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# NEW MEXICO STATE UNIVERSITY

## Graduate Catalog 2014-2015

[gradschool.nmsu.edu](http://gradschool.nmsu.edu)

Academic programs at New Mexico State University are available to all students without regard to age, ancestry, color, disability, gender, national origin, race, religion, sexual orientation, or veteran status.

Any item in this catalog is subject to modification at any time by proper administrative procedure.

The NMSU Graduate Catalog is available online at [catalog.nmsu.edu](http://catalog.nmsu.edu).

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# GENERAL INFORMATION

## THE UNIVERSITY

New Mexico State University (NMSU) is the state's land-grant university, serving the educational needs of New Mexico's diverse population through comprehensive programs of education, research, extension education, and public service. NMSU was founded in 1888 as Las Cruces College and later renamed New Mexico College of Agriculture and Mechanic Arts. In 1960, the constitution of New Mexico formally recognized the institution as NMSU. Throughout its history, the university has preserved many of the traditions of its land-grant origin while also increasing emphasis on the fine arts, humanities, social and natural sciences. Today, NMSU is a major institution of higher education.

## ACCREDITATION

New Mexico State University has been accredited since 1926. We are accredited by The Higher Learning Commission and are a member of the North Central Association of Colleges and Schools. The Higher Learning Commission may be contacted at Higher Learning Commission, 30 North LaSalle St., Suite 2400, Chicago, IL 60602-2504 and (800) 621-7440 or [www.ncahigherlearningcommission.org](http://www.ncahigherlearningcommission.org). The university was accredited in 1954 by the American Association of University Women. Our accredited programs are:

### College of Agricultural, Consumer and Environmental Sciences

The Department of Animal and Range Sciences is accredited by the Society for Range Management.

### College of Arts and Sciences

The Department of Chemistry and Biochemistry is accredited by the American Chemical Society.

The Master of Public Administration program in the Department of Government is accredited by the National Association of Schools of Public Affairs and Administration.

Music curricula in the Department of Music are accredited by the National Association of Schools of Music.

### College of Business

The baccalaureate and graduate degree programs in business and accounting are accredited by AACSB International-The Association to Advance Collegiate Schools of Business.

### College of Education

The College of Education is accredited by the New Mexico Public Education Department.

The Communication Disorders Program within the Department of Special Education/Communication Disorders is accredited by the American Speech-Language and Hearing Association.

The Counseling Psychology Doctorate Program within the Department of Counseling and Educational Psychology is accredited by the American Psychological Association (APA). The Master of Arts in Counseling and Guidance is accredited by the Council of Accreditation of Counseling and Related Educational programs (CACREP).

The university's teacher preparation program was accredited in 1962 by the National Council for the Accreditation of Teacher Education. This program involves several colleges and is directed by the College of Education.

### College of Engineering

The Accreditation Board for Engineering and Technology (111 Market Place, Suite 1050, Baltimore, MD 21202-4012 or by phone (410) 347-7700) has accredited baccalaureate degree curricula in chemical, civil, electrical, geological, industrial, mechanical and surveying engineering, and for the bachelor and associate degree programs in civil, electronic, and mechanical engineering technology.

### College of Health and Social Services

The Master of Public Health (MPH) in Community Health Education, Department of Health Science, is accredited by the Council on Education for Public Health.

The Department of Nursing Graduate Program is accredited by the Commission on Collegiate Nursing Education.

The School of Social Work, is accredited by the Council on Social Work Education.

## THE GRADUATE SCHOOL

A number of academic departments of the university have a long history of providing formal graduate study. The first master's degree was awarded in 1896. In 1921, the president of NMSU appointed a committee to oversee graduate study. The Graduate School was formally established in 1956 with a full-time dean. In 1956, 57 master's degrees were awarded. In 2011-2012, the following were awarded: 7 specialist in education degrees, 875 master's degrees; 102 doctoral degrees, and 20 graduate certificates. The Graduate School currently enrolls 3,375 students pursuing advanced degrees.

Fellowships, assistantships, and special loan programs are available in growing numbers and value for students who have achieved good academic records in their undergraduate and/or graduate programs. With the rapidly expanding facilities, laboratories, and library holdings, the Graduate School of New Mexico State University offers unique programs of high quality graduate study. There are 655 regular faculty.

The Graduate School mission is to facilitate the exchange of ideas and the creation of knowledge, while fostering academic excellence. The Graduate School promotes a high-quality learning environment that embraces diversity. New Mexico State University is one of the few research extensive universities that reflect Hispanic, Native American, other American cultures and the world. Our international students from Latin American, Asian, African, and European countries add to the richness of our diversity. The quality of life for our students is of critical importance to the Graduate School and NMSU. We cultivate the marriage of academic, professional, and personal skills while helping students graduate in a timely manner.

The Graduate School and University Admissions strive to provide quality services to students, faculty and staff.

## GRADUATE DEGREE PROGRAMS, SPECIALIZATIONS/CONCENTRATION, AND APPROVED MINORS

Because graduate degrees are awarded for attainment in scholarship, the requirements stated in this catalog are to be considered as minimal. The major department or the dean of the Graduate School may make additional requirements deemed necessary for each candidate. Each student's program is subject to the approval of the respective department head. Responsibility for securing approval of the proposed program of study rests with the student.

Frequent consultation with the advisor is essential to satisfactory planning and progress toward a degree.

Graduate degrees, concentrations, approved minors, and the programs in which they are awarded are listed below. Please note that these are official specializations/concentrations for each degree program. The following list supersedes those listed in the department listings of the Graduate Catalog:

**Interdisciplinary Master of Art**  
**Interdisciplinary Master of Science**  
**Master of Accountancy**  
**Master of Agriculture**

*Specialization/Concentration in:*

Agribusiness  
 Domestic Animal Biology

**Master of Applied Geography**  
**Master of Arts**  
 Agricultural Extension Education  
 Anthropology  
 Art

Communication Disorders  
 Communication Studies  
 Counseling and Guidance

*Specialization/Concentration in:*  
 Counseling  
 Educational Diagnostics

Economics

*Specialization/Concentration in:*  
 Public Utility Policy and Regulation

Education

*Specialization/Concentration in:*  
 Autism Spectrum Disorders  
 Bilingual Education  
 Bilingual/Multicultural Special Education  
 Bilingual Speech-Language Pathology  
 Curriculum and Instruction  
 Early Childhood Education  
 Early Childhood Special Education  
 Educational Learning Technologies  
 Elementary Licensure Prep  
 Language, Literacy & Culture  
 Secondary Licensure Prep  
 Special Education  
 Special Education/Deaf-Hard of Hearing  
 Teaching English to Speakers of Other Languages  
 Educational Administration

English

Government

History

*Specialization/Concentration in:*  
 Public History

Psychology

Sociology

Spanish

**Master of Arts in Teaching**

*Specialization/Concentration in:*  
 Dance  
 Math  
 Science  
 Spanish

**Master of Business Administration**

*Specialization/Concentration in:*  
 Agribusiness  
 Finance  
 Information Systems

**Master of Criminal Justice**

**Master of Fine Arts**

**Master of Fine Arts in Creative Writing**

**Master of Music**

**Master of Public Administration**

**Master of Public Health**

**Master of Science**

Aerospace Engineering  
 Agricultural Biology  
 Agricultural Economics  
 Animal Science  
 Applied Statistics  
 Astronomy  
 Bioinformatics & Computational Biology  
 Biology  
 Chemistry  
 Computer Science  
 Family and Consumer Sciences  
 Geology  
 Horticulture  
 Mathematics  
 Molecular Biology  
 Physics

*Specialization/Concentration in:*  
 Space Physics

Plant and Environmental Science

Range Science

Water Science Management

Wildlife Science

**Master of Science in Chemical Engineering**

**Master of Science in Civil Engineering**

**Master of Science in Electrical Engineering**

**Master of Science in Environmental Engineering**

**Master of Science in Industrial Engineering**

**Master of Science in Mechanical Engineering**

**Master of Science in Nursing**

*Specialization/Concentration in:*  
 Nursing Administration

**Master of Social Work**

**Specialist in Education**

Curriculum and Instruction

*Specialization/Concentration in:*

Special Education/Deaf-Hard of Hearing  
 Special Education

Reading

School Psychology

**Doctor of Economic Development**

**Doctor of Nursing Practice**

*Specialization/Concentration in:*

Adult/Geriatric Nursing  
 Family/Psychiatric Mental Health Nursing  
 Public/Community Health Nursing

**Doctor of Education**

Curriculum and Instruction

Educational Administration

Special Education

*Specialization/Concentration in:*

Bilingual/Multicultural Special Education

**Doctor of Philosophy**

Aerospace Engineering

Animal Science

Astronomy

Biology

Business Administration

*Specialization/Concentration in:*

Management  
 Marketing

Chemistry

Computer Science

Counseling Psychology

Curriculum and Instruction

Educational Administration

Engineering

*Specialization/Concentration in:*

Chemical Engineering  
 Civil Engineering  
 Electrical Engineering  
 Industrial Engineering  
 Mechanical Engineering

Interdisciplinary Doctorate

Mathematics

Molecular Biology

Nursing

Physics

Plant and Environmental Science

Psychology

Range Science

Rhetoric and Professional Communication

Special Education

*Specialization/Concentration in:*

Bilingual/Multicultural Special Education

Water Science and Management

**DUAL AND JOINT DEGREES PROGRAMS**

**Master of Art in History and Master of Public Administration**

**Master of Criminal Justice and Master of Public Administration**

**Master of Public Health and Master of Social Work**

**Bachelor of Science in Engineering and Master of Business Administration**

(5 year combined program)

**Bachelor of Accountancy and Master of Accountancy**

(5 year combined program)

**Bachelor of Science and Master of Science in Computer Science**

**Bachelor of Science and Master of Chemical Engineering**

(5 year combined program)

**Bachelor of Science and Master of Civil Engineering**

(5 year combined program)

**Bachelor of Science and Master of Science in Electrical Engineering**

(5 year combined program)

**Bachelor of Science and Master of Science in Industrial Engineering**

(5 year combined program)

**Bachelor of Science and Master of Science in Mechanical Engineering**

(5 year combined program)

**Bachelor of Science and Master of Science in Physics**

**GRADUATE CERTIFICATE PROGRAMS**

**Cultural Resource Management**

**Digital Communications**

**Digital Signal Processing**

**Electric Energy Systems**

**Finance**

**Museum Studies**

**Online Teaching and Learning Certificate**

**Public Utility Policy and Regulation**

**Systems Engineering**

**Telemetry**

**APPROVED GRADUATE MINORS AND PROGRAMS**

**Accounting**

Accounting

Information Systems

**Agricultural Economics and Agricultural Business**

Agricultural Economics

**Animal and Range Sciences**

Animal Science

Range Science

**Anthropology**

Anthropology

Archaeology

Forensic Anthropology

Native American Studies

**Applied Statistics**

Applied Statistics

**Astronomy**

Astronomy

**Agricultural Extension Education**

Agricultural Extension Education

International Agriculture Development and Extension

**Center for Latin American and Border Studies**

Latin American Studies

**Chemistry and Biochemistry**

Biochemistry

Chemistry

**Communication Studies**

Communication Studies

Communications and National Security

**Computer Science**

Computer Science

**Counseling and Guidance**

Interdisciplinary Minor in Spanish Counseling

**Curriculum and Instruction**

Bilingual Education

Curriculum and Instruction

Early Childhood Special Education

Education

Educational Learning Technologies

Reading

**Educational Leadership and Administration**

Educational Administration

**Electrical Engineering**

Computer Engineering

Electrical Engineering

**Entomology, Plant Pathology, and Weed Science**

Agricultural Biology

**Family and Consumer Sciences**

Family and Consumer Sciences

**Finance**

Finance

**Geography**

Geographic Information Systems

**Government**

Government

Public Administration

Security and Intelligence Studies

**History**

History

**Health Science**

Alcohol and Drug Counseling (interdisciplinary)

Environmental and Occupational Health

Gerontology

Public Health

US/Mexico Border Health Issues

**Hotel, Restaurant and Tourism Management**

Hotel, Restaurant, and Tourism Management

**Human Performance, Dance and Recreation**

Adapted Physical Education

Dance

Exercise Science

**Languages and Linguistics**

Spanish

**Management**

Management

**Mathematics**

Mathematics

**Mechanical Engineering**

Mechanical Engineering

**Molecular Biology**

Bioinformatics (with Computer Science)

**Physics**

Physics

**Plant and Environmental Sciences**

Horticulture

**Psychology**

Psychology

**Social Work**

Alcohol and Drug Counseling (interdisciplinary)

**Sociology**

Sociology

**Special Education and Communication Disorders**

Communication Disorders

Deaf Education

Special Education

**Women Studies**

Women Studies

**INTERDISCIPLINARY GRADUATE PROGRAMS**

Challenges facing society require an interdisciplinary approach in graduate education. To prepare the next generation of scholars, scientists and professionals, New Mexico State University offers a number of interdisciplinary degree programs. Through collaborations among departments, our faculty members have created degree programs and concentrations that will equip graduate students with research tools and professional skills to resolve complex societal problems.

Interdisciplinary programs include the integration of courses from two or more fields of study in an approved degree program, concentration or minor area of study. We offer three types of interdisciplinary degree programs as listed below. We also offer several approved concentrations and minors within traditional degree programs.

**Specialized Interdisciplinary Degree Programs**

Master of Bioinformatics and Computational Biology

Please contact the Computer Science department at

<http://www.cs.nmsu.edu/vwp/>

Master of Business Administration within the College of Business

<http://business.nmsu.edu/academics/mba/>

Professional Master of Financial Mathematics

Please contact the Department of Mathematical Sciences at

<http://www.math.nmsu.edu/>

Master of Molecular Biology

<http://molb.research.nmsu.edu/>

Master of Science in Water Science and Management

Please contact the Water Resources Research Institute

<http://wrri.nmsu.edu/index.html>

Doctor of Economic Development

<http://business.nmsu.edu/academics/economics-ib/economics-programs/ded/>

Doctor of Philosophy in Molecular Biology

<http://molb.research.nmsu.edu/>

Doctor of Philosophy in Water Science and Management

Please contact the Water Resources Research Institute

<http://wrri.nmsu.edu/index.html>

**Individualized Interdisciplinary Degree Programs**

This option allows students and faculty to design an individualized program of study that draws on more than one degree program of study that are not offered within our specialized interdisciplinary degree programs. Students receive a degree that is titled interdisciplinary master of art or science or interdisciplinary



doctorate. Please review the Graduate Catalog to review admissions and degree requirements for the master's and doctoral degree program.

Interdisciplinary Master of Art  
Interdisciplinary Master of Science  
Interdisciplinary Doctorate

### Dual Degree

Dual degree programs give students an opportunity to enroll and complete two separate master degrees. Courses and degree requirements are integrated so that full time students can complete an approved dual degree program in 3 years rather than in 4 years. Below is the list of approved dual degree programs that are offered at the graduate level.

Master of Art in History and Master of Public Administration  
<http://web.nmsu.edu/~pubhist/~pubhist.htm>  
Master of Criminal Justice and Master of Public Administration  
<http://www.nmsu.edu/~crimjust/criminal-justice-graduat.html>  
Master of Public Health and Master of Social Work  
<http://publichealth.nmsu.edu/graduate-programs/current-graduate-students/>

### Interdisciplinary Concentrations within Degree Programs

Within traditional degree programs, there are concentrations that integrate programs of study from more than one discipline. A list of approved interdisciplinary concentrations within degree programs are provided below.

Master of Agriculture with a concentration in Agribusiness  
<http://aces.nmsu.edu/academics/aeab/graduate-program.html>  
Master of Business Administration with a concentration in Agribusiness  
<http://prospective.nmsu.edu/graduate/degrees/bus/ba.html>  
Master of Science in Physics with a concentration in Space Physics  
<http://physics.nmsu.edu/SpacePhysics/index.html>  
Master of Art in History with a concentration in Public History  
<http://web.nmsu.edu/~pubhist/~pubhist.htm>

### Interdisciplinary Approved Minors

Departments offer interdisciplinary minors that include courses from more than one field of study. For a full list of approved minors, please see the Graduate Catalog.

