). May be convened with 466.

Pharmacology II & III (4-2) For a description of course topics see 471a-471b. Graduate-level requirements include an in-depth research paper on a current topic. P, 536. May be convened with 471a-471b.

Nursing Pharmacology (3) For a description of course topics see 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 472.

Clinical Toxicology (2) For a description of course topics see 474. Graduate students will complete sixteen hours experience in the Poison Information Center. May be convened with 474.

Environmental Toxicology (3) Toxicity of agricultural and industrial chemicals, with emphasis on air and water pollutants; decision-making in environmental issues and risk assessment. P, 6 units of biology and organic chemistry; 602a-602b. (Identical with ENTO 576).

Systems Physiology (5) (Identical with PSIO 580, which is home).

Immunotoxicology (3) Broad overview of the immune system, with emphasis on how chemicals affect the immune system (immunomodulation) and the role of the immune system in chemical-induced tissue injury/allergic responses. P, 602a-602b, MIC 419 or equivalent. (Identical with MBIM 582).

Fundamentals of Industrial and Environmental Health (3) (Identical with OSH 584, which is home). May be convened with 484.

Industrial Ventilation (3) (Identical with OSH 585, which is home). May be convened with 485.

Introduction to Pharmacology and Toxicology Research (1-1) 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.

Seminar c. Advanced Toxicology (1-2) [Rpt/3]b. Current Concepts in Industrial Hygiene (1) [Rpt/3]

Workshop a. Computer-assisted Instruction (1) Open to PCOL majors only.
601. Analytical Instrumentation and Techniques (2-4) 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/lab (4 units). Elective for pharmacology majors and others should take lecture only (2 units). CR, 6L, P, CHEM 325, 326.


610. Topics in Advanced Toxicology (1-3) [Rpt./3] Current developments in toxicology including: chemical carcinogenesis, mutagenesis and teratogenesis; behavioral toxicology; inhalation toxicology; pharmacokinetics; metabolism and environmental toxicology or other selected topics. P, 602a.

620. Principles of Pharmacology (3) 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.

653. Neuropharmacology (3) 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.


671. Perfusion Technology Laboratory (1) An introduction to basic extracorporeal systems. Open to majors only. (Identical with SURG 671).

672. Principles of Perfusion Techniques II (2) Introduction to basic extracorporeal techniques through discussion of blood propelting devices, heat transfer, gas transfer, bio-materials and perfusion pharmacology. Open to majors only. (Identical with SURG 672).

691. Preceptorship (3) I. Perfusion Science (1-3) [Rpt./25 units] 3 units for Fall and Spring; 1 unit for Summer Sessions. 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 within pharmacology.

695. Colloquium b. Cellular/Molecular Pharmacology (1-3) [Rpt./4 units] P, BIO 462a-462b, 568 and/or PCOL 551.

696. Seminar a. Student Research (1) [Rpt./10]

PHYSIOLOGICAL SCIENCES (PS)
The University of Arizona PO Box 245051 Tucson, AZ 85724-5051 (520) 626-2896 or 621-2785 FAX: (520) 626-2382 e-mail: pmdonag@u.arizona.edu or hollyj@u.arizona.edu http://www.physiol.arizona.edu/physiosci or http://grad.admin.arizona.edu/idps/ps/ps.html

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

Major Physiological Sciences (M.S.*, Ph.D.)

* The Master of Science degree is offered only in rare instances when individuals qualified to study for the Doctor of Philosophy degree are forced to terminate their graduate education.

Program Requirements For other 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.

PLANNING (PLAN)
Architecture Bldg., Rm. 214 The University of Arizona PO Box 210075 Tucson, AZ 85721-0075 (520) 621-9597; FAX: (520) 621-9820 e-mail: youngkl@ccit.arizona.edu http://w3.arizona.edu/~archplan/

Graduate Interdisciplinary Program

Graduate degree Master of Science (M.S.)

Major Planning (M.S.)

Program Requirements For academic program requirements for graduate degrees, 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.