Department of Anthropology  
Food Science  
<http://www.nmsu.edu/~anthro/>  
Center for Latin American and Border Studies  
Latin American Studies  
<http://clabs.nmsu.edu/>  
Department of Health Sciences and the School of Social Work  
Alcohol and Drug Counseling  
<http://publichealth.nmsu.edu/graduate-programs/minors/>

## ADMISSION

A student seeking admission to graduate school at New Mexico State University must hold a minimum of a bachelor's degree or an advanced degree from a regionally accredited institution. The program of preparation should be substantially equivalent in the distribution of academic subject matter to the requirements for a comparable degree at NMSU.

The required grade-point averages to be considered for admission to a master's program is explained under "Categories of Graduate Students." To be considered for admission to a doctoral program, an applicant must have a minimum grade-point average of 3.0. Some doctoral degree programs also require a master's degree or its equivalent.

**No student is officially admitted into a graduate program until a "Certificate for Admission" has been issued by University Admissions. Although University Admissions considers this certificate valid for a one year period, academic departments may require re-application if the admitted applicant does not enroll in the semester noted in the certificate.**

Formal application is required of all prospective students, including graduates of NMSU, who seek admission to a graduate program. Students must submit the "Application for Admission" as well as other supplemental documents required by the academic department. Supplemental documents may include, but are not limited to, unofficial college transcripts, test scores (TOEFL, IELTS, GRE, and GMAT), statement of purpose, writing samples, and letters of recommendation. If a student is admitted by the academic department, the student will be required to submit official transcripts, test scores, and the appropriate application fee directly to University Admissions. Other official documents may be required. Official transcripts must be sent directly from the prior colleges or university directly to University Admissions.

### INTERNATIONAL STUDENT APPLICATION FOR ADMISSION

An international student that wishes to engage in graduate studies at New Mexico State University must be proficient in the English language. To be considered for regular admission to NMSU, an international student must submit a Test of English as a Foreign Language (TOEFL) with an official score of 550 or above on the paper-based, or 79 on the internet-based exam. The TOEFL is administered by Educational Testing Service (ETS). To learn more about TOEFL, please visit their web site at: <http://www.ets.org>.

As an alternative to the TOEFL, NMSU also accepts test scores from the International English Language Testing System (IELTS). A test score of 6.5 or above on IELTS is needed for admission consideration by University Admissions. To learn more about IELTS, please visit their web site: <http://www.ielts.org/>.

Only scores from exams taken within the previous two years and reported directly from the testing service programs to NMSU will be accepted. NMSU's code for TOEFL score reporting is 4531.

The English language exam requirement may be waived for an international student who holds a degree from an accredited university in the United States, or a country or accredited university where English is the official language of instruction. (Find the list of waiver countries on the NMSU website.) An exchange student that has studied at NMSU for one academic year and has maintained a satisfactory grade-point average is exempt from the English language exam requirement when applying to an NMSU graduate program.

NMSU will accept an international student on a conditional basis who has a TOEFL or IELTS score that falls below regular admission requirements. A student who has an official TOEFL score below 550 on the paper-based or below a 79 on the internet-based or an IELTS official test score below 6.5 may be admitted conditionally by University Admissions. A conditionally admitted international student will need to take the Academic English Proficiency Placement Test offered by the Department of Communication Studies. Based on the placement results, University Admissions and ISSS may require the student to successfully complete one or more English as a foreign language course(s). If completion of one or more courses is required, the student should enroll in the first such course during his or her first semester at NMSU, or prior to taking an assignment as a teaching assistant. Faculty members can appeal decisions concerning the language training needs of a student.

A conditional admission to NMSU may require that an international student enroll in English classes through the Center for English Language Programs (CELP). Depending on a student's TOEFL or IELTS score and the Placement Test administered upon arrival, the student will be placed in the appropriate level of English instruction. The student will register for 3, 6, 9, or 12 credits for each level based on his or her English language needs. The number of credits is determined by the Director of CELP. A student conditionally admitted should be aware that the duration of his or her studies may be one, two, or three semesters longer in order to satisfy the English requirement. For more information about the Center for English Language Programs, go to the Office of International and Border Programs website at <http://www.nmsu.edu/~ip/>. A conditional student cannot work as teaching assistant; however, he or she can work as a research assistant. A conditional student can later be classified as a regular student once he or she has successfully completed the required English courses and successfully meet regular admissions requirements.

### ADMISSION TO A GRADUATE CERTIFICATE PROGRAM

The graduate certificate program of study is designed to develop or enhance a focused area of expertise. The primary purpose of a graduate certificate program is to provide specific skill training to meet employment needs locally, regionally, nationally, and globally.

A graduate certificate is a focused collection of courses, consisting of 12-18 credits, successfully completed by a student in a given discipline or a set of related disciplines. A graduate certificate is not an official graduate degree of NMSU. A student that successfully completes a certificate program at the graduate level will receive a certificate of completion statement on his or her official transcript and a formal certificate from NMSU University Admissions. A student has three years to complete a graduate certificate program.

The graduate certificate program is offered to currently enrolled degree seeking students and students that meet the admissions criteria but enroll solely to obtain a certificate. Completing courses as part of a certificate program does not guarantee admissions into a graduate degree program. Certificate only seeking graduate students who are not enrolled in a master's, educational specialist or doctoral programs will be admitted with a separate classification called "Graduate Certificate Student."

Enrolled degree seeking students must apply separately for the certificate program prior to completing half of their required degree credits.

A student enrolled in a graduate certificate program cannot transfer credits from another institution towards the completion of the certificate program. However, he or she can transfer credits taken in a graduate certificate program into a graduate degree program provided that the courses lead toward a graduate degree in the focused area of the certificate program. The number of transfer

credits will be determined by the program of study. The time limit on course transfer is 5 years after the completion of the certificate.

## APPLICATION DATES AND DEADLINES

Contact the graduate degree program for published application deadlines. If the graduate program does not publish a deadline, University Admissions encourages the applicant to apply by March 15th for fall enrollment and by October 15th for spring enrollment to be considered for financial support. University Admissions will continue to accept applications 30 days prior to the first day of classes.

## TRANSCRIPTS

An applicant is required to arrange to have one official transcript from each institution previously attended sent directly to University Admissions.

If undergraduate work has not been completed at time of application, the student must obtain a transcript complete with degree statement as soon as the degree has been granted. No application materials will be returned to the applicant.

## STANDARDIZED TESTS

Certain graduate programs may require standardized test scores for admission. An applicant may be required to take one or more of the following examinations as determined by the academic department: Graduate Record Examination, the Miller Analogies Test, the Graduate Management Admission Test. (See academic department description for required testing.)

## READMISSION

An NMSU student who has been out of school for more than two consecutive terms is required to make formal application for readmission to the institution. The application will be reviewed by the academic department and University Admissions. The application should be submitted at least 30 days prior to the start of the semester.

A student who has attended other institutions during the absence is required to submit official transcripts to University Admissions prior to the date of registration and be eligible to return to the college or university last attended. Admission status will be determined by previous NMSU academic standing. Academic performance at other institutions attended during the applicant's absence from NMSU may be taken into consideration in determining the student's admission status.

## RENEWAL OF APPLICATION FOR ADMISSION

The admission credentials for an applicant who does not register for the semester admitted are retained at University Admissions for a period of one calendar year from the date of application. At the end of this period, credentials are discarded. A student wishing to renew his or her application after the one-year lapse must submit a new application.

## DENIED ADMISSION

University Admissions or the department may deny admission if the scholastic record or program of study is judged inadequate. If denied admission by a specific academic department, the applicant may be eligible to seek "undeclared" status as described in "Categories of Graduate Students." If denied by the department, the student may wish to contact the department for additional information.

Admission may be denied to an otherwise qualified applicant when the desired program lacks resources to accommodate additional enrollment.

A student who is denied admission to one program and wishes to be considered for another program must complete a new application for the second program.

Application documents are retained by University Admissions for one calendar year.

## CATEGORIES OF GRADUATE STUDENTS

A student seeking admission to a graduate program is assigned one of the following categories based upon previous academic performance.

### Regular Student

An applicant whose scholastic record is satisfactory will be admitted as a regular student. This classification includes:

1. an applicant whose grade-point average is greater than or equal to 3.0, or a grade-point average greater than or equal to 3.0 in the last half of undergraduate work,
2. an international applicant whose grade-point average (or its equivalent) is greater than or equal to 3.0,
3. a continuing graduate student whose grade-point average is greater than or equal to 3.0, or

4. a student with prior graduate work at another institution whose minimum grade-point average is 3.0.

### Provisional Student

An applicant whose scholastic record is not satisfactory is admitted as a provisional student. This classification includes:

1. a graduate student transferring whose cumulative grade-point average is less than 3.0; or
2. an applicant whose cumulative grade-point average or grade-point average the last half of undergraduate work is less than a 3.0, but who does have a minimum grade-point average of 2.5; or
3. a beginning graduate student who has qualified for admission by taking nine graded graduate credits as a undeclared student (defined below).

A student admitted provisionally must complete the first three courses totaling 9 credits of graduate work, with a minimum grade-point average of 3.0. A provisional student who does not meet the 3.0 grade-point average after at least 9 credits of graduate work is subject to dismissal. A provisional student is prohibited from working as a teaching assistant, however can work as research assistant for one semester.

A provisional student can be employed for one semester as a grader. Academic departments wishing to hire a provisional student as a grader must submit an official letter requesting permission from the Graduate School.

### Undeclared Graduate Student

An applicant who has not decided on a specific graduate degree program and who has an undergraduate minimum grade-point average of 2.5 may be considered for admission as an undeclared master student. An undeclared master student is restricted to transferring 9 hours graduate credit to a degree program. An applicant admitted as an undeclared master is not eligible to receive a graduate teaching assistantship. Undeclared students are not eligible to receive federal or state financial aid.

Transferring from undeclared master to a degree program requires a new Application for Admission. If the student has nine or more graded graduate credit hours, the cumulative minimum grade-point average must be 3.0 for the request to be considered. If the student transferring to a degree program has fewer than nine graded graduate credits and the undergraduate grade-point average is between 2.5 to 2.9 the recommendation for admission will be provisional student status. If the undergraduate grade-point average is 3.0 or greater, the admission recommendation will be regular student status.

International students with an F-1 visa are not eligible for undeclared master status.

A student who has been denied admission to a graduate program by the department may enroll as an undeclared master in the college of interest and can complete up to nine hours graduate credit (exclusive of directed readings and independent study) with a grade-point average of 3.0 or above. Course restrictions placed by the graduate department may constrain enrollment by an undeclared student. An undeclared master student is restricted to transferring 9 hours graduate credit with a grade B or better into a degree program.

Academic advising for an undeclared master student is obtained from the Graduate School or the academic department.

### Graduate Study by University Seniors (Senior Petitioner)

An undergraduate student who is in the last 15 graded credit hours of a bachelor's degree program and who is completing all requirements for graduation, may take up to 6 credits of graduate level courses numbered from 450 through 598 for credit toward an advanced degree, with the approval of the appropriate academic department, college dean and the graduate dean.

The student must (1) have a cumulative grade-point average of 3.0 or higher or have a grade-point average of 3.0 or higher in the last 45 credits completed; (2) complete the Senior Petitioner Form at University Admissions 30 days prior to registration; (3) if accepted as a senior petitioner, the student must file a Senior Petitioner Course Form for each course by the deadline to add courses for the semester in which the course is to be taken and obtain approval from the graduate instructor, and the undergraduate advisor; and (4) register for the course at University Admissions.

The combined total of graduate and undergraduate courses for the semester may not exceed 17 credits. Senior petitioners must consult with an admission's representative at University Admissions.

As a senior petitioner in a graduate program, the course(s) will become part of the graduate record and will not be used in the calculation of the student's undergraduate grade-point average or credit hours.

For students enrolled in a joint bachelor's and master's degree program see the subsection "Transfer of Undergraduate Credits to an NMSU Graduate Program" in the "Requirements for Enrolled Students" section (p. 18) of the Graduate Catalog.

### Nondegree Admission

Non-degree admission is designed to meet the needs of an applicant who does not wish to pursue a degree or who has not yet completed the application process to a specific department. Academic advising for non-degree students is obtained from the academic department. No more than 9 hours graduate credit earned in non-degree status may be transferred to a graduate degree program. NMSU only recognizes graduate credit for non-degree work from The University of New Mexico (UNM). Transfer credit is restricted to 6 credits with the approval of the appropriate department, the college dean, and the graduate dean. A student classified as non-degree is not eligible to receive financial aid, student employment, or institutional tuition waivers; nor is he or she eligible to participate in student government or intercollegiate athletics; and is not eligible to receive benefits from veterans' programs.

### Visiting Student

A visiting student is a student taking graduate credit to transfer to his or her parent institution. An "Application for Admission" to University Admissions must be submitted 30 days prior to registration. The student is required to submit unofficial transcripts; however, the academic department must concur and admit a visiting student. Visiting students are not eligible for undeclared status or for graduate assistantships.

### Graduate Certificate Student

A student enrolled in a certificate program is not enrolled in any graduate degree seeking program at NMSU. The status will change if he or she applies and is accepted to a graduate degree program. A student enrolled in a graduate certificate program is not eligible for a graduate assistantship.

### Out-of-State Students and Legal Jurisdiction

By applying for admission/enrollment, both the student and parents agree that New Mexico law prevails and all litigation will be held in New Mexico federal court or state court in Dona Ana County, New Mexico.

## TUITION, FEES AND OTHER EXPENSES

All costs are given for one term. The University reserves the right to change any of the charges without notice.

### GRADUATE TUITION AND REQUIRED FEES

	New Mexico Residents	Non-Residents
<b>All Terms</b>		
15+ credits	\$3,543.00	\$10,584.00
7-14 credits, per credit	267.90	816.20
1-6 credits, per credit	267.90	267.90

### ADDITIONAL FEES

Graduate admission application fee	\$40.00
International student admission application fee	50.00
International student orientation fee	50.00
Distance education course fee (per credit)	35.00
ASNMSU Fee (Fall / Spring 1-11 credit enrollment)	33.50
ASNMSU Fee (Summer 1-8 credit enrollment)	12.40
Graduate Wellness/Fitness fee—(Fall/Spring 9-11 credits)	79.65
Course examination fee (per credit)	267.90
Certificate degree fee	10.00
Master or Doctorate degree fee.	35.00
Degree application late filing fee.	25.00

Thesis binding fee (3 copies)	38.50
Late Registration Fee Base Cost	25.00
Thesis binding molecular biology / astronomy majors (4 copies)	48.50
Dissertation binding fee (3 copies)	38.50
Dissertation molecular biology / astronomy majors (4 copies)	48.50
Engineering Technology Fee	145.00

### Course Fees (fees assessed per course)

See each term's Registration Guide for a list of courses with additional fees. Applied Music courses - see Music section of catalog.

### Mandatory International Student Fees

All international students are required to have Student Health Center coverage and to purchase the student accident and health insurance unless otherwise covered by comparable health and accident insurance approved by International Student Services. International students will be required to purchase health insurance for spring and summer during spring registration unless they have applied for spring graduation. All International graduate assistants are required to have supplemental health insurance. (See optional fees below.)

### OPTIONAL FEES

#### Wellness/Fitness Fee - Rates may increase for 2014-2015

The Wellness/Fitness fee is included in tuition for full-time students at the Las Cruces Campus. Options for part-time students enrolled at Las Cruces Campus include:

	Wellness	Fitness
Term pass for student enrolled in 6-11 credits	\$79.00	\$40.00
Term pass for student enrolled in 1-5 credits	105.00	53.00
Single visit for student enrolled in 1 – 11 credits	35.00	5.00

The Wellness fee grants access to the Student Health Center with charges accruing for medications, lab work, testing or procedures. The Fitness fee grants access to the Student Activity Center.

### Supplemental Health Insurance

Students who have access to the Student Health Center may choose to purchase a commercial insurance policy endorsed by NMSU. This insurance is intended to supplement the Student Health Center service. Dependent coverage is not available through NMSU but may be purchased directly from the insurance company; however, dependents of students are not eligible to use the Student Health Center. Insurance information is available at <http://www.uhcsr.com>.

### Graduate Assistant Health Insurance Benefit Program

New Mexico State University offers health insurance to graduate assistants including teaching assistants, research assistants and graduate assistants employed by student services and other support units on campus. The University covers seventy percent of the cost of the health insurance plan and graduate assistants cover the remaining thirty percent. To be eligible for the Graduate Assistant Health Insurance Benefit Program, graduate assistants must:

1. work at least 10 hours per week for an academic term (.25 FTE) in a salary position of NMSU;
2. be a full-time graduate student enrolled in at least 9 graded credits from NMSU;
3. be in good academic standing; and
4. complete the online NMSU Graduate Assistant Health Insurance Benefit Program enrollment form.

NMSU's Graduate Assistant Health Insurance Benefit Program is managed by United Healthcare Student Resources. UHCSR is a market leader in student insurance programs. For more information, visit their website, <http://www.uhcsr.com>. Spouse and children coverage can be obtained by enrolling in a separate plan with UHCSR (see their web site for enrollment information).

International graduate assistants are required to have health insurance. International graduate assistant students can enroll in the Graduate Assistant

Health Insurance Benefit Program listed above. For more information, please see <http://hr.nmsu.edu/benefits>.

### Housing Services

See the "Resources For Students" section (p. 27) for room descriptions, accommodations, application process, deposit requirement, regulations, and eligibility.

For current rate information, please visit our website at [www.nmsu.edu/~housing](http://www.nmsu.edu/~housing).

### Dining Services

See the "Resources for Students" section (p. 27) for meal plan descriptions, application process, deposit requirement, regulations, and eligibility.

For current rate information, please visit our website at <http://dining.nmsu.edu/>

### Late Registration Penalties

A late registration penalty of \$25 will be assessed for course registrations processed during a term's late registration time period. Failure to make scheduled payments with the University Accounts Receivable on due dates may result in additional liability.

### PAYMENT OF CHARGES

By enrolling in classes at NMSU, a student makes a financial commitment to pay the tuition and fee charges associated with that enrollment. The enrollment action constitutes a financial obligation between the student and NMSU and all proceeds of this agreement will be used for education purposes and constitutes an education loan pursuant to 11 U.S.C. § 523(a) (8). Terms and Conditions of Course Registration are posted on the NMSU website and available in each term's registration guide. Payments can be made by mail, web, telephone, or in person at the University Accounts Receivable. Cash, checks, money orders and limited types of credit cards are accepted. Term charges can be paid in full or paid by using a payment plan. For payment plan options visit the NMSU website. Fees vary based on the plan. All financial aid received must be paid towards balances owed. Additional penalty charges may be assessed for failure to make payments when due. The University reserves the right to deny a payment plan to any student who has a poor credit rating or who has been negligent in making payments to the University for previous debts. Course reservations may be cancelled if payment arrangements for past due debts are not completed by the deadlines as outlined in a term's registration guide. Academic credits, transcripts, and diplomas will be withheld until all financial obligations are paid. Students are prohibited from registering for a term until all previous debts due to the University are paid in full.

### TUITION ADJUSTMENTS, REFUND, AND FORFEITURES

Any student officially dropping or withdrawing from a course or courses during a term may receive tuition and fee adjustments as outlined in the current registration guide. No tuition adjustments will be made on classes of less than five weeks' duration. **Non-attendance does not constitute official course drop or withdrawal. All charges due to the University must be paid before refunds will be permitted.**

In cases of academic or disciplinary suspension, eligibility for tuition adjustments will depend on the conditions of the suspension and will be entirely at the option of the University. Should unforeseen circumstances beyond the reasonable control of the University result in curtailing classes, closing residence facilities, or otherwise withdrawing services that are a normal function of NMSU, refunds of any nature will be at the discretion of the University administration.

Residence hall rentals and dining hall charges may be refunded in accordance with schedules adopted by these departments.

### DISHONORED FINANCIAL TRANSACTIONS – CHECKS, CREDIT CARDS, ACH TRANSACTIONS

The University charges a penalty on all dishonored cash instruments. Personal checks will not be accepted from students who have had previously dishonored checks.

### ESTIMATING OTHER EXPENSES

In addition to the direct costs stated above, other expenses per term may include such items as textbooks and supplies (estimated at \$500) and personal expenses (estimated at \$660).

### COOPERATIVE EDUCATION

Students participating in the Cooperative Education Program who receive academic credit pay the same tuition and fees as regularly enrolled students. Work phase students who are assigned to campus or nearby off-campus workstation may purchase the student wellness/fitness optional fees the same as a part-time student enrolled in 1 to 5 credits.

### RESIDENT/NONRESIDENT STATUS

Resident or nonresident status is determined in accordance to a uniform definition established for all New Mexico institutions by the Higher Education Department, State of New Mexico. The NMSU Registrar's Office administers residency.

Active duty members of the Armed Forces, their spouses and minor children not otherwise entitled to claim residency, are eligible for tuition payment at the resident student rates upon presentation of a certification from their commanding officer of assignment to active duty within New Mexico. Certification is required upon initial registration.

Information on the following programs may be obtained from the Office of Admissions:

- Residents of Texas who reside in Texas within 135 miles of the NMSU-Las Cruces campus may be eligible for a special tuition rate for the Las Cruces campus only.
- American Indian nations, tribes and pueblos. All out of state members of an American Indian nation, tribe, and pueblo, located wholly or partially in New Mexico, regardless of the residence of the member prior to acceptance at a post-secondary educational institution shall be eligible to pay the in-state tuition rate. These include members of the following tribes or pueblos: Jicarilla Apache, Mescalero Apache, Taos pueblo, Picuris pueblo, Ohkay Ovingeh, Santa Clara pueblo, Nambe pueblo, Navajo tribe, San Ildefonso pueblo, Pojoaque pueblo, Tesuque pueblo, Cochiti pueblo, Jemez pueblo, Santo Domingo pueblo, San Felipe pueblo, Zia pueblo, Santa Ana pueblo, Sandia pueblo, Isleta pueblo, Laguna pueblo, Acoma pueblo, Zuni pueblo, and the Ute Mountain tribe.
- The Western Interstate Commission for Higher Education (WICHE) allows students in western states to enroll in college programs at a special tuition rate. Students interested in dentistry, veterinary medicine, occupational therapy, optometry, osteopathy, podiatry, forestry, graduate library studies, graduate nursing education, and public health should see the paragraph on Western Interstate Commission for Higher Education in the "Resources for Students" section.

### STUDENT ACCIDENT AND SICKNESS INSURANCE

All full-time students may purchase an additional accident and sickness policy to supplement the Student Health Center service. Part-time students enrolled for 6 or more credits may purchase the additional accident and sickness policy provided they have paid the wellness fee.

## FUNDING OPPORTUNITIES

In selecting individuals for any assistantship or fellowship, and in the administration of appointments, New Mexico State University will not discriminate on grounds of age, ancestry, color, disability, gender, national origin, race, religion, sexual orientation, or veteran status.

The Graduate School offers awards, assistantships, and fellowships to qualified graduate students. All awards require faculty nominations. Current students and admitted students can request the faculty or the department head to nominate them for the awards of the Graduate School.

Below is a summary of those awards. For detailed information and the application process and deadlines please consult <http://gradschool.nmsu.edu/gradschool/announcements.html>.

Most graduate assistantships offered by New Mexico State University are awarded by the students' academic department. We suggest that you contact the department of study to receive information on graduate assistantships, fellowships, and internships. The student must be admitted to the Graduate School before a request for an assistantship or fellowship will be considered by the department or the Graduate School.

The university limits the number of years a student may be supported on funds from the state of New Mexico. A student should check Graduate Assistant Employment Guidelines of the Graduate School at:

<http://gradschool.nmsu.edu/ga/index.htm>. Departments may place additional limitations on the years of support.

### AWARDS OF THE GRADUATE SCHOOL

Information on the Graduate School awards can be found at <http://gradschool.nmsu.edu/gradschool/announcements.html>.

### Merit-based Enhancement Fellowships for Current Graduate Assistants

To help departments reward outstanding graduate assistants, the Graduate School offers Merit-Based Enhancement Fellowships to graduate assistants who are engaged in the teaching or research mission of New Mexico State University. The amount of the awards is \$4,000 for an academic year.

Nominations must come from faculty and are due at the Graduate School on March 1st. Please contact the dean of Graduate School if you have any questions, (575) 646-5745 or lacey@nmsu.edu.

### Outstanding Graduate Assistantship Award

We also offer Outstanding Graduate Assistant awards of \$2,000 to recognize the contributions of graduate assistants to the teaching and research mission of New Mexico State University. The awards allow faculty to show appreciation for the excellent work of graduate assistants. Current graduate assistants must be nominated by their faculty to be considered for the awards.

### The Mike Watts Outstanding Leadership Graduate Fellowships of \$2,000

The Graduate School encourages faculty to nominate outstanding graduate assistants for a Mike Watts Outstanding Leadership award. The fellowship is made available through the generosity of the family and friends of Michael E. Watts. The Watts Fellowships are available to graduate assistants from any area of Graduate School.

If awarded, the fellowship will be paid as salary supplement to the regular assistantship. Please note that for those students who also receive financial aid, the fellowship can have an impact on the amount of financial aid received. Nominations from faculty are due March 1st. The Graduate School will review the applications and select recipients.

### Graduate Assistant Tuition Fellowships

The Graduate School awards tuition fellowships to graduate assistants to help departments recruit outstanding graduate students to their programs.

Master's degree students will receive up to 2 years of support and doctoral degree students will receive up to three years of support. In order for students to qualify for a second and third year of support, they must maintain their status as graduate assistants for the duration of the tuition fellowship period. These awards are for students receiving 10 hour and 20 hour graduate assistantships. The tuition fellowships do not include fees.

Nominations from faculty are due to the Graduate School by March 1st.

Please contact the dean of the Graduate School if you have any questions, (575)-646-5745 or lacey@nmsu.edu.

### McNair Graduate Assistantships

The Graduate School wishes to support and recognize the success of the McNair program by offering several McNair Graduate Assistantships for one academic year with a match of one year from a department. Nominations from faculty are due to the Graduate School March 1.

### State of New Mexico Department of Higher Education (NMHED) Graduate Scholarship Programs

The State of New Mexico Higher Education Department Graduate Scholarship Program offers Graduate Fellowships/Assistantships for women and minority persons who are citizens or permanent U.S. residents and who are a first year student or a student that is beginning graduate studies in any graduate department at the master's or doctoral level at NMSU. The selected student must be admitted to a graduate program prior to applying for this award.

NMHED fellowships carry stipends of \$7,200 per annum and matched with half-time (10 hours per week) teaching assistantship provided by the student's department for a total award of \$15,800.

The total amount of this award is based on the salary for a 20 hour graduate assistantship and usually increases from year to year, based on raises awarded by the State of New Mexico.

Fellowships are available for two years for master's students and four years for doctoral students. One of the NMHED fellowships is, when possible, designated for a McNair Scholar. The nomination process can be found at: <http://gradschool.nmsu.edu/>.

In order for the student to establish financial need, students must complete a Free Application for Federal Student Aid (FAFSA) form available in the Financial Aid Office. This form is not to be returned to the Graduate School. The form must be mailed to the Federal Student Aid Programs address listed on the application or submitted via computer at the Financial Aid Office. The results will be sent to the student and the Financial Aid Office. **Students must have a complete file and have been approved for financial aid to be considered for this fellowship.** Preference will be given to those students that have a current FAFSA form on file at the NMSU Financial Aid office.

Nominations from faculty should be sent to the Graduate School as soon as possible but no later than March 1st.

### Diversity Graduate Assistantships

The diversity awards are allocated to departments on a competitive basis to help increase the diversity and quality of the student body. Matching support is required to win one of these awards for your student. The diversity award can be used to recruit domestic students. Please note that the award is for an academic year. Departments will need to commit funds to the selected student for at least one additional semester, or preferably a year.

**The selected student must be admitted to the department prior to applying for the diversity award.**

The Graduate School will accept applications from faculty until March 1. Please direct inquiries to the dean of the Graduate School at (575) 646-5745 or lacey@nmsu.edu.

### Fellowships

The Graduate School maintains a Fellowship and Grant Information Web page <http://gradschool.nmsu.edu/fellowships/> which provides a database of grants, fellowships, and assistantships for graduate students. The university offers a number of fellowships available to both new and continuing students.

### Assistantships

Graduate assistantships in teaching and research are available primarily through the department in which the student is enrolled. Eligibility for teaching assistantships includes (a) acceptance by and subsequent registration in the Graduate School and academic department, (b) classification as a "regular" graduate student, (c) enroll in and successfully complete nine graded credit hours each semester and (d) maintain a 3.0 grade-point average. Full time status for graduate students is enrollment in nine graded credit hours.

Graduate students accepted on a provisional basis cannot serve as teaching assistants. However, they can serve as research assistants. Eligibility includes (a) acceptance by and subsequent registration in the Graduate School and academic department, (b) classification as a "provisional" graduate student (c) enroll in and successfully complete nine graded credits hours, and (d) funded on research projects of the faculty of NMSU. Provisional students can also be hired as graders for one semester. The department must submit a formal letter to the Graduate School requesting that the student be allowed to work as a grader. The Graduate School can approve or deny the request.

A student seeking appointment as a teaching assistant will be required to demonstrate proficiency in communication skills necessary for satisfactory service in the classroom. All graduate students given an assistantship must attend a mandatory orientation offered by the Graduate School. Departments may also require students to complete workshops/orientations in order to qualify for assistantships.

All international students seeking a teaching assistantship must demonstrate proficiency in English and competency in pedagogy. Prior to the first semester in which the teaching assistantship is to be received, international students must undergo the NMSU International Teaching Assistant (ITA) screening administered by the Department of Communication Studies on behalf of the Graduate School. Students who pass the screening exam are immediately eligible for assignment to a teaching assistantship. Those who do not pass the screening exam must enroll in and satisfactorily complete COMM 485 before being eligible for a teaching assistantship. To aid those incoming international students who plan to teach in the fall semester, COMM 485 is offered in the summer. International graduate students wishing to hold a teaching assistantship should check with their department to determine when they should arrive on campus to meet the screening requirement. International students who don't pass the screening exam may be eligible to serve as graders for their academic departments. The academic departments must receive approval from the Graduate School in order to hire these students.

The duties involved normally require about 20 hours per week (full time fall and spring) of the student's time. By accepting an assistantship, the student is obligated to enroll in and maintain enrollment in a minimum of nine graded credits per semester, but not more than 15 per semester. A graduate assistant may not enroll for more than 15 credits for each fall and spring semesters. Courses taken for audit or undergraduate deficiencies are counted in the maximum total course load; audited classes and courses under 450 cannot be used for the minimum GA course load requirement.

### GRADUATE ASSISTANTS SALARIES AND TAX WITHHOLDING GUIDELINES

Internal Revenue Service tax withholding guidelines require undergraduate and graduate students employed through New Mexico State University to maintain at least six credit hours of course work during the fall and spring semesters and three credit hours of course work for summer sessions to be eligible for the student FICA tax exemption. Student employees who do not meet this requirement during any given pay period will be subject to Social Security taxes at the rate of 6.2% and Medicare taxes at the rate of 1.45%. Salaries for graduate assistants in 2011-2012 are as follows:

Level	Salary
I	\$16,100
II	\$16,500
III	\$16,900

Level I applies to students pursuing a master's degree. Level II applies to students (a) pursuing the education specialist or doctoral degree who have passed the qualifying exam or (b) who have a master's degree in the same or cognate field and the recommendation of the head of their major department. Level III applies to a doctoral student who has passed the comprehensive examination.

Graduate assistants employed at least ten hours per week will be given in-state tuition during the first 12 months of tenure if the hiring process is approved by Human Resources prior to census date (stated by the Office of the Registrar as the third Friday of the semester each spring and fall semester).

If New Mexico resident status has not been established by the time of any reappointment, the graduate assistant may be subject to nonresident tuition rates.

Applications for state residency may be obtained in the Office of the Registrar, located in the Educational Services Building.