110. Regional Land Use (3) 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) 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) (Identical with GEOG 379, which is home).

401. Introduction to Planning (3) Development of cities and urban planning profession; function and scope; principles and practices in community, environmental land use, transportation, and borderlands planning. Field trip. (Identical with GEOG 401). May be convened with 501.

427. Aging and Public Policy (3) (Identical with PA 427, which is home). May be convened with 527.

444. Site Planning (3) 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 544.

453. Locational Analysis (3) (Identical with GEOG 453, which is home). May be convened with 553.

456. The American City (3) (Identical with GEOG 456, which is home).

457. Statistical Techniques in Geography, Regional Development and Planning (3) (Identical with GEOG 457, which is home). May be convened with 557.

459. Land Use and Growth Controls (3) (Identical with GEOG 459, which is home). May be convened with 559.

461. Environmental and Resource Geography (3) (Identical with GEOG 461, which is home).

468. Urban Transportation Planning (3) CDT (Identical with C E 468, which is home). May be convened with 568.

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

473. Geology and the Urban Environment (3) (Identical with GEOS 473, which is home). May be convened with 573.

476. The Land Development Process (3) [Rpt./1] (Identical with GEOG 476, which is home). May be convened with 576.

481. Computer Cartography (3) (Identical with GEOG 481, which is home). May be convened with 581.

483. Geographic Applications of Remote Sensing (3) (Identical with GEOG 483, which is home). May be convened with 583.

484. Planning the Built Environment (2) (Identical with ARCH 484, which is home). May be
500. Ecosystemology for Urban Planning (3) (Identical with HWR 500, which is home).

501. Introduction to Planning (3) For a description of course topics see 401. Graduate-level requirements include an additional term paper and presentation. Field trip. (Identical with GEOG 501). May be convened with 401.

504. Public and Policy Economics (3) (Identical with PA 504, which is home).

510. Development of Regional Planning (3) Survey of the historical development of the planning profession; the evolution of American planning as a response to urbanization. Open to majors only. Credit allowed for this course or 301 but not for both. (Identical with GEOG 510).

514. Analytic Methods in Planning and Management (3) (Identical with PA 514, which is home).

523. Health and Public Policy (3) (Identical with PA 523, which is home).

527. Aging and Public Policy (3) (Identical with PA 527, which is home). May be convened with 427.

544. Site Planning (3) For a description of course topics see 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 444.

550. Metropolitan and Regional Planning (3) 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) (Identical with GEOG 553, which is home). May be convened with 453.

557. Statistical Techniques in Geography, Regional Development and Planning (3) (Identical with GEOG 557, which is home). May be convened with 457.

559. Land Use and Growth Controls (3) (Identical with GEOG 559, which is home). May be convened with 459.

561. Resource Management (3) (Identical with GEOG 561, which is home).

563. Perception of Environment (3) (Identical with GEOG 563, which is home).

565. Project Planning and Modeling (3) (Identical with C E 565, which is home).

567. Geographical Analysis of Population (3) (Identical with GEOG 567, which is home).

568. Urban Transportation Planning (3) CDT (Identical with C E 568, which is home). May be convened with 468.

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

573. Geology and the Urban Environment (3) (Identical with GEOG 573, which is home). May be convened with 473.

576. The Land Development Process (3) [Rpt. /1] (Identical with GEOG 576, which is home). May be convened with 476.

581. Computer Cartography (3) (Identical with GEOG 581, which is home). May be convened with 481.

583. Geographic Applications of Remote Sensing (3) (Identical with GEOG 583, which is home). May be convened with 483.

584. Planning the Built Environment (2) (Identical with ARCH 584, which is home). May be convened with 484.

597. Workshop a. Architecture (3-8) [Rpt.] (Identical with ARCH 597a, which is home). i. Community Design for Non-Designers (3-6) (Identical with ARCH 597i, which is home). May be convened with 497i.