### SOCIAL SECURITY NUMBERS IN STUDENT RECORDS

As required by law, social security numbers are collected from prospective and current students who 1) plan to seek employment on campus or 2) wish to receive financial aid. In addition, the university is mandated by federal tax regulations to provide tuition and fee payment information to the student and the Internal Revenue Service, so that applicable educational tax credits may be computed. The social security number will be necessary to submit this tax reporting. The social security number is a confidential record and is maintained as such by the university in accordance with the Family Educational Rights and Privacy Act.

In order to be employed by New Mexico State University all students must have obtained a social security number within eight weeks of being hired or risk losing their assistantship.

When an official social security number is issued to an international student, it is the student's responsibility to inform Human Resources or the Office of the Registrar as soon as possible.

### HOURLY WORK

Eligibility for student payroll requires that a graduate student (a) be admitted to the Graduate School as well as to a department, (b) have a GPA of 3.0, and (c) be enrolled for at least nine graded credits. A student may not work more than 20 hours per week during the academic year. Students should check with Student Employment Services, Garcia Annex, Room 204, for current job postings.

Students not classified as residents of New Mexico but working at an hourly rate are not eligible to receive in-state tuition.

## FINANCIAL AID

The mission of New Mexico State Financial Aid and Scholarship Services is a commitment to providing a high level of service to support students in achieving their academic goals by helping to remove the financial barriers to college attendance. The office's mission is to offer coordinated delivery of comprehensive student aid programs that are supportive of the recruitment and retention of academically talented and diverse students. Although primary responsibility for educational cost rests with the student and his or her family, NMSU, the federal government, and the state of New Mexico all contribute to assist students pursuing higher education.

University Financial Aid and Scholarship Services administers a broad spectrum of loan, grant, scholarship and work-study funding in an attempt to meet the financial needs of the university's students. Students and spouses, if applicable, are expected to contribute from their own assets and earnings, including appropriate borrowing against future income. All information provided to University Financial Aid is regarded as confidential.

Students applying for financial aid complete a "Free Application for Federal Student Aid" (FAFSA) designed to determine, in accordance with state and federal guidelines, the difference between what the student or family is expected to contribute and the cost of attending NMSU. Among the factors that determine the Expected Family Contribution (EFC) are (1) annual adjusted gross income as reported to the Internal Revenue Service; (2) savings, stocks, or bonds; (3) other assets in the form of a business, farm, or real estate; (4) nontaxable income and benefits; and (5) student's prior year income and assets. Students applying for

financial aid should complete a FAFSA by visiting <http://fa.nmsu.edu> or <http://fafsa.ed.gov/>.

Please refer to <http://fa.nmsu.edu/> for more information on financial aid. A complete listing of programs and policies is available at <http://fa.nmsu.edu/>.

### GENERAL ELIGIBILITY REQUIREMENTS

To receive financial aid a student must:

- Be a U.S. citizen or an eligible non-citizen.
- Enroll at least half time (as defined by federal regulation); this applies to most Title IV programs.
- Enroll in an eligible major.
- Enroll in eligible courses.
- Maintain satisfactory academic progress defined by federal regulations.
- Not be in default on any federal educational loans or owe a refund on a grant.
- Sign a statement of educational purpose, stating that the money will be used toward educational purposes only.

### SOURCES OF FINANCIAL AID

**Grants and scholarships** are often called "gift aid" because they are free money, that is, financial aid that doesn't have to be repaid. Both grants and scholarships can be need, non-need or merit based. Grants and scholarships can come from the Federal government, the state government, a college or career school, or a private or nonprofit organization. Students may do research to apply for any grants or scholarships they might be eligible for, and should be sure to meet application deadlines! Occasionally, a student might have to pay back part or all of a grant if, for example, they withdrew from school before finishing an enrollment period such as a semester. The U.S. Department of Education offers Teacher Education Assistance for College and Higher Education (TEACH) Grants to graduate students attending four-year colleges or universities.

**Federal Direct Loans** are long-term loans available to graduate students. Students receiving an unsubsidized Federal Direct Loan must complete an entrance counseling session by visiting <http://studentloans.gov> before NMSU will disburse funds. In addition, students must complete an exit counseling session upon graduation or withdrawal from the University. Repayment of a Direct Loan begins six months after graduation or six months after enrollment drops below half time. The interest rate on new Direct Loans vary according to the year the loan is disbursed. More information will be available at the time the loan is made.

**Federal Perkins Loans** are available to graduate students with financial need and are long-term, low-interest loans with a 5% fixed interest rate. In order to receive a Perkins Loan, the student must complete an entrance counseling session by visiting <http://studentloans.gov> before NMSU will disburse funds. Additionally, a Perkins Loan must be repaid according to Federal guidelines. Repayment of Federal Perkins Loans begins nine months after graduation or nine months after enrollment drops below half time.

**Work-Study Programs:** The Federal Work-Study Program provides employment opportunities for selected students with demonstrated financial need. The New Mexico Work-Study Program also provides employment opportunities for students; however, only New Mexico residents are eligible to participate in the program.

### FINANCIAL AID AWARDS

All financial aid awards are based on information provided by the student and spouse, if applicable, availability of funds, and eligibility requirements. Any award may be revised based on changes in enrollment, cost of attendance, outside resources, family contribution, or failure to meet satisfactory academic progress. Withdrawals or reductions in enrollment may affect an award or any future awards. Financial aid will not pay for audited courses or for classes in which credit will not be received.

### FINANCIAL AID SATISFACTORY ACADEMIC PROGRESS

Federal regulations require that financial aid recipients meet certain academic standards to be eligible for federal financial aid. To ensure that financial aid recipients are making satisfactory academic progress, academic transcripts are reviewed at the end of each term to determine eligibility for the next term. All terms of attendance are reviewed, including periods in which the student did not receive financial aid. All transfer work is taken into account when satisfactory progress is reviewed. In addition, repeated courses are included in the academic progress calculation.

**Grade Point Average:** Graduate students must maintain a cumulative grade point average of at least 3.0 (a B average). Grade point values are: A = 4.0, B = 3.0, C = 2.0, D = 1.0, F = 0. Grades of I, CR, PR, NC, W, U and AU are not calculated in the GPA.

**Completion Rate:** Students must complete a minimum of 70 percent of all course work (registered credit hours) attempted at NMSU. Any course with a

grade of Withdraw (W), Incomplete (I), Failure (F), Audit (AU), or No Credit (NC) is considered attempted but not completed. Repeats are considered attempted credits.

**Maximum Time Frame:** Graduate students must complete their program within 150 percent of the credit hours required by the program. Students who have reached the maximum allowable time will be suspended from receiving financial aid. Total attempted hours including repeated courses and transfer course work are included in the student's maximum time frame calculation.

### FINANCIAL AID SUSPENSION

Students are suspended from receiving financial aid if they do not meet satisfactory academic progress standards. Students on financial aid suspension will not receive any form of federal or state financial aid (grants, loans, work study). When all standards of satisfactory progress are met, the student may contact their Financial Aid Advisor to have their financial eligibility reinstated. Please visit <http://fa.nmsu.edu/contact-us> for a list of personnel.

### THE APPEALS PROCESS

Students suspended from financial aid may appeal the suspension if there are mitigating circumstances affecting their progress. Students who would like to appeal the suspension must submit an appeal form and all required documentation to the University Financial Aid. A committee will review the appeal and may grant reinstatement of financial aid based on mitigating circumstances that directly contributed to deficient academic performance. Appeals are evaluated on a term-by-term basis.

## REGISTRATION

Graduate students may register in person at University Admissions or on the Web at <https://my.nmsu.edu>. No person will be officially registered unless formally admitted to the Graduate School.

### CHANGE OF ADDRESS

In order to assure accurate student records, **students are responsible for keeping University Admissions and the Office of the Registrar informed of the following:** Changes in residence and mailing addresses; current telephone numbers, and primary e-mail addresses. Failure to do so may result in transcripts, diplomas, or other important communications from the university not being received in a timely manner.

The deadlines for registration and for the add/drop period are printed in the Schedule of Classes and are available on-line at <http://gradschool.nmsu.edu/deadlines/index.htm>.

### INTERNATIONAL STUDENTS

#### English Proficiency

International students that wish to become teaching assistants must prove that they are proficient in the English language. During summer session II preferably or before the start of the first semester of enrollment, each international student who is required to submit a TOEFL (Test of English as a Second Language) or an IELTS (International English Language Testing System) score that wishes to be considered for a teaching assistantship must also take the Academic English Proficiency Test administered by the Department of Communication Studies. Also, students who successfully complete and pass approved English as a Second Language (ELS) course, and who wish to become a teaching assistant must also take the Academic English Proficiency Test administered by the Department of Communication Studies. Based on the recommendation of the Department of Communication Studies, the Graduate School may require the student to successfully complete one or more English as a foreign language course(s) prior to beginning an assignment as a teaching assistant. If completion of one or more courses is required, the student should enroll in the first such course during his or her first semester at NMSU or prior to taking an assignment as a teaching assistant.

#### Enrollment

All international graduate students on F-1 or J-1 visas are required to comply with Department of Homeland Security regulations governing maintenance of status related to full-time enrollment and making normal progress toward completing a degree. Therefore, all international graduate students are required to enroll in nine or more credits (exclusive of audited work) during fall and spring semesters.

### SHORT COURSES AND INSTITUTES

Short courses and institutes are conducted on the campus each summer and during the academic year. Courses numbered 450 and above have been approved to carry graduate credit for students regularly enrolled in the Graduate School. Registration is required to receive graduate credit for these courses. **Concurrent enrollment of graduate students in regular and short courses is allowed provided that the combined credits do not exceed 15 in a fall or spring semester.**

All short courses carrying one semester credit will be graded on an S/U basis, and these S/U credits will be counted toward the student's limit of S/U credits.

### SUMMER SCHOOL SESSION

During the summer session, the maximum number of graduate credits a graduate student may take is 9. Students who wish to enroll in more than 9 credits in the summer, must write an appeal letter addressed to the Graduate Dean.

### APPLICATION FOR A CERTIFICATE

#### Completion of a Graduate Certificate Program

You must meet several requirements to receive your Graduate Certificate. These requirements are listed below. You can also find more information about receiving your Graduate Certificate at the FAQ – Certificate Programs link: <http://gradschool.nmsu.edu/certificates.html>.

1. Submit an Application for Certificate to University Admissions, along with the fee of \$25. The form can be found at: <http://gradschool.nmsu.edu/forms-index.html>.

The deadlines for submitting this form are:

October 1st for December certificate

February 15th for May certificate

May 15th for August certificate

**Note: Late applications are automatically transferred to the next award period.**

1. You must be enrolled or pay the special Exam Fee: You need to be registered for at least one credit during the semester in which you plan to complete your Certificate. If you are not registered, you must pay the Exam Fee: <http://gradschool.nmsu.edu/forms/ExamFeeForm.pdf>.
2. Approved Program of Study: You must also fill out a Program of Study for your Graduate Certificate Program. These forms are specific to each Graduate Certificate Program and can be found at this website, under Forms for Graduate Certificate Programs: <http://gradschool.nmsu.edu/forms-index.html>.
3. Grade Point Average of 3.0: You must have an overall GPA of 3.0 to receive your Certificate.

## MILITARY AND VETERANS PROGRAMS (MVP)

NMSU is a military-friendly university and an institutional member of the Service members Opportunity Colleges (SOC) Consortium. NMSU Military and Veterans Programs promotes lifelong learning and professional development for veterans, active-duty military and their families, assisting them in their higher education goals by offering:

- Affordable, in-state tuition rates for active-duty military personnel and dependents living at regional military installations
- Affordable, in-state tuition rates for veterans receiving U.S. Department of Veterans Affairs education benefits
- Easily transferable credits that count toward degrees at NMSU
- GoArmyEd participation
- Courses taught online and at locations on and near regional military installations
- Innovative technology and course delivery methods
- A tradition of quality education

NMSU degree programs are approved by the State Approving Agency Directory at the New Mexico Higher Education Department. Eligible students may receive education benefits from the U.S. Department of Veterans' Affairs.

#### MVP Lab

Military and Veterans Programs has a lab containing six computers, with two that have Common Access Card (CAC) readers. The lab is open 8 am – 5 pm, Monday through Friday and is available to all military and veteran students including dependents. Enjoy a free cup of coffee while doing your homework or

just hang out and network with likeminded veterans. We offer free fax, copy and printing services to further accommodate our students. The MVP lab serves as a one stop shop for military and veteran students with numerous resources on and off campus.

### UNIV 115- Transition from Military to University

Making a positive transition from military to civilian life is key to success. This course will cover a variety of topics ranging from time management to critical thinking. It is designed to assist military and veteran students in becoming more effective learners through self-awareness, effective study and learning strategies and interpersonal skills. Skills and techniques for managing military to civilian readjustment transition issues are discussed and examined.

### Responsibility of Veteran Students

Students must be pursuing a degree in a specific program to be eligible for benefits. Admission procedures for veterans and other eligible persons are the same as for all students. Academic advisors must submit degree plans to Military and Veterans Programs prior to certification. For continued certification, students must submit a "Concise Student Schedule" to the MVP office every semester.

Veterans must notify the MVP office when any of the following occurs:

- Dropping or adding course(s)
- Withdrawing from course(s)
- Discontinuing regular class attendance
- Changing programs (academic majors)

VA education benefits are payable for regular attendance in courses that are part of the veteran's program (major) curriculum. VA educational benefits are not payable for:

- Classes not attended regularly
- Repeating a course for which a passing grade was received
- Classes for which credit is received through successful completion of a proficiency test or grade by examination
- Classes taken on an audit basis
- Classes that are dropped or withdrawn from
- Classes taken that are not part of the veteran's program (major) curriculum

For further information, contact Military and Veterans Programs at MSC 4740, NMSU, P.O. Box 30001, Las Cruces, NM 88003-8001 or (575) 646-4524. Overview may be viewed at <http://military.nmsu.edu> or <http://nmsu.edu/va>.

### COSTS

#### Active-Duty

Active-duty military personnel (Armed Forces,) stationed in New Mexico or at Fort Bliss, Texas may complete a "Resident Tuition Application for Active Duty Military" waiver to qualify for in-state tuition. Spouses and minor children of active-duty personnel who are stationed in New Mexico and Fort Bliss, Texas who are not otherwise entitled to claim in-state residency, may apply for in-state tuition by submitting a "Resident Tuition Application for Active-Duty Military" waiver to the NMSU Registrar. Applications are available at the NMSU Registrar's Office or by contacting Military and Veterans Programs at MSC 4740, NMSU, P.O. Box 30001, Las Cruces, NM 88003-8001 or (575) 646-4524.

#### Veterans

Veterans receiving U.S. Department of Veterans Affairs education benefits are eligible for in-state tuition through the Veterans In-State Tuition Act by submitting a "Resident Tuition Application for Veterans of the U.S. Armed Forces" waiver. For further information concerning approved programs and application process, eligible persons should contact Military and Veterans Programs at Garcia Annex, room 141, by phone (575) 646-4524, by email at [va@nmsu.edu](mailto:va@nmsu.edu) or online at <http://nmsu.edu/va>.

Veteran students enrolled under the following programs are responsible for their tuition and fees in the same manner as a nonveteran student:

- Montgomery GI Bill-Active Duty (CH30)
- Dependents (CH35)
- Montgomery GI Bill-Selected Reserve (CH1606)
- Reserve Educational Assistance Program (REAP)
- Post 9/11 (CH33)

Tuition and fees of students enrolled under the Vocational Rehabilitation Program (CH31) will be paid by the U.S. Department of Veterans Affairs under contract with the university.

## RESOURCES FOR STUDENTS

### Military and Veteran Housing

New Mexico State University is one of the first in the nation to offer on-campus housing specifically designated for student veterans and their families transitioning out of the military and into student life. The Department of Housing & Residential Life has worked in conjunction with the Student Veterans' Association of NMSU to offer affordable housing on campus to student veterans attending the university. For more information, please contact Housing and Campus Life: (575) 646-3202, [housing@nmsu.edu](mailto:housing@nmsu.edu), [housing.nmsu.edu](http://housing.nmsu.edu).

### Servicemembers Opportunity Consortium (SOC)

The NMSU system has been designated a Servicemembers Opportunity Colleges (SOC) Consortium university. As a member of SOC, NMSU has committed itself to fully support and comply with SOC principles and criteria, ensuring that servicemembers and their families share in the postsecondary educational opportunities available to other citizens. Those eligible are provided with appropriately accredited educational programs, courses, and services. Flexibility of programs and procedures particularly in admissions, counseling, credit transfer, course articulation, recognition of other applicable learning experiences, including those gained in the military, scheduling, course format and residency requirements are provided to enhance access of servicemembers and their families to undergraduate education programs. All SOC rules and regulations apply, including:

- Credit for military training and experience – NMSU recognizes and uses ACE Guide in evaluating military training experiences
- Reduced academic residency requirements – 25% maximum for most programs; 30% for 100% online programs
- No final year or semester requirement
- Credit for nationally-recognized testing programs such as CLEP (General and Subject exams), DSST (DANTES Standardized Subject Tests)

For further assistance contact the SOC coordinator through Military and Veterans Programs at MSC 4740, NMSU, P.O. Box 30001, Las Cruces, NM 88003-8001 or (575) 646-4524.

### Regulations

Note: These regulations apply to all campuses of NMSU and are effective with the publication of this catalog. Tuition amounts, fees, and similar items subject to annual review and change are all effective with the current catalog.

### GoArmyEd

Soldiers must first be admitted to NMSU before they may enroll in any classes at NMSU. Only enrollments verified through the GoArmyEd portal will be eligible for Tuition Assistance (TA). It is the soldier's responsibility to process all class withdrawals through both GoArmyEd and NMSU systems in accordance with institutional policies and procedures. For further information, contact Military and Veterans Programs at MSC 4740, NMSU, P.O. Box 30001, Las Cruces, NM 88003-8001 or (575) 646-4524.

### Credit for Military Service

New Mexico State University will award academic credit to United States military personnel for courses and Military Occupational Specialties (MOS), based on the American Council of Education Guide (ACE) as well as through national standardized tests, such as CLEP, AP, PEP, and DANTES. Credit for military-training is in accordance with NMSU Faculty Senate Legislation Proposition 24-07/08, which was passed in May 2008. Military Training and Military Occupational Specialties (MOS) must have a recommendation evaluation by ACE (in the ACE Guide) for credit to be awarded. Courses accepted for transfer credit are given an NMSU equivalent and become part of the student's official NMSU transcript and academic record. If a student wishes to appeal a decision regarding the acceptance of military training/education and/or MOS for academic credit, the student must submit a written statement of appeal to the Dean of the College to which the student has applied. The Dean will review the merits of the appeal and render a decision. The decision of the Dean is final.

Only Primary MOS (s) are eligible for academic credit in the initial review and evaluation. Credit for Duty and/or Secondary MOS may be eligible for academic credit if the student petitions the college's Associate Dean. Primary MOS is the primary specialty of a soldier and reflects the broadest and most in-depth scope of military experience. Veterans, active-duty personnel, National Guard and Reservists who are current students or students applying for admission to New Mexico State University may be granted academic credit on a case-by-case basis upon evaluation of military transcripts - the Joint Service Transcript and the United States Coast Guard transcripts. Course equivalencies and credit hours awarded for a particular NMSU degree are determined by colleges and/or academic departments. Credit hours may be awarded for specific courses toward



degree requirement, or as elective credit. The number of credit hours awarded will be determined by the college and/or academic department.

**NOTE:** Students submitting military transcripts for credit evaluation must keep in mind the Maximum Time Frame policy. See FINANCIAL AID section (p. 11).

### Veterans' Attendance and Satisfactory Progress

The U.S. Department of Veterans Affairs requires all veterans receiving VA education benefits to make satisfactory progress and systematic advancement toward an educational objective or be liable for over-payments. Satisfactory progress and regular class attendance are expected of such students.

If a veteran receiving benefits is suspended for academic reasons, benefits are terminated and will be restored only after readmission to NMSU.

If the university has liability claims filed against it as a result of a veteran failing to meet compliance requirements of the U.S. Department of Veterans Affairs, the university will not release any academic records on the veteran until such time as the veteran has reimbursed the federal government for funds drawn in violation of those requirements.

A student receiving VA education benefits who is pursuing a degree program offered by New Mexico State University should adhere to the curriculum of that program. Failure to do so will result in the student being certified for less than full-time status or becoming liable for an overpayment.

### Military Withdrawal

The following steps must be taken by all New Mexico State University students called up for active duty who wish to withdraw from all their classes:

1. Military and Veterans Programs. VA students ordered to Active Duty must provide a copy of orders to the MVP office, Garcia Annex, room 141. To assist in reporting accurate information to the VA Regional Office, student should also provide, in writing, last day of class attendance.
2. NMSU Registrar. All students presenting their orders to the NMSU Registrar's Office, (575) 646-3411, will receive a military withdrawal from classes and a full tuition and fees refund for that semester.
3. Bookstore. Students who still have their receipts for textbooks purchased the semester in which they are called to active duty will be given a full refund for these textbook purchases when they present their orders. (575) 646-4431.

### Military/Veteran Graduate Student Status

Veteran benefits are determined by the number of graded graduate credits of enrollment for a given semester or summer session. Listed below are the credit hours that determine student status for military veterans.

Fall and Spring semester: full-time enrollment includes 9 or more graded credit hours. Students are considered three-fourths time if they are enrolled in 7 to 8 credit hours. Half time enrollment is 5 hours. Veterans enrolled in less than 5 credit hours are reimbursed for tuition and allowable fees only.

There are several sessions within the summer term. For the 10 week summer session, full-time enrollment is 6 credit hours and half time enrollment is 3 credit hours. During the five week sessions, full-time enrollment is 4 graded credit hours.

## SPECIAL PROGRAMS

### Reserve Officer Training Corps (ROTC)

The Reserve Officer Training Corps is a commissioning program designed to attract, motivate, and train qualified students for military service as officers. The ROTC program is represented on the NMSU campus by the Department of Military Science (U.S. Army) and the Department of Aerospace Studies (U.S. Air Force).

Curricula in the Departments of Military Science and Aerospace Studies are divided into basic and advanced courses of two years each. Enrollment in the basic course is voluntary and involves no obligation. Participation in the advanced courses is on a contractual basis and leads to military service as a commissioned officer. Elective academic credit is granted by the university for ROTC classes.

Students with prior military service or Junior ROTC experience may receive credit, although not academic credit, for all or portions of the basic courses.

All qualified cadets enrolled in ROTC receive a stipend that varies dependent upon the year the cadet is in the program. Scholarships, which pay full college tuition as well as various laboratory, textbook, and incidental fees, are available on a competitive basis.

For more detailed information about the ROTC programs, see the College of Arts and Sciences departments of Aerospace Studies and Military Science in this catalog. Additional information may be obtained by contacting the departments directly at (575) 646-4030 (Army) and (575) 646-2136 (Air Force).

# REGULATIONS AND PROCEDURES FOR STUDENTS

## GRADING SYSTEM

Graduate students are expected to apply themselves intensively to the study of the material covered by the courses in which they are enrolled. Accordingly, a high level of performance is required. The student must maintain a grade-point average of at least 3.0 in all graduate courses taken as a graduate student at NMSU. Courses transferred from the undeclared program at NMSU or from other institutions will be included in determining grade-point averages.

### Grades

The grades awarded in all courses are indicative of the quality of work done. Their significance is as follows:

Letter Grade	Point per Credit
A — For excellent work	4
B — For better than average work	3
C — For average work	2
D — For below average work	1
F — For failing work	0
W — Withdrawal	0
N — Grade not submitted	0
CR — Credit authorized, but not letter grade	0
IP — In progress	0
PR — Progress on graduate thesis	0
S — Satisfactory work	0
U — Unsatisfactory work	0
I — Incomplete	0
AU — Audit	0

Distinctions within a letter grade may be indicated by the use of plus or minus, and these will become part of the official record.

### S Grade

An S grade indicates satisfactory performance.

### C, D, and F Grades

Although C grades earned at New Mexico State University may be counted toward the requirements for an advanced degree, this is not considered acceptable graduate-level performance.

Courses in which a student earns only a D or F may never be counted toward a graduate degree, although such grades are calculated in determining the grade-point average. Therefore, any grades of D or F must be compensated for by the necessary hours of A if the student is to have the 3.0 grade-point average required before awarding of the degree.

### Incomplete Grade

The grade of Incomplete is given for passable work that could not be completed due to circumstances beyond the student's control. The following regulations apply to removing or changing an Incomplete grade:

1. Instructors may assign an Incomplete grade only if the student is unable to complete the course due to circumstances beyond the student's control that develop after the last day to withdraw from the course. Examples of appropriate circumstances include documented illness, documented death or crisis in the student's immediate family, and similar circumstances. Job related circumstances are generally not appropriate grounds for being assigned an Incomplete. In no case is an Incomplete to be used to avoid the assigning of D, F, or Unsatisfactory grades for marginal or failing work.

2. To assign an I grade, the instructor must complete the "I Grade Information Form" and have the form delivered to the course dean. The instructor will state in writing the steps necessary to complete the remaining course work or the instructor may indicate that the student will be required to re-enroll in the course to receive credit (in which case the I grade will not be removed). The student will sign this document or the course dean will send a copy of the document to the student's official permanent address.
3. The student is entitled to have the Incomplete grade removed from the transcript only if the student completes the remaining course work as specified on the "I Grade Information Form," in a manner satisfactory to the instructor. The work must be completed within 12 months after the Incomplete is assigned and prior to the student's graduation, or within a shorter period of time if specified by the instructor on the "I Grade Information Form." If the student fails to complete the course work, the instructor may change the Incomplete grade to any appropriate grade (including D, F, or Unsatisfactory) provided that the instructor stated that this would occur on the "I Grade Information Form."
4. Incomplete grades can be removed from the transcript by the instructor only during the 12-month period following assignment of the Incomplete or prior to the student's graduation, whichever comes first. To remove an Incomplete, the instructor must complete a "Change of Grade Form" and file the form with the Office of the Registrar. The instructor may assign whatever grade is appropriate for the entire course. This may include grades of D, F, or Unsatisfactory. An Incomplete not changed by the assigning instructor within 12 months and prior to graduation shall remain an Incomplete grade thereafter.
5. A student may re-enroll and receive credit for any course for which an Incomplete grade was previously received, but retaking the course will not result in removal of the Incomplete grade from the student's transcript. The effect of removing an Incomplete grade on a student's academic standing (scholastic warning, probation, or suspension) depends on the date the transaction is officially recorded on the student's academic record. If the transaction is recorded before the student begins another semester, the grade replacing the Incomplete is included in the grade-point average calculation that establishes the student's academic standing. If the transaction is recorded after the student begins another semester, the new grade's effect on academic standing is based upon its inclusion with grades for the semester in which the student is enrolled. Students may appeal an unsatisfactory grade through the procedure described in the "Disciplinary Issues for Graduate Students" section of this catalog.

### Independent Studies

Independent study courses (including directed reading and special topics courses which do not carry a subtitle) are for students capable of self-direction who meet the requirements for the *S/U* option, i.e., if the students are not eligible for the *S/U* option, they are not eligible for independent study. Each college determines the maximum number of credits that may be earned in independent study courses.

### Grading of Research

In grading master's and doctoral research and thesis work in progress, the instructor reports for each enrollment period the symbol PR (Progress) or U (Unsatisfactory) in place of a grade. "Progress" indicates that the student has devoted an adequate amount of time to the work scheduled but gives no indication of its quality. "Unsatisfactory" indicates that the student has stopped work or is doing work of unacceptable quality. These symbols remain on the student's transcript permanently. Only those credits graded PR (Progress) accumulate toward the minimum number of credits of research required.

After having submitted a series of PR (Progress) or U (Unsatisfactory) symbols, the instructor shall report a grade at the conclusion of the final oral examination, or no later than the date the thesis is submitted for the signature of the graduate dean. If the thesis or dissertation and the performance in the final oral examination are found to be acceptable, the instructor shall report S (Satisfactory), which grade applies to the preceding series of registrations graded Progress and Unsatisfactory and denotes the overall quality of the entire series. If the thesis or dissertation or the performance in the final oral examination is found to be unacceptable, the instructor shall report U (Unsatisfactory), which grade applies only to the credits of research for the enrollment period in which the examination is administered.

**Students who accumulate a total of two Unsatisfactory grades in courses numbered 598 (approved courses), 599, 600, 699, or 700 will be placed in provisional status. Three Unsatisfactory grades in these courses will result in dismissal from the Graduate School.**

### Satisfactory and Unsatisfactory Course Option

Grades of Satisfactory and Unsatisfactory (S/U) may be used for courses taken by a regular status graduate student outside the major department, provided that the student's advisor and the head of the department approve. Departments may designate three credits of departmental courses numbered 500 and above for S/U option grading with the approval of the college dean and the graduate dean. The S/U grade request form must be submitted to the graduate dean at the time of registration for an academic session.

The limitations of the S/U option are as follows: No more than six total credits of S/U courses are permitted on the master's degree. Doctoral candidates may take six additional credits under the S/U option after application to candidacy. Registration is limited to one course per semester, and courses with Unsatisfactory grades cannot be used in a student's program.

### POLICIES ON GRADUATE COURSES

#### Numbering of Courses

Courses numbered 100 through 299 are for undergraduate credit only. In no event may courses numbered below 300 be applied toward a graduate degree; 300 through 449 courses are intended primarily for undergraduate level. In some cases, graduate credit may be obtained in courses numbered 300 through 449 with the approval of the student's advisor, the instructor of the course, the program dean, the student's department head, and the dean of the Graduate School. To secure such credit, a written request must be filed with the dean of the Graduate School at the time of registration. However, these courses cannot be deficiencies, and not more than four credits toward a degree can be granted for courses numbered below 400. The total of courses numbered 300 through 449 cannot exceed eight credits.

Courses numbered 450 through 499 are designed for seniors and graduates; 500 through 599 are primarily for graduate students working on the master's degree; 600 through 700 are principally for students working on a doctoral degree.

#### Adding and/or Dropping Courses

It is the student's responsibility to initiate official withdrawal from a course. Courses may not be added after the last day to add as indicated in the academic calendar (printed on the inside back cover of the Graduate Catalog or on-line at <http://gradschool.nmsu.edu>). The last day to drop a course is listed in the Schedule of Classes and the academic calendar. The refund policy and schedule is also noted in the Schedule of Classes.

#### Auditing Courses

A student officially admitted to the Graduate School may enroll in any class as an auditor with the verbal consent of the instructor, provided the facilities are not required for regular students. Record of enrollment is preserved but no credit is given. Courses being taken as audit will count toward total course load but cannot be used to meet the minimum course load requirements.

Because graduate students can enroll in any undergraduate course under the S/U option, they are discouraged from auditing classes.

#### Repeating Courses

Any graduate course numbered 450 and above may be repeated. Any computable grade (excluding I, W, AU, CR, S or U) earned for the course will be included in the cumulative grade-point average, but the credit hours may be earned only once.

#### Substitutions and Waivers

All substitutions or waivers of required courses for degree candidates must be approved before the last day of registration during the semester in which the student expects to obtain the degree.

#### Challenging Graduate Courses

A graduate student may challenge a graduate course by examination.

#### Changes in Registration

Registration changes may be processed only in accordance with university regulations and with appropriate signatures. It is the responsibility of the student to initiate official withdrawal from a course.

Forms are available from the academic advisor or in the deans' offices. Courses may not be added or dropped after the deadline date indicated in the university calendar. For refund policy, see the "Costs" section of the catalog.

When a student officially drops a course, the **W** grade is assigned as follows:

1. No grade is assigned during the registration period.
2. A **W** grade is assigned to any student who officially drops a course during the first half of its duration. A student may not officially withdraw from a course after this time. All drop forms must be signed and dated by the instructor of the course and the advisor.

3. A grade of **W** is assigned in all courses to any student officially withdrawing from the university prior to the last three weeks of classes.

Any person attending under Veterans Educational Assistance should notify the Office of Veterans' Programs if dropping or adding courses changes enrollment status for benefits.

### TRANSFER OF GRADUATE CREDITS INTO A DEGREE PROGRAM

A student may transfer graduate credits taken at NMSU as well as graduate credits from another university to New Mexico State University, provided the credits were earned on the campus of an accredited institution. Transferred course work (grades and hours) is maintained separately from NMSU course work.