605. Planning Theories and Perspectives (3) A critical examination of normative and methodological assumptions of alternative planning models, with emphasis on developing a perspective on contemporary issues. (Identical with GEOG 605).

611. Projects in Regional Planning (1-5) [Rpt./5 units] Lectures, laboratory, and field projects covering various aspects of professional practice. P, 605, 24 units toward a graduate degree in planning. Field trips. (Identical with GEOG 611).

657. Spatial Analysis (3) (Identical with GEOG 657, which is home).

660. Land Use Planning (3) Review of the principal legal devices available to implement planning decisions on community design (official map, subdivision control), the use of land (nusance, convenants and zoning) and housing needs (including urban renewal). Special attention will be paid to the significance and legal effect of a comprehensive plan and to the social and economic effects of planning decisions. (Identical with LAW 660).

665. Quick Response Transportation Planning Methods (3) (Identical with C E 665, which is home).

668. Urban Public Transportation Systems (3) (Identical with C E 668, which is home).

684. 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, CR 584.

696. Seminar b. Financing Public Services (3) (Identical with ARCH 696b).

h. Land-Use Regulation (3) (Identical with MAP 696b, which is home).

j. Environmental Planning (3) (Identical with MAP 696j, which is home).

k. Planning Administration (3) (Identical with MAP 696k, which is home).

PUBLIC HEALTH (PHL)
Arizona Health Sciences Center, Rm. 1115
The University of Arizona
PO Box 245033
Tucson, AZ 85724-5033
(520) 626-3200; FAX(520) 626-3206
http://ahsc.arizona.edu/pub-hlth/100.htm

Intra-university/Intra-agency Program

Graduate degree
Master of Public Health (M.P.H.)

Major
Public Health (M.P.H.)

Program Requirements
For information about graduate program requirements, consult the Graduate Catalog or 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.

425. Topics in Latino Health (3) (Identical with MAS 425, which is home). May be convened with 525

500. Research (3-12) [Rpt./2] (Identical with F CM 500, which is home).

502. Organization Theory and Behavioral Relations (3) (Identical with MAP 502, which is home).

511. Health Care Systems (3) (Identical with PHSC 511, which is home).

513. Pharmaceutical Economics (3) (Identical with PHSC 513, which is home).

525. Topics in Latino Health (3) (Identical with MAS 525, which is home). May be convened with 425.

527. Psychology of Sport and Exercise (3) (Identical with PSIO 527, which is home).

530. Methods in Nursing Research (3) (Identical with NURS 530, which is home).

548. Perspectives in Geriatrics (2) (Identical with PHSC 548, which is home).

553. Toxicology and Chemical Exposures (2-4) (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 Comparison of Health Care Systems (3) (Identical with F CM 571, which is home).

572. Population Dynamics and Family Planning
295H. Honors Colloquium (1-3) 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 Grades available A-B-C-D-E-I-W

391H. Honors Preceptorship (1-3) Open to select upper-division students interested in gaining teaching or practical experience in a department. (Prior consent required.)

396H. Honors Proseminar (3) A small, interdisciplinary class focusing on specialized topics.

399H. Honors Independent Study (1-3) Open to select students who wish to work independently under the supervision of an honors faculty member.

49911. Honors Independent Study 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)

102.* Introduction to Cultural and Linguistic Anthropology (3)

111.* Exploring Biological Anthropology (3)

200.* Cultural Anthropology (3)

206.* Native People of the Southwest (3)

396H. Honors Proseminar (3)

444.* Introduction to Medical Anthropology (3)

Architecture

452H. Honors Senior Project (6)

Art

393/493.* Internship (1-6)

Art History

118. Survey of Art - Renaissance to Modern (3)

Astronomy

100.* Essentials of Astronomy (3)

101L.* Astronomy Lab (1)

105a.* Universe and Humanity: Origins and Destiny (3)

109L. Exploration and Discovery in Planetary Science (1)

396H. Honors Proseminar (3)

400a.* Theoretical Astrophysics (3)

400b.* Theoretical Astrophysics (3)

Atmospheric Sciences

171.* Introduction to Meteorology and Climatology (3)

Biochemistry

105a.* Universe and Humanity: Origins and Destiny (3)

181.* Introductory Biology I (3)

182.* Introductory Biology II (4)

410.* Cell Biology (3)

411.* Molecular Biology (3)

462a-462b. Biochemistry (3-3)

Additional independent laboratory opportunities are available.