Immediately after initial enrollment in the Graduate School, students must submit forms to obtain formal permission from the department head, the dean of the college, and the dean of the Graduate School to transfer graduate-level course work. The department has the responsibility to accept or reject any number of transferred credits based on such elements as whether the work fits into a logical program for a degree, if grades of A or B have been earned in the courses proposed for transfer, and any other elements it deems relevant. Credit granted for work done at another institution is tentative until proved by satisfactory work in residence, and the department may also require work to be validated by examination. At the master's level, students must take at least 50 percent of the course work required for the degree from faculty of New Mexico State University to meet the residency requirements for their degree. Transfer credits must meet the same time-limit requirements (seven years) as graduate classes at accredited universities. Course work taken elsewhere after initiation of Graduate School at NMSU must have prior approval of the department head and the dean of the Graduate School if such work is to be transferred. All requirements as to accreditation, level, grades, and other elements described for initial transfer work will apply.

"Request for Transfer of Credit" forms are available at University Admissions.

### TRANSFER OF CREDITS FOR CERTIFICATE PROGRAMS

Students enrolled in certificate programs cannot transfer credits from another institution towards the completion of the certificate program offered by New Mexico State University. However, they can transfer credits taken in a graduate certificate program of NMSU into a graduate degree program of New Mexico State University provided that the courses will lead towards a graduate degree in the focused area of the certificate program. The number of transfer credits will be determined by the program of study. The time limit on course transfer is 5 years after the completion of the certificate.

### TRANSFER OF UNDERGRADUATE CREDITS TO A NMSU GRADUATE PROGRAM

A student who is enrolled in a specially designated, pre-approved (by the graduate dean and the applicable academic college dean(s) joint degree program that leads to the student being awarded both undergraduate and graduate degrees may petition to have two graduate level courses (up to six credits) previously taken for undergraduate credit considered as transfer credits into the student's graduate degree program.

To be considered for transfer credit, a course must have been taken by the student as a senior, and prior written permission must have been received from the director of the applicable graduate program, the course instructor, and the department head. In addition, only courses in which the student received a grade of B or better will be considered for transfer credit. Credit can be transferred once the student has been accepted into the graduate degree program.

Approved joint undergraduate/graduate degree programs are listed in the section called "Graduate Degree Programs."

"Request for Transfer of Credit" forms are available at University Admissions and on the web page <http://prospective.nmsu.edu/graduate/current/index.html>.

### LEAVING GRADUATE SCHOOL

#### Leave of Absence/Continuous Enrollment

Students working on advanced degrees who plan an interruption in studies for a calendar year should address a request for leave of absence through their department head, alerting the dean of the Graduate School. The student must submit a formal letter through their department head to the Dean of the Graduate School. Email will not be accepted. The request should include the beginning date and the anticipated ending date for the period of absence. A graduate student on leave of absence will be expected not to use university facilities and place no demands upon the university faculty and staff, and, therefore will pay no fees. Time spent in leave-of-absence status will not be counted toward time limits.

A graduate student who fails to register for one calendar year without obtaining a leave of absence from the Graduate School will be considered

withdrawn from the university. For information on resuming studies after such absence, see "Readmission." (p. 7)

#### Withdrawal from NMSU

Withdrawal from any NMSU campus is an official procedure that must be approved as indicated on the withdrawal form. All such withdrawals will be registered on the student's transcript. It is the student's responsibility to initiate withdrawal from the university and to obtain necessary signatures. Students who leave without following the official procedure are graded appropriately by the instructor. The withdrawal process is initiated at the Registrar's Office. Applicable dates are published in the university calendar for all regular sessions.

#### Medical Withdrawal

A medical withdrawal applies to a student who becomes seriously ill, injured, or hospitalized and is therefore unable to complete an academic term for which they are enrolled. Based on the physician's information, a determination will be made if the student is eligible for consideration of tuition or other refunds. At the Las Cruces campus, medical withdrawal begins at the Registrar's Office. At all other campuses, medical withdrawal begins at the Student Services Office.

#### Military Withdrawal

See the section on Military/Veterans and Family Members for special provisions for servicemembers.

### DISCIPLINARY ISSUES FOR GRADUATE STUDENTS

#### Graduate Student Appeals Board

Each academic year a standing committee, consisting of three members of the graduate faculty and two graduate students, is appointed by the dean of Graduate School to handle grievance complaints including grade appeals. Any graduate who believes that he or she has been unjustly treated within the academic process may proceed as far as necessary in the following steps to resolve his or her grievance. In general, there are three levels at which a grievance can be addressed: a course instructor or advisor, a department head, or the dean of the Graduate School. If the initial grievance is with an instructor or advisor, the process begins at Step 1. If the initial grievance is with a departmental committee, the process begins at Step 3. In all instances, the process must begin at the lowest possible level.

1. Under normal circumstances, the student should discuss the issue with the instructor/advisor.
2. If the student is unable to resolve the issue through consultation with the faculty member, the student must submit a written memorandum detailing the grievance to the course instructor or advisor within 10 calendar days of the beginning of the following full (i.e., fall or spring) semester. The person to whom the memorandum is addressed must respond in writing within 10 calendar days to the student.
3. If the student is not satisfied with the response from Steps 1-2, he or she must submit a written appeal to the department head within ten working days of the initial decision. If the student is initiating the appeal at the departmental level, he or she must do so, in writing, within 10 calendar days of the beginning of the following full (i.e., fall or spring) semester. The department head must respond in writing within ten working days to the student, the instructor or advisor (if one is involved), and the dean of Graduate School.
4. If the student is not satisfied with the response from Steps 1-3, they must submit a written grade appeal letter to the academic dean's office of the college where the course is taught. If it is a grievance against a faculty member, then the academic dean's office where the course is taught would be that of the faculty member's college. The student has 10 calendar days after receiving the decision of the department head. The associate dean of the given college has 10 days to collect the necessary documents to make a decision on the student's appeal or grievance. Please note that additional days may be required to collect information from the faculty and/or student involved in the case. The academic dean's office where the course is taught may convene an ad hoc committee to investigate the case.
5. If after the fourth step the student or any of the other parties involved is still not satisfied with the response, he or she must present to the dean of the Graduate School within ten working days a formal letter that provides specific details regarding the nature of the grievance. Copies of all documents including course materials and grades must accompany the letter. In the letter, the student can request that their case be presented to the Graduate Student Appeals Board. After receiving a letter complaint (not an email), the dean or associate dean of the Graduate School will determine

whether the complaint has merit. He or she will do so after reviewing the letters from the faculty member, the department head and the office of the academic dean as well as the materials from the student and all those involved in the case. If the graduate dean determines that the appeal does not have merit, he or she will inform the appellant and other parties, in writing, within ten working days of receiving the appeal. Please note that additional days may be required to collect information from the faculty and/or student involved in the case. If the graduate dean decides that the appeal does have merit, he or she will convene the Graduate Student Appeals Board, normally within three weeks. The Graduate Student Appeals Board will conduct, within 60 days of their convening, whatever investigations and deliberations are necessary, and will forward to the dean of the Graduate School a recommendation to resolve the grievance.

6. After reviewing the recommendation of the Graduate Student Appeals Board, the dean of Graduate School will, within ten working days, inform all parties involved of his or her decision in writing.
7. The dean of the Graduate School may waive the normal time frame for grievances when either party presents compelling evidence justifying such a delay, but grievances must be launched within one year. Grade appeals involving charges of plagiarism must follow the process established on academic misconduct in the Student Code of Conduct. The web site is <http://www.nmsu.edu/~vpsa/SCOC/index.html> Graduate School strongly encourages students to study and use the Plagiarism web site of the Library to learn of ways to avoid plagiarism: <http://lib.nmsu.edu/plagiarism>.

### Academic Probation and Suspension

Academic Standing is based on both the student's semester GPA and cumulative GPA.

**Graduate Academic Probation I:** A graduate student is placed on Graduate Academic Probation I when a graduate student's semester GPA is above a 3.000 and the cumulative GPA drops below 3.000; or when the semester and cumulative GPA's drop below 3.000 and the previous academic standing is Graduate Regular Good Standing.

**Graduate Academic Probation II:** Is issued when a graduate student semester GPA is above a 3.000 and the cumulative GPA drops below as 3.000 and the previous academic standing is one of Graduate Academic Probation I or Graduate Re-admit on Probation I.

The student must maintain a semester GPA of 3.000 or higher until the cumulative GPA reaches a 3.0 or higher at which time the graduate student is placed on Good Academic Standing. If the graduate student is unable to maintain a semester GPA of 3.000 or higher and the cumulative remains below 3.000 GPA while under Graduate Academic Probation II, the student will then be placed on Graduate Academic Suspension.

**Graduate Academic Suspension:** When a graduate student does not achieve a semester GPA of 3.000 or higher, and the graduate cumulative GPA remains below a 3.000 while under Graduate Academic Probation II or Graduate Re-Admit on Probation II, the graduate student is placed on Graduate Academic Suspension.

Graduate students under Graduate Academic Suspension are barred from enrolling in graduate level courses at NMSU while under Graduate Academic Suspension. Graduate students on Graduate Academic Suspension must sit out a minimum of one semester. Graduate students on suspension who wish to continue Graduate School after suspension must re-apply to the Graduate School and petition the Graduate Dean or College Academic Dean to be removed from Graduate Academic Suspension. At this time the graduate academic suspension status will be evaluated for possible removal. Should the suspension be lifted, the graduate student is placed on Graduate Academic Probation II or Graduate Re-admit on Probation II until such time that the graduate cumulative GPA equals or exceeds 3.000.

If you have questions about your academic standing, please contact the advising center or Graduate Dean's office.

### Disciplinary Probation and Suspension

Graduate students are subject to the rules and regulations with respect to disciplinary probation and suspension as listed in the "Student Code of Conduct" section of the Student Handbook <http://www.nmsu.edu/~vpsa/SCOC/index.html> and in the "Regulations" section (p. 14) of the Undergraduate Catalog [http://www.nmsu.edu/Academic\\_Progs/Undergraduate\\_Catalog/](http://www.nmsu.edu/Academic_Progs/Undergraduate_Catalog/). Graduate students who engage in academic misconduct at any of the other campuses of New Mexico State University, including Alamogordo, Carlsbad, Dona Ana and Grants, are also subject to the Student Code of Conduct of NMSU.

### Attendance and Student Behavior

The instructor may report any absences to the graduate dean when the number of absences from class (including audited courses) is impairing the work of a student in a course. The graduate dean may drop a student from a class for persistent absence when such action is recommended by the instructor. Similarly, a student may also be dropped from a class for engaging in behavior that interferes with the educational environment of the class.

Students making satisfactory progress in their classes will be excused from classes when they are representing New Mexico State University on a university-sponsored event (e.g., ASNMSU president representing NMSU at legislative session, student-athletes competing in NMSU-scheduled athletic events, or students attending educational field trips and conferences).

Authorized absences do not relieve the students of their class responsibilities. Prior written notice of the authorized absence will be provided to the instructor by the sponsoring department.

Only students who have enrolled in a class for credit or audit are allowed to attend classes. A student who has officially withdrawn from a course may continue to attend the course with the permission of the instructor for the remainder of the semester.

Students not enrolled may visit classes only with the permission of the instructor.

### Academic Conduct of Graduate Students

Graduate students at New Mexico State University are expected to observe and maintain the highest academic, ethical, and professional standards of conduct.

Students should consult Section III of the "Student Code of Conduct" in the Student Handbook (<http://www.nmsu.edu/~vpsa/SCOC/index.html>) for more specific information regarding the rules of conduct and definitions of misconduct. In the event these standards of conduct appear to have been breached by violations such as plagiarism (consult the Library's Web page at <http://lib.nmsu.edu/plagiarism>), cheating, nondisclosure or misrepresentation of academic credentials, fabrication of data, or other forms of academic misconduct, the procedures set forth below shall be employed to resolve the issues. As mentioned before, graduate students who engage in academic misconduct at any of the other campuses of New Mexico State University, including Alamogordo, Carlsbad, Dona Ana and Grants, are also subject to the Student Code of Conduct of NMSU.

### Procedures to Deal with Cases of Alleged Academic Misconduct in Graduate School

Policies and procedures for dealing with such cases are detailed in the in the Student Code of Conduct <http://www.nmsu.edu/~vpsa/SCOC/>.

Questions concerning these policies and procedures should be addressed to the dean of the Graduate School. Procedures include all course levels and all of the campuses of New Mexico State University, including Alamogordo, Carlsbad, Dona Ana, Grants and Las Cruces.

### PRIVACY ISSUES

#### Privacy Rights

The following information has been designated as directory information and is subject to release to the public under the Buckley Amendment (PL 98-380), "The Family Educational Rights and Privacy Act of 1974": Student's name, address, e-mail address, telephone listing, date and place of birth, major field of study, classification, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and the most recent, previous educational agency or institution attended by the student.

Other information regarding disclosure of student data is posted at the Office of the Registrar in compliance with the act. Requests for withholding directory information must be filed in writing with the Office of the Registrar.

### PURGING OF STUDENT FILES

All files of students who have attended NMSU Graduate School are kept for five years following final enrollment and then destroyed. Only archival documentation is retained. The files of students who do not enroll are destroyed after one year.

### TRANSCRIPT OF CREDITS

An official transcript is the University's certified statement of a student's complete NMSU academic record in chronological order by semester and year. It includes coursework, grades, and degrees earned. Credit hours earned through transfer work are not listed in detail, but do appear as cumulative totals.

Transcripts are available as digitally-signed PDFs or printed copies. Transcripts can be ordered online at <http://mytranscript.nmsu.edu>. A fee is

charged for each copy. No transcript will be released if the student is in debt to the university.

The student name appearing on the transcript will be the same as it appears on the student's official NMSU records. Name changes are processed for current students only. Contact the Office of the Registrar, [registra@nmsu.edu](mailto:registra@nmsu.edu), for additional information.

### CHANGE OF ADDRESS

In order to assure accurate student records, **students are responsible for keeping University Admissions and the Office of the Registrar informed of the following:** Changes in residence and mailing addresses; current telephone numbers, and primary e-mail addresses. Failure to do so may result in transcripts, diplomas, or other important communications from the university not being received in a timely manner.

### EVALUATING YOUR ACADEMIC EXPERIENCE

As part of its continuing effort to maintain quality academic programs and to provide strong support services, New Mexico State University routinely conducts surveys. Students may be required to participate in one or more of these activities. The resulting data will be published only in aggregate form.

## REQUIREMENTS FOR ENROLLED STUDENTS

The following are general requirements applying to all graduate students. Requirements applicable to specific graduate degrees follow this section.

### FULL-TIME GRADUATE STUDENT

A full-time graduate student is one enrolled for nine or more credits per semester, other than for tuition purposes. Students doing graduate work while engaged in full-time, off-campus employment should limit themselves to one or two courses per semester.

Graduate students should take into consideration any outside workload and commitments in planning their course load. Full-time graduate students without other commitments normally enroll for nine to 12 graded credits each regular semester; the maximum number of graded credits a graduate student may take in any regular semester is 15. During the summer session, the maximum number of graded credits a graduate student may take is 9. Graduate students may enroll for one additional credit that is not graded (i.e., Audit) for summer, fall, and spring semesters.

### COURSE DEFICIENCIES

Students who have been admitted with departmental deficiencies may be required to take diagnostic tests and additional qualifying examinations. They must complete satisfactorily, in a manner specified by the major department, all undergraduate course deficiencies as prescribed by the department responsible for the graduate program. Course deficiencies will be listed on the transcript; however, these deficiencies will not be calculated in the student's graduate GPA or graduate hours.

With the permission of the student's advisor and the head of the department, courses to meet undergraduate deficiencies may be taken under an S/U option (with S being a grade satisfactory to the professor). These courses will not affect the maximum number of S/U graduate credits permitted.

### SPECIALIZATIONS/CONCENTRATIONS

A specialization is a collection of coursework in a specific area that is part of a degree program of study at NMSU. Only approved specializations/concentrations within a students' department or program may be noted on a transcript.

Students must file a request for inclusion of an approved specializations/concentration at the time they file their program of study and must identify the specializations/concentration in their application for the degree. Specializations/concentrations will not be added to a transcript after the degree is awarded.