Chemical Engineering

481.* Bioreactor Engineering (3)

Chemistry

105a-105b. Honors Fundamentals of Chemistry (1-1)

106a-106b. Honors Fundamentals of Chemistry (1-2)

242a-242b. Honors Lectures in Organic Chemistry (3-3)

243a-243b. Honors Organic Chemistry Laboratory (1-1)

462a-462b.* Biochemistry (3)

Chinese

174.* Chinese Civilization (3)

Civil Engineering

214.* Statics (3)

217.* Mechanics of Materials (3)

Additional independent research opportunities available.

Communication

396H. Honors Proseminar (3)

Computer Science

433.* Computer Graphics (3)

445.* Algorithms (3)

453.* Compilers and Systems Software (4)

460.* Database Systems (3)

473.* Automata, Grammars and Languages (3)

Dance

400.* Human Movement in the Arts (4)

Ecology and Evolutionary Biology

182.* Introductory Biology II (4)

205H. Do Animals Think? (3)

206.* Environmental Biology (4)

320.* Genetics (5)

335.* Evolutionary Biology (4)

396H. Honors Proseminar (4)

479.* Art of Scientific Discovery (3)

497a.* Undergraduate Teaching Training in Ecology (1-5)

Additional independent laboratory opportunities available.

Economics

200.* Basic Economic Issues (3)

330.* Macroeconomic Institutions and Policy (3)

332.* Intermediate Macroeconomics (3)

361.* Intermediate Microeconomics (3)

406.* Introduction to Experimental Economics (3)

411.* Macroeconomic Theory and Behavior (3)

418.* Introduction to Econometrics (3)

424.* The Chinese Economy (3)

443.* International Trade Theory (3)

444.* International Financial Management (3)

460.* Industrial Organization (3)

461.* Economics of Regulated Industry (3)

480.* New Venture Markets and Industrial Analysis (4)

481.* Economics of Wage Determination (3)

Education

350†. Schooling in America (3)

Eduational Psychology

300.* Development Throughout Life (3)

301.* Child Development (3)

310. Learning in the Schools (3)

358.* Psychological Measurements in Education (3)

402.* Early Adolescent Development (3)

Engineering

102.* Introduction to Engineering (3)

196a-196b. Honors Proseminar (1-1)

English

103H. First-Year Composition (3)

104H. First-Year Composition (3)

109H. Advanced First-Year Composition (3)

251a-251b-251c.* Western Civilization (3)

295q.* 10Q4 Creativity (3)

495. Colloquium
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<tbody>
<tr>
<td>a. Honors for Juniors (3)</td>
<td>b. Honors for Seniors (3)</td>
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<tr>
<td>Family and Consumer Resources</td>
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<tr>
<td>396H. Honors Proseminar (1)</td>
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<tr>
<td>Family Studies</td>
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<td>377.* Adolescence (3)</td>
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<td>413.* Issues in Aging (3)</td>
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<td>447.* Problems in Human Development and Family Relations (3)</td>
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<td>457.* Bio-Social Determinants of Socialization (3)</td>
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<td>466.* Family Economics (3)</td>
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<td>Finance</td>
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<td>311.* Corporation Finance (3)</td>
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<td>412.* Corporate Financial Problems (3)</td>
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<td>421.* Investments (3)</td>
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<td>444.* International Financial Management (3)</td>
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<td>481.* Finance and New Venture Development (4)</td>
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<td>484.* Development of New Venture Plans (4)</td>
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<td>Fine Arts</td>
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<td>207.* Western Civilization and the Arts: The 20th Century (3)</td>
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<td>Geography</td>
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<td>102a.* Human Geography (3)</td>
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<td>106.* Geographic Perspectives on People and the Environment (3)</td>
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<td>171.* Introduction to Meteorology and Climatology (3)</td>
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<td>369.* Geography of the Middle East (3)</td>
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<td>464.* Arid and Semi Arid Lands (3)</td>
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<td>Geosciences</td>
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<td>101. Introduction to Physical Geology (3)</td>
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<td>102.* Historical Geology (3)</td>
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<td>103.* Introduction to Geology Laboratory (1)</td>
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<td>104.* Historical Geology Laboratory (1)</td>
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<td>109L.* Exploration and Discovery in Planetary Sciences (1)</td>
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<td>346.* Mineral and Energy Resources (3)</td>
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<td>391. Honors Preceptorship (2)</td>
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<td>397a.* Teaching Geosciences (2-3)</td>
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<td>German Studies</td>
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<td>376.* German-Jewish Writers (3)</td>
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<td>Higher Education</td>
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<td>Genetics</td>
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<td>Contemporary Biology in Human Affairs</td>
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<td>Cell Biology</td>
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<td>Molecular Biology</td>
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<td>462a-462b</td>
<td>Biochemistry</td>
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Additional independent laboratory opportunities available.

**Music**

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<tr>
<td>120a</td>
<td>Musical Skills and Structure</td>
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<tr>
<td>120b</td>
<td>Musical Skills and Structure</td>
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<td>396H</td>
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**Near Eastern Studies**

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<tr>
<td>369</td>
<td>Geography of the Middle East</td>
<td>3</td>
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<tr>
<td>372a-372b</td>
<td>History and Religion of Israel in Ancient Times</td>
<td>3-3</td>
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<tr>
<td>377</td>
<td>Modern Israel</td>
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**Neuroscience**

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<tr>
<td>195H</td>
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**Nursing**

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<tr>
<td>250</td>
<td>Pathophysiology</td>
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<td>255</td>
<td>Perspectives of Nursing and Health Care</td>
<td>3</td>
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<tr>
<td>279</td>
<td>Nurse as Consumer and User of Research</td>
<td>3</td>
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<tr>
<td>372</td>
<td>Nurse as Care Provider for Developing Families</td>
<td>5</td>
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<tr>
<td>383</td>
<td>Nurse as Care Provider in Mental Health</td>
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<tr>
<td>396H</td>
<td>Honors Proseminar</td>
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<tr>
<td>481</td>
<td>Nurse as Care Provider of Communities</td>
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**Nutritional Sciences**

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<tr>
<td>102H</td>
<td>Nutrition, Food, and You</td>
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**Pharmacology**

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<td>462a-462b</td>
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**Philosophy**

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<td>Introduction to Philosophy</td>
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<td>122</td>
<td>Philosophical Foundations of Western Civilization: Mind, Matter and God</td>
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<td>123</td>
<td>Philosophical Foundations of Western Civilization: Science and Inquiry</td>
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**Physics**

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<tr>
<td>141</td>
<td>Introductory Mechanics</td>
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<td>142H</td>
<td>Introductory Optics and Thermodynamics</td>
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<tr>
<td>241H</td>
<td>Introductory Electricity and Magnetism</td>
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<td>242</td>
<td>Introduction to Relativity and Quantum Mechanics</td>
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**Physiology**

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<td>Human Anatomy and Physiology I</td>
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<td>Human Anatomy and Physiology II</td>
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**Planetary Sciences**

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<tr>
<td>105a</td>
<td>Universe and Humanity: Origins and Destiny</td>
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<td>109L</td>
<td>Exploration and Discovery in Planetary Sciences</td>
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<td>112</td>
<td>Undergraduate Research in Planetary Sciences</td>
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**Plant Science**

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<td>101H</td>
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<td>410</td>
<td>Cell Biology</td>
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**Political Science**