Departments must certify that a student has met the requirements for a specializations/concentration at the time the student successfully completes the final examination.

### DECLARATION OF MINOR

Any doctoral applicant for candidacy may declare up to two approved minors in addition to the major area of study. All minors must be approved by the minor department head and the dean of the Graduate School and normally consist

of nine credits. Demonstration of competency in the minor area will be required at both comprehensive and final examinations.

### COMPLETING A THESIS OR DISSERTATION

The student must ensure that each member of the examining committee receives a copy of the thesis no later than seven working days before the date of the final examination.

The form and style of the thesis or dissertation must comply with the regulations given in the Guidelines for Preparing a Thesis or Dissertation. These guidelines also contain detailed information on the thesis-approval process and binding. See <http://gradschool.nmsu.edu/Guidelines>. Candidates are encouraged to consult with the graduate reviewer on format, deadlines, and procedures before final typing.

The thesis must be submitted to the graduate reviewer on or before the deadlines posted in the current academic calendar printed inside the back cover of the current Graduate Catalog and at <http://gradschool.nmsu.edu/deadlines/deadlines.htm>. The thesis or dissertation is not complete until copies have been accepted for binding by the binding section staff in Branson Library.

### OUTCOMES ASSESSMENT - EVALUATING YOUR ACADEMIC EXPERIENCE

New Mexico State University is committed to providing its students with a quality education and a supportive learning environment. Assessment is a process of rigorous review followed by implementation of changes to enhance and improve the quality of education students receive at NMSU. For assessment to be effective, students must be actively aware of, and engaged in, assessment activities. Faculty and staff at NMSU will communicate to students the value and implications of assessment. For their part, students will provide feedback on personal, professional and academic development. Students are expected to participate in all types of assessment when asked to do so. Types of assessment activities include class assignments, course projects, exams, exit interviews, standardized tests, surveys, focus groups, etc. Data gathered through these assessments will be published only in aggregate form. Efforts will be made to inform students of assessment results and the program improvements implemented as a result of assessment.

### REGISTRATION FOR SUMMER GRADUATION

If the final examination is to be scheduled or the thesis is to be completed during the summer, the student must register for one credit hour during the summer session in which the oral examination will be held or the thesis will be completed.

In order to graduate during a summer session the student must also have filed the "Application for Degree (Diploma)" by the deadline posted in the current Schedule of Classes, or the academic calendar printed on the inside back cover of the current Graduate Catalog, and at <http://gradschool.nmsu.edu/deadlines/deadlines.htm>.

### APPLICATION FOR DEGREE (DIPLOMA)

The student must file an "Application for Degree (Diploma)" by the deadline set forth in the Schedule of Classes. The student must submit the "Application for Degree (Diploma)" to the Office of the Registrar prior to the last day for registration for the final semester or summer session in which the student will be completing degree requirements.

Students filing an "Application for Degree (Diploma)" after the deadline will be charged an additional \$25 fee. No "Application for Degree (Diploma)" forms are processed after midterm. The Graduate School will not approve Applications for Degrees after the late fee deadline has been reached.

If a student does not complete requirements for the semester for which the "Application for Degree (Diploma)" has been made, **then the student must reapply for the degree and pay all applicable fees for the semester in which the degree requirements will be completed.**

### ATTENDANCE AT COMMENCEMENT

To participate in commencement, all eligible candidates must have applied for their degree by the deadline established by the Registrar's Office (<http://nmsu.edu/~registra/degdate.html>) and met all final degree requirements set by their department, the Graduate School and University Admissions. In addition, doctoral degree students who wish to participate in commencement must have applied for their degree by the deadline established by the Registrar's Office, submitted their dissertation title by the deadline set by the Graduate School and met all final degree requirements. The title of the dissertation will be published in the Commencement book provided that all requirements and deadlines were met by the student. Degree recipients from the previous summer session who wish to participate in commencement must attend the fall ceremony. Students who complete all degree requirements in the spring semester attend the spring ceremony.

Participation in commencement does not, in itself, mean that a student is considered an NMSU graduate. In order to receive a graduate degree, a student must fulfill all university requirements. The degree will reflect the graduation date when all requirements were met.

## THE MASTER'S DEGREE

New Mexico State University offers both academic and professional master's degrees.

If the student's undergraduate program fails to provide a proper foundation for advanced work in the chosen field or department, the student may be required to take classes to correct those deficiencies, consequently resulting in a longer period of residence than would otherwise be required.

### AMOUNT AND DISTRIBUTION OF WORK

A minimum of 30 semester credits is required for the master's degree. Most master's degrees require at least 15 credits in courses numbered 500 or above, including thesis credit for master's programs involving a thesis. Master's programs involving a thesis include no more than six and no fewer than four credits of thesis. (See the section on "Thesis" (p. 19) for further guidelines.)

At least 15 credits for the master's degree must be for work in courses in the department in which the student was admitted. Additional credits may be selected from other fields to fit into a logical, justifiable program. Courses used to remove deficiencies or satisfy prerequisites cannot be counted as part of the requirements for the master's degree.

Students must take coursework from a variety of faculty. Students may not take more than half of the minimum credits required for a master's degree (excluding thesis credits) with the same professor. Short courses of less than one summer session or one semester duration cannot constitute more than one-fourth of the total course requirements for a master's degree.

### PROGRAM OF STUDY

It is recommended that, during the first semester of enrollment, each graduate student beginning studies toward a degree prepare a complete tentative program of study in consultation with the student's advisor. This tentative program should be kept in the student's file within the department and is not to be considered as the "Application for Admission to Candidacy," which contains the permanent program.

### APPLICATION TO CANDIDACY

The admission of a student to the Graduate School does not imply admission to candidacy for an advanced degree. The major department in which the student intends to become a candidate for a master's degree must be satisfied as to the student's sound basic training and the ability to pursue studies at the graduate level. Departments may require a comprehensive qualifying examination before officially approving any candidate for the master's degree.

**An "Application for Admission to Candidacy," which formally lists curriculum requirements for the student's program of studies, must be filed with University Admissions no later than after the completion of 12 credits of graduate work.**

At the time the "Application for Admission to Candidacy" is submitted, the student must have a cumulative graduate grade-point average of 3.0. The application may specify the Graduate Catalog in effect at the time of matriculation, provided that the catalog is not more than seven years old. Otherwise, the current Graduate Catalog will be used. The student's program listed in the "Application for Admission to Candidacy" must (1) meet the requirements of the chosen catalog, including the regulations of the Graduate School and of the major department, (2) include undergraduate deficiencies and required courses specified on the student's "Certificate of Admission," (3) be certified by the student, the student's advisor, heads of departments offering major and minor fields, and the cognizant deans, and (4) list each course number and abbreviated title with the hours and grades. If the program is not satisfactory in the judgment of the graduate dean, it may be returned to the department for revision. When the "Application for Admission to Candidacy" has been approved by the graduate dean, the student will be formally admitted to candidacy for the master's degree.

### THESIS OR NON-THESIS OPTION

A thesis in the major field is recommended and may be required, at the discretion of the department concerned.

Not more than six nor fewer than four thesis credits may be counted toward the requirements for a master's degree.

Many departments have a non-thesis option. Please check with the department on the non-thesis option.

### CONTINUOUS ENROLLMENT

Having once registered for thesis, a student must continue to register for a minimum of one credit in thesis or graduate course work each regular semester until the thesis is approved by the Graduate School and the copies have been accepted by the binding section in Branson Library. A student who fails to abide by this regulation will be considered withdrawn from the university and, in order to resume studies, must formally apply for readmission and satisfy the requirements in effect at the time of reapplication.

### GRADUATE COMMITTEE

The master's degree committee will consist of a minimum of three faculty members holding at least master's degrees. The committee chair and one other member must be in the student's department; however, the home department of one of these two committee members may be outside the student's department (see Graduate Faculty Guidelines section "Appointments Outside of Home Department"). The third person on the committee must serve as the dean's representative and cannot be a faculty member of the students' home department.

The committee chair and the dean's representative must be members of the graduate faculty (please refer to "Guidelines for Graduate Faculty Appointments"). If the student has an approved minor area of study then either the dean's representative or a fourth committee member must come from the minor department.

If no minor is declared, the dean's representative may come from a related area (recommended by the committee chair) or be appointed independently by the dean of the Graduate School.

All students completing a written exam are required to have a dean's representative that reviews the process of administering the exam. The dean's representative can sign off on all of the exams of students taking a written exam for the given semester. The dean's representative must be from outside the students' home department.

The faculty committee of the student is responsible for identifying a dean's representative and completing the examination forms. A list of graduate faculty is available at the web site of the Graduate School. Faculty can use the list to identify graduate faculty to serve as the dean's representative.

Departments can nominate individuals with a master's degree and/or doctoral degree and related experience for a temporary appointment to graduate faculty (please see Appointment to Graduate Faculty of Non-NMSU Employees in the Guidelines on Graduate Faculty Appointments in this Graduate Catalog). Nomination letters must identify specific roles of the individual and the year(s) of service (up to three years per request per individual). The nomination letter must receive the endorsement of the academic dean. If granted a temporary appointment to graduate faculty, the individual will be limited to the specific role(s) identified by the department. Departments can request that the individual be allowed to serve as a dean's representative.

As indicated in the "Guidelines for Graduate Faculty Appointments," any qualified member of the graduate faculty may join any graduate program within a department. Applicants will be approved by the graduate program to which they are applying, through a process to be determined by that program, before their application is forwarded to the dean of the Graduate School. Departments may structure committees that include more than the minimum number of members as long as the stated conditions of membership are satisfied. Additional voting and nonvoting members may be any person approved or appointed by the dean of the Graduate School.

### FINAL EXAMINATION

Each candidate will be given a final examination conducted by the graduate committee in accordance to the schedule provided by University Admissions. **It is the student's responsibility to be sure that the form to schedule this examination is submitted to the Graduate School at least ten working days prior to the proposed date for the examination.**

At the time of the final examination, a graduate student must have an NMSU cumulative graduate grade-point average of at least 3.0 and must be enrolled in the final semester; or, if the student is writing a thesis, he or she must have completed all course work for the master's degree.

Students with the no thesis option may be required to pay a special exam fee in lieu of registering for one credit hour of graduate course work. (See "Tuition, Fees, and Other Expenses." (p. 8))

The final examination format shall be determined by the department, with the approval of the graduate dean. If a department does not specify an examination format, the final examination shall consist of an oral defense of the student's thesis (if one was written) as well as a general examination of the candidate's field of study.

Any candidate who fails in the final examination may (1) upon recommendation of the advisor and approval of the graduate dean, be granted a second examination after a lapse of at least one semester, or (2) be excluded from further candidacy for the degree. Failure in the second examination disqualifies a candidate from obtaining the degree. Certification that the thesis has been

accepted and that the final examination has been passed must be filed with University Admissions not later than one week before the degree is conferred.

### TIME LIMIT

The graduate program leading to the master's degree must be completed within seven years (or eight successive summers) including completion of the master's thesis or final project. Any course work more than seven years old at time of the final examination will not be included in the program.

### MINORS

A candidate for a master's degree may select up to two approved minors in addition to the major. A minimum of nine credits of graduate work is necessary for a minor at the master's level. (See "Graduate Degree Programs, Specializations/ Concentrations, and Approved Minors" for a list of approved minors.) To record a minor on a student's permanent record, the minor must be listed on the "Application for Admission to Candidacy," and this form must be signed by the head of the department offering the minor program. At the oral examination, a committee member may move to remove the designation of a minor with the concurrence of the committee.

A minor will not be awarded after the degree has been posted to the transcript.

### INTERDISCIPLINARY MASTER'S DEGREE

Interdisciplinary studies at New Mexico State University are intended for individuals specializing in programs that require the integration of more than one discipline to fully engage in the field of study. Interdisciplinary studies provide a mechanism to address emerging scholarship, innovation, and research and allows graduate students to engage in emerging technologies, optimizing their education outside the traditional disciplinary boundaries. Interdisciplinary study takes advantage of traditional academic training within specific departments yet allows students to customize their own career preparation.

In these programs, a coherent common core is expected and is intended to combine existing courses across disciplines to meet unique objectives. The Master of Science or Master of Arts degrees are awarded for interdisciplinary programs and are carried out under the direction of the student's graduate committee. The interdisciplinary studies option should not be used in cases where the applicants' objectives can be realized by admission to a specific department and inclusion of up to two minor areas in the program of study.

### Admission

Students follow the regular admission procedures set forth by the Graduate School. In completing the application, the applicant indicates IMAS in the section requesting Department or Program and designates the area of interdisciplinary study in the section requesting "Field or area of advanced study." A proposal for interdisciplinary studies (see 1 below) must be submitted with the application. A departmental referral form will be generated and sent to the primary department specified in the proposal (see 3 below). Once the student's graduate committee is designated, the committee can require additional materials such as a statement of interest, letters of recommendation, GRE or GMAT scores, and a personal interview.

### Thesis/Non-thesis option

As with any graduate student, the student in interdisciplinary studies can select to follow a thesis or non-thesis option. Students enrolled in the thesis option register for six thesis credits. Students not wishing to follow the thesis option will be required to complete a project report. The project must reflect the interdisciplinary nature of the program in which the student is engaged.

### Comprehensive exam

Students in interdisciplinary studies take a comprehensive exam composed of questions designed by the student's committee. Two individuals in the areas of study plus the dean's representative outside of the department/program/interdisciplinary study option will be involved. A chair is also identified.

### Degree awarded

Students receive a Master of Arts (MA) or Master of Science (MS) and a concentration in the interdisciplinary study area.

### Other conditions that apply

1. The student must present a written description of the program concept consisting of (a) objective of the program of study including proposed areas of skill development, proposed courses in more than one graduate degree granting department of NMSU, and (b) a justification for not using an existing departmental degree program. In addition the student needs to designate the degree

being sought (Master of Science or Master of Arts) and a name for the interdisciplinary area.

2. The student's program of study must include a minimum of 30 graduate level credits and a maximum of 36 credits. The student may take six credits in departments that do not grant a graduate degree but the courses must be numbered 450 and above, and be pertinent to the program of study.
3. The majority of the departments involved in the student's program will be master's degree and doctoral degree granting departments. The student is expected to take at least 15 credits in the primary area of study within one department. The department selected by the student will receive a copy of the student's application for admissions from University Admissions. In addition, the student is required to select an approved minor area of study in another department that consists of at least 9 credit hours (see the Approved Graduate Minors and Programs section for the approved list of minors).
4. The student will form a committee composed of members of the graduate faculty and select an advisor who will chair the committee. The chair must be from the primary department where the student has taken at least 15 credit hours listed in the proposal submitted and the other committee member must be from another department in which the student has selected a minor area of study from the approved list of minors listed in the Graduate Catalog. The third faculty member must be the dean's representative.
5. The student will be required to submit the Candidacy Form to University Admissions after 12 credits are satisfactorily completed.
6. The program will meet all requirements of a master's degree, as listed in the Graduate Catalog; with the interpretation that "major field" includes courses from two or more departments and in the designated interdisciplinary study area.
7. The program of study will include completion of a research thesis or project. The work may be submitted in the form of a publishable manuscript, technical report, thesis or creative option.
8. The student may enroll on a part-time basis keeping in mind that coursework cannot be more than seven years old at the time of the final examination.
9. The student will be administered a final comprehensive exam that is consistent with the department selected for the primary area of study. For example, if a department requires a written exam, the student in the interdisciplinary masters will also be required to take a written exam.
10. The final oral comprehensive exam will consist of questions pertinent to the area of study and the defense of the research thesis or project. In both cases an integrated approach to the areas of study chosen should be followed.
11. All other rules for graduate study at NMSU must be followed.

### SECOND MASTER'S DEGREE

A student who has earned one master's degree at NMSU may be allowed to count a maximum of six semester credits earned on the first degree toward a second master's degree, if those credits fit into a logical graduate program. The number of shared credits may be increased for dual and joint degree programs.

### DUAL AND JOINT DEGREE PROGRAMS

A **dual** degree program is a program of study whereby courses of study are combined so that students can complete two degree programs of study in less time than it would take if the programs were independently pursued. Upon graduation, they receive two separate diplomas from each degree program of participating departments and/or institutions. To enroll in a dual, students must complete two separate applications, receive two independent offers of admissions, and meet program and course requirements of both programs of study.