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<tr>
<td>102</td>
<td>American National Government</td>
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<td>120</td>
<td>Introduction to International Relations</td>
<td>3</td>
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<td>140</td>
<td>Introduction to Comparative Politics</td>
<td>3</td>
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<td>250</td>
<td>Contemporary National Politics</td>
<td>3</td>
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<td>377</td>
<td>Modern Israel</td>
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<tr>
<td>396H</td>
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**Psychology**

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<tr>
<td>101</td>
<td>Introduction to Psychology</td>
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<td>205H</td>
<td>Do Animals Think?</td>
<td>3</td>
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<td>230</td>
<td>Psychological Measurement and Statistics</td>
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<td>296H</td>
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<td>374</td>
<td>Environmental Psychology</td>
<td>3</td>
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<td>396H</td>
<td>Honors Proseminar</td>
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<td>429</td>
<td>Advanced Perception</td>
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<td>491</td>
<td>Honors Preceptorship</td>
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**Religious Studies**

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<tr>
<td>144</td>
<td>Japanese Humanities</td>
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<td>372a-372b</td>
<td>History and Religion of Israel in Ancient Times</td>
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**Renewable Natural Resources**

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**Retailing and Consumer Studies**

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<td>Merchandising Analysis</td>
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<td>340</td>
<td>Consumer Concepts and Theory</td>
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**Russian and Slavic Languages**

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<td>201a-201b</td>
<td>Intermediate Russian</td>
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**Sociology**

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<td>313</td>
<td>Collective Behavior and Social Movements</td>
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<td>324</td>
<td>Sociology and Sexuality</td>
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<td>Teaching Language Arts and Communication in Elementary School</td>
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<td>323</td>
<td>Teaching Reading and Decoding in Elementary School</td>
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<td>324</td>
<td>Teaching Science and Health in Elementary School</td>
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<td>326</td>
<td>Teaching Elementary School Mathematics in a Technological Age</td>
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<td>Teaching Elementary School Social Studies in a Multicultural Society</td>
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<td>The Teaching of Secondary School Family and Consumer Sciences Education</td>
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<td>Middle School Curriculum and Teaching</td>
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<tr>
<td>394</td>
<td>Practicum</td>
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<tr>
<td>396H</td>
<td>Honors Proseminar</td>
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<tr>
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<td>The Teaching of English Language</td>
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<td>493a</td>
<td>Student Teaching in Elementary School</td>
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**Theatre Arts**

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<td>Modern Drama Through Performance</td>
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**Veterinary Science**

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**Women's Studies**

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<td>396H</td>
<td>Honors Proseminar</td>
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</table>
The Center for Middle Eastern Studies (CMES) coordinates a concentration in Middle Eastern studies for students majoring in a variety of other disciplines, including anthropology, agriculture, architecture, economics, French, journalism, Judaic studies, medicine, Near Eastern studies, and political science.

CMES offers several Foreign Language and Area Studies (FLAS) fellowships per year for both the school year and for summer intensive language study programs. CMES also offers one undergraduate language fellowship per year. Professional development workshops for graduate and undergraduate students, as well as advising with regards to study abroad programs and careers in Middle Eastern studies are also offered by the Center.

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

GENERAL DIVISIONS

Extended University
1955 E. Sixth St.
The University of Arizona
Tucson, AZ 85721
Phone: (520) 624-UofA
http://w3.arizona.edu/~uaextend/

The University of Arizona Extended University promotes lifelong learning by extending the resources of The University of Arizona through convenient educational programs.

Extended University manages off-campus courses for undergraduate and graduate credit. Extended University manages degree programs offered throughout the Evening and Weekend Campus, VideoCampus, Correspondence, and other off-campus and distance-learning resources such as:

- Individual and Professional Development Courses
- Business and Contract Education
- Certificate Award Programs
- Conference Services
- Continuing Education Units (CEUs)
- Senior Programs/SAGE
- Elderhostel
- Children's Programs/SEEK/SPEAK/LEAP
- TravelLearn
- Writing Works Center

For more information about Extended University, please contact the office at the address listed above.

Sierra Vista Campus
1140 N. Colombo
Sierra Vista, AZ 85635
Phone: (520) 629-0335 (Tucson)
(520) 626-2492 (Tucson FAX)
(520) 458-USAV (Sierra Vista)

The University of Arizona Sierra Vista Campus delivers educational services at the junior, senior, and graduate levels in southeastern Arizona. Students may take lower-division courses at any accredited college or university for credit, or take upper-division University of Arizona credit work at the Sierra Vista Campus for a complete undergraduate degree program. Students may complete entire undergraduate and graduate programs at this campus.

Admission procedures for The University of Arizona credit programs in Sierra Vista are the same as for the Tucson campus.

In addition to facilities for teaching and advising at the Sierra Vista Campus, the University maintains offices for Community Affairs, the Cooperative Extension Service, and the Southeast Arizona Area Health Education Center (SEAHEC). The campus also maintains an office at Fort Huachuca.

For more information, contact the Sierra Vista Campus at the address above.

Study Abroad
Harvill Building, Ste. 147
The University of Arizona
PO Box 210076
Tucson, AZ 85721-0076
http://w3.arizona.edu/~ciss/study.html

The Study Abroad Office, a part of the Center for Global Student Programs, offers opportunities for foreign study on a summer, semester, or year-long basis. Study Abroad counselors assist students in choosing a program, gaining admission, selecting classes, planning housing and transportation and arranging for academic credit. Costs for programs vary. Limited financial aid is available through the Study Abroad Office and foreign institutions; in addition, students qualifying for financial aid through The University of Arizona (e.g., Federal grants and loans) can normally apply those funds toward foreign study programs.

In addition to study abroad programs, the Study Abroad Office also offers exchange programs with select foreign universities; exchange programs with a number of universities in Mexico are available to University of Arizona undergraduates, as well as exchange programs in Germany and Taiwan.

For more information about Study Abroad, contact the office at the address listed above.

Guadalajara Summer School
1521 E. Helen St.
The University of Arizona
Tucson, AZ 85721
Phone: (520) 621-5137; FAX: (520) 621-8141
e-mail: janteg@u.arizona.edu

Students have the opportunity to study Intensive Spanish (1st, 2nd & 3rd years) in six weeks for up to eight units of credit, and Intensive Spanish (1st & 2nd years) in three weeks for four units of credit. A five-week session offers additional Spanish language courses, as well as course work in such areas as literature, anthropology, bilingual education, and political science. A host family program, students' travel experiences and contact with the people of Mexico assist in integrating students' studies with the real-life context of Mexico. Undergraduate and graduate credits earned are transferable to most U.S. colleges and universities. For more information, contact the Guadalajara Summer School.

MILITARY AEROSPACE STUDIES

(ML A)
South Hall, Rm. 104
The University of Arizona
PO Box 210032
Tucson, AZ 85721-0032
(520) 621-3521; FAX: (520) 621-5678

MILITARY SCIENCE

(ML S)
South Hall, Rm. 101
The University of Arizona
PO Box 210032
Tucson, AZ 85721-0032
(520) 621-1078; FAX: (520) 621-1846
e-mail: armyrotc@ccit.arizona.edu
http://w3.arizona.edu/~rotc/

NAVAL SCIENCE

South Hall, Rm. 109
The University of Arizona
PO Box 210032
Tucson, AZ 85721-0032
(520) 621-1281; FAX: (520) 798-1673
http://w3.arizona.edu/~nrotc/

Military science (Army), naval science (Navy and Marine Corps) and aerospace studies (Air Force) are open to male and female students seeking a
MILITARY AEROSPACE STUDIES

100a-100b. Air Force Today (2-2) First Year GMC* Survey of the doctrine, mission, and organization of the U.S.A.F.; U.S. strategic offensive and defensive forces; U.S. general purpose and aerospace support forces. 1R, 1L. 100a is not prerequisite to 100b.

200a-200b. History of Aviation* (2-2) Second Year GMC* Survey of the development of aviation from the advent of the air age to the present, with emphasis on military aviation and its relationship with political and economic aspects of historical world situations. 1R, 1L. 200a is not prerequisite to 200b.

300a-300b. Third Year POC**, Leadership and Management (3-3) Theory and application of leadership and management, with emphasis on human relations, motivation, communication for managers, organizational behavior and Total Quality Management (TQM) principles and processes. 3R, 1L. Consult department before enrolling.

400a-400b. Fourth Year POC**, American Defense Policy (3-3) Critical analysis of various aspects of the military in American society and its application and effects on the world political and economic environment. 3R, 1L. Consult department before enrolling.

*General Military Course
**Professional Officer Course

MILITARY SCIENCE

105a-105b. Situational Leadership I (1-1) 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 orientation. P, consent of instructor.

110. Physical Fitness Training (1) [Rpt/8] Develop an awareness of the importance of physical fitness and its life-long benefits. Enhance the individual’s physical conditioning to improve general health.

197. Workshop
a. Adventure Training I (2) Program to develop confidence, build basic leadership and military skills. Applicable to civilian and military interests. Activities include first aid, leadership principles, effective communication, basic land navigation and rappelling.

b. Adventure Training II (2) Continues program to develop confidence, build basic leadership and military skills. Applicable to civilian and military interests. Activities include leadership principles, orienteering and rifle marksmanship.

205a-205b. Situational Leadership II (1-1) 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. Tactics (2) [Rpt/4] 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] 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) 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) 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) Army ROTC rifle marksmanship program. Students fire 22cal 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.

231. Rifle Marksmanship II (1) Army ROTC rifle marksmanship program. Students fire 22cal 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) P, completion of 197a and 197b or consent of department.

b. Army Leadership Dynamics II (2) P, completion of 197a and 197b or consent of department.

300. Small Unit Leadership I (3) Topographical map interpretation; fundamentals of small-unit operations; drill and ceremony, leadership and behavior in the military environment; military planning and execution; practicum. 3R, 1L. Consult department before enrolling.

301. Small Unit Leadership II (3) Topographical map interpretation; fundamentals of small-unit operations; drill and ceremony, leadership and behavior in the military environment; military planning and execution; practicum. 3R, 1L. Consult department before enrolling.

305a-305b. Situational Leadership II (1-1) 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) 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) 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. 3R, 1L. Consult department before enrolling.

401. Officership II (3) 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. 3R, 1L. Consult department before enrolling.

405a-405b. Situational Leadership IV (1-1) 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.

496. Seminar
a. Advanced Officership (3) [Rpt/1] Consult department before enrolling.

NAVAL SCIENCE

100. Naval Laboratory (1) [Rpt/10 units] 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. 3L.

101. Introduction to Naval Science (3) 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) 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] Various top-
ics 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] USMC history, traditions, missions, land navigation, troop leading skills and small unit tactics.


202. Seapower and Maritime Affairs (3) 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) 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.

302. Navigation and Naval Operations II (3) International and inland rules of the road, relative-motion vector-analysis, formation tactics, and ship employment. Introduction to naval operations and ship handling. P, 301

310. Evolution of Warfare (3) 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./6 units] 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. Open to students of NROTC only.

401. Leadership and Management I (2) Organizational behavior and management in the context of the naval organization. A survey of management functions of planning, organizing, and controlling; and introduction to individual and group behavior in organizations; motivation and leadership.

402. Leadership Management II (2) Naval officer responsibilities in naval administration: counseling methods, military justice administration, naval human resources management, directives and correspondence, naval personnel administration, material management and maintenance. P, 401 or MAP 305.

403. Advanced Naval Laboratory for Marines (2) [Rpt./12 units] Commanding and leadership training associated with the student battalion. Includes settings which manifest conditions of stress, time management, personal accountability, decision making, and command leadership. Open to students of NROTC only.

410. Amphibious Warfare (3) 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.
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