A **joint** degree program is one where two or more departments interweave their courses and course requirements to create a single degree program. Students are admitted into one program, take courses in each participating department, college or university, but only received one degree and diploma. These degree programs allow departments and/or campuses to take advantage of faculty talents.

Both dual and joint degree programs must have prior approval by the Graduate School. Students must apply and be accepted into graduate programs of each department participating in a specific dual or joint degree program. The list of approved dual and joint degrees can be found in the section "Graduate Degree Programs."

## TEACHER LICENSURE

Students wishing to take graduate courses for licensure or renewal of licensure or for personal enrichment must be fully admitted to a department to do so. Undeclared students may not register for teacher licensure classes. Endorsement is available at both the elementary and secondary levels in bilingual education, TESOL (Teaching of English as a Second Language), reading, and special education. Endorsement is also available in early childhood education at the elementary level. Contact [curric-instr@nmsu.edu](mailto:curric-instr@nmsu.edu) for more information.

## SPECIALIST IN EDUCATION DEGREE

The degree of specialist in education is provided for experienced members of the education profession who have completed the master's degree (except the school psychology program, which requires the bachelor's degree) and have maintained a 3.3 grade-point average during pursuit of this degree or its equivalent. Primary emphasis is placed on the development of competencies needed for a professional specialization in a given field. Programs are available in curriculum and instruction and school psychology.

Students must complete the general application for the Graduate School. They should also check with the admitting department for specific departmental requirements.

### Residency and Credit Requirements

The specialist in education degree requires a minimum of 30 semester credits beyond the master's degree, including research, intern experiences, and graduate courses. The student meets the campus residency requirement by completing a minimum of 24 credits from faculty of New Mexico State University.

The student must maintain a 3.0 average. No more than six semester credits of C level work are allowed in this program.

### Program of Study

It is recommended that, during the first semester of enrollment, each graduate student beginning studies toward a degree prepare a complete tentative program of study in consultation with the student's advisor. This tentative program should be kept in the student's file within the department and is not to be considered as the "Application for Admission to Candidacy," which contains the permanent program.

### Transfer of Credits

A maximum of six graduate credits earned at another approved institution may apply to this degree. Transfer credits must have been earned during the five-year period prior to completion of the specialist in education degree.

### Major Field

All course work taken for the degree should apply directly, through a logical program of study, to the specialty which the candidate has selected. Two to six credits will be earned through research that is acceptable to the College of Education and the cooperating educational agency. Each department is responsible for defining the required sequence of courses.

### Candidacy

Following the successful completion of 12 semester credits beyond the master's degree, the student is eligible for admission to candidacy. With the achievement of candidacy, a committee is appointed to work with the candidate on the remainder of the program. The committee consists of three members of the graduate faculty in the College of Education.

### Internship

Each candidate will earn from three to six semester credits in an internship. This experience will consist of supervised performance of duties related to the candidate's specialty. The structure of the internship will be determined by the student's department. A research project will be conducted in conjunction with the internship.

### Oral Examination

The oral examination committee will consist of the student's committee plus a dean's representative appointed from the graduate faculty by the dean of the Graduate School. This committee will conduct an oral examination at the conclusion of the research project and no earlier than the candidate's last semester of enrollment.

The examination will consist of a defense of the project along with general questions on subject matter related to the candidate's field of study. Any candidate who fails the oral examination may, upon recommendation of the advisor and approval of the graduate dean, be granted a second examination after a lapse of at least one semester. Failure in the second examination disqualifies the candidate from obtaining the degree.

## Time Limit

The specialist in education degree must be completed within seven years following admission to the program.

Students cannot include any course work on their program of study that is more than seven years old at the time of the final oral examination.

# THE DOCTORAL DEGREES

## PREPARATION FOR DOCTORAL DEGREE PROGRAMS

Prospective candidates are expected to hold bachelor's or master's degrees from accredited institutions, based on curricula that include the prerequisites for graduate study in the department of their subject. To be considered for admission to a doctoral program, the applicant must have a grade-point average of at least 3.0. Prospective candidates are urged to consult the department in which they wish to study for information concerning specific requirements.

### DOCTOR OF PHILOSOPHY (PH.D.)

The degree of doctor of philosophy requires distinguished attainment in both scholarship and original research. The degree is granted chiefly in recognition of the candidate's high attainments and ability in the special field, as shown by work on the required examinations covering both the general and the special fields, and by the preparation of a dissertation. A candidate for the Ph.D. degree is expected to maintain a higher level of work than the grade-point average of 3.0 that has been established for the candidate for the master's degree.

### DOCTOR OF EDUCATION (ED.D.)

The degree of doctor of education attests proficiency in a program of graduate study in which the emphasis is upon preparation for competent performance in professional education. This program is intended primarily for students pursuing careers in which teaching, administration, or school services predominate, rather than those in which research predominates. The Ed.D. degree in curriculum and instruction is offered in the Department of Curriculum and Instruction; the degree in educational administration is offered in the Department of Educational Management and Development.

The requirements for doctoral degrees in the two departments of the College of Education have the following distinguishing elements:

1. The qualifying examination consists of a written and an oral section, both of which are administered prior to admission to the program. Successful completion of the qualifying examination is tantamount to acceptance of the student for doctoral admission. Residency of at least two consecutive semesters cannot commence until the semester after the qualifying examination is successfully completed.
2. Comprehensive examinations are usually administered three times annually. The written examination tests the major and related areas of concentration. Within two weeks after successful completion of the major and related area examinations, the student takes a comprehensive oral examination. Candidacy follows the successful completion of the orals. A student who fails any part of the comprehensive examination may present him- or herself for re-examination of the failed part of the exam before moving on to the next part.
3. The major area of study must be within the College of Education. A minimum of nine planned and integrated credits constitutes the related area and can be taken in any department of the university with the approval of the student's committee. The related area must be specifically planned with the major and minor departments in order for the doctoral fields to be mutually supportive. Any transfer credit or predoctoral course work to be included in the related field must have the approval of both the major and minor department at the outset. Specified course work in both research and statistics is required for this degree. Other requirements are described in the departmental sections of this catalog.

### DOCTOR OF ECONOMIC DEVELOPMENT

Students enrolled in the Doctor of Economic Development are required to complete and pass their comprehensive examination. Since a dissertation is not required, they are expected to complete an internship experience and a Project paper as defined by their program. They can embark on the Project paper once they have completed and passed their comprehensive examination. They are not required to take 700 level dissertation hours. However, they are expected to



complete at least 12 credits at the 600 level including ECDV 694 Internship and ECDV 699 Doctoral Project.

A Project paper must be finalized using a similar submission process as the dissertation (see section Finalizing the Doctoral Dissertation of the Graduate Catalog). On the front page, after the title of the paper, the student should indicate that it is a Project paper. Students completing Projects papers do not need to complete the Earned Doctoral Survey. The paper must be submitted to the Graduate School for format review on or before the deadline. The form and style of the paper must comply with regulations given in the Guidelines for Preparing a Thesis or Dissertation. These guidelines also contain detailed information on the dissertation/project paper-approval process as well as information on binding. Candidates are encouraged to consult with the Graduate School on format, deadlines, and procedures before final typing. The project paper is not complete until copies have been accepted for binding by the staff of Branson Library and until the microfilm agreement form has been completed and received in Branson Library.

### DOCTOR OF NURSING PRACTICE

Students that hold a baccalaureate degree in Nursing are required to complete and pass all required course work for the Doctor of Nursing Practice degree program. They are also expected to complete and pass their comprehensive examination. Since a dissertation is not required, they are expected to complete an internship experience and a project paper as defined by their program. They can embark on the Project paper once they have completed and passed their comprehensive examination. They are not required to take 700 level dissertation hours. However, they are expected to complete at least 12 credits at the 600 level including NURS 698 Advanced Clinical Residency and NURS 699 Clinical Scholarly Project. Students that hold a Master's of Science in Nursing are required to complete all course work requirements, complete and pass their comprehensive exam, and complete a Project paper. To complete their Project paper, they must complete at least 6 credits at the 600 level including NURS 699 Clinical Scholarly Project.

A Projects paper must be finalized using a similar submission process as the dissertation (see section Finalizing the Doctoral Dissertation of the Graduate Catalog). On the front page, after the title of the paper, the student should indicate that it is a Project paper. Students completing Project papers do not need to complete the Earned Doctoral Survey. The Project paper must be submitted to the Graduate School for format review on or before the deadline. The form and style of the paper must comply with the regulations given in the Guidelines for Preparing a Thesis or Dissertation. These guidelines also contain detailed information on the dissertation/project paper-approval process as well as information on binding. Candidates are encouraged to consult with the Graduate School on format, deadlines, and procedures before final typing. The project paper is not complete until copies have been accepted for binding by the staff of Branson Library and until the microfilm agreement form has been completed and received in Branson Library.

### INTERDISCIPLINARY DOCTORATE

Students wishing to study in the interdisciplinary doctoral degree program must apply and be accepted into a doctorate-granting department. The following requirements for admission to the interdisciplinary doctorate degree program have been established:

1. A master's degree or equivalent program of study that includes at least 30 credit hours of graduate course work with a minimum cumulative grade point average of 3.0.
2. Twelve credit hours of graduate course work must be completed at New Mexico State University in order to apply for admission into the interdisciplinary doctorate degree program. Additional course work is required for degree completion.
3. Evidence of outstanding academic achievement in graduate school.
4. A written description of the program concept prepared by the student consisting of (a) areas in which competency is required; (b) proposed readings and course work and how these relate to required competencies; (c) objectives and an outline for thesis research; (d) justification for not using an existing departmental degree program.
5. The student must select an advisor from his or her department to chair the committee and, in consultation with the advisor, structure a committee consisting of at least five faculty members from the graduate faculty list who are willing to work on the interdisciplinary degree program. The committee must include at least two members from each of two doctorate-granting departments. The committee chair will convene a meeting to review and approve the proposed program.
6. University Admissions will send an "Admission Referral" document, signed by all committee members, to the heads of all departments from which the student proposes to use more than eight credits of

course work, or from which faculty are requested to serve on the proposed committee.

7. Once the "Admission Referral" document has been approved by all departments, the committee chair will convene a meeting of the committee to review the student's program and make changes as necessary. In addition, the committee will set the format and date for the qualifying exam. An effort should be made to incorporate the interdisciplinary nature of the program into the qualifying exam.
8. When the student has passed the qualifying exam and the "Admission Referral" memorandum has been approved by the respective department heads, the requirements for admission to the program are satisfied. Formal acceptance into a doctoral program may be required in order to receive financial assistance.
9. The number of courses required for degree completion will vary depending on the student's program of study. Interdisciplinary doctorate degree students must meet the requirements for residency, registration, the comprehensive examination, the Final Examination, the dissertation, and the declaration of approved minor. Please see the "Doctoral Degrees" section of this catalog to review the full requirements for doctoral degrees.
10. The dissertation work shall include at least 18 credits of a 700-level course.

### REQUIREMENTS FOR THE DOCTORAL DEGREES

#### Qualifying Examination

Doctoral students must pass a qualifying examination. This examination is scheduled by the student's advisor and is administered by the major department. Its purpose is to determine the areas in which the student shows strength or weakness, as well as the ability to assimilate subject matter presented at the graduate level.

Scheduling the qualifying examination is based on the following criteria: (a) for students who enter the Graduate School with little or no previous graduate experience but wish to proceed directly to the doctorate, the qualifying examination should be taken after 12 credits of graduate work; (b) for students who enter with a master's degree or equivalent from another university, or another department, the qualifying examination should be taken before the completion of one semester of graduate work.

The department may allow the master's final examination to serve as the doctoral qualifying examination or may require a separate examination for students who earn their master's degree at New Mexico State University, and will continue in the same department.

Based on the result of the qualifying examination, the department will take one or more of the following actions: (a) admit the student to further work toward the doctorate; (b) recommend that the program be limited to the master's degree; (c) recommend a re-evaluation of the student's progress after the lapse of one semester; or (d) recommend a discontinuation of graduate work. In all cases, University Admissions shall be notified of the results of the qualifying examination.

Upon passing the qualifying examination, the student will be admitted to the doctoral program. The student's advisor and department head will then appoint the doctoral committee to prepare the student's preliminary program of study for the doctorate. This program shall be filed with University Admissions.

#### Graduate Committee—Doctoral

The doctoral committee will be composed of at least four members of the graduate faculty holding doctoral degrees. The following rules apply to the composition of the committee:

- In addition to the committee chair, at least one other member must be from a discipline within the student's major area, which may encompass more than one degree-granting department.
- One member of the committee may be from a related area of study other than the student's declared minor.
- If an approved minor is declared, at least one but not more than two members of the committee must be from the minor area.
- At least three committee members must be members of the graduate faculty in doctorate-granting departments. Of these three members:
- The committee chair must be a member of the graduate faculty in the student's department (See the section "Appointments Outside of Home Department" in the "Guidelines on Graduate Faculty Appointments").
- The home department of no more than one of the other two committee members from doctorate-granting departments may be outside the student's department.

As indicated in the "Guidelines for Graduate Faculty Appointments," any qualified member of the graduate faculty may join any graduate program within a department. Applicants will be approved by the graduate program to which they

are applying, through a process to be determined by that program, before their application is forwarded to the dean of the Graduate School.

One member of the committee must serve as the dean's representative. The dean's representative can be either the member from the related area or minor area or an independent member appointed by the dean of the Graduate School but must not be from the student's department. In programs where more than one department is a participant, the dean's representative may not be from any of those departments.

Departments may structure committees that include more than the minimum number of members as long as the stated conditions of membership are satisfied. Additional voting and nonvoting members may be any person approved or appointed by the dean of the Graduate School. All members of the committee will attend the comprehensive oral and the final defense for the dissertation. No change in membership of the doctoral committee may be made without prior approval from the dean of the Graduate School.

### Program of Study

A student who has completed 12 credits of graduate work beyond the master's degree, or its equivalent, in residence at New Mexico State University, and has successfully completed the qualifying examination, should file the "Program of Study and Committee for Doctoral Students" form (also called "Program of Study") for the doctorate before registering for additional courses. This form may be obtained from University Admissions, department offices, or from the website of University Admissions: <http://prospective.nmsu.edu/graduate/forms/index.html>. The "Program of Study" should be completed in consultation with the advisor and other members of the doctoral committee. This form should include the course number and abbreviated title with the credit hours. For courses already completed, grades must be shown for both major and minor areas. The program recommended by the student's committee is subject to approval by the head of the major department, the head of the minor department (if applicable), the college dean, and the dean of the Graduate School.

The program of study should be designed to meet the campus residency requirement described in "Residency" (p. 24) and should include a minimum of 30 graduate credits (from NMSU or other approved graduate programs) plus 18 credits of dissertation work (700-level course).

### Comprehensive Examination

Before admission to candidacy for a doctoral degree, the student must pass a comprehensive examination intended to test knowledge of the major and any approved minor fields of study. The student will be admitted to the examination after satisfaction of the language requirements (where applicable), after completion of adequate course work to the satisfaction of the major department and the Graduate School, and when considered by the committee to be adequately prepared.

University Admissions should receive the "Program of Study and Committee for Doctoral Students" and standardized test scores (if required by the department) after the student passes the qualifying examination and before the comprehensive examination. **The oral examination form must be on file at University Admissions at least ten working days prior to the proposed date for the examination.** The examination must be part written and part oral. The results of the oral examination will be reported to University Admissions.

Any applicant for candidacy who fails the comprehensive examination may, upon recommendation of the committee and approval of the graduate dean, (1) be granted a second examination after a lapse of at least one semester or (2) be terminated from the doctoral program. The student must be duly registered for three credits of graduate course work in the Graduate School during the semester in which the comprehensive examination is taken. A student taking an oral examination during the summer must enroll for at least one credit for that term.

In general, there should be a time lapse of at least one year between the comprehensive and final oral examination. However, due to the type of research required in some departments and the method of administering the written comprehensive in other departments, such a time lapse is not always practical. In all cases there must be one semester between the comprehensive and the final oral examinations.

### Time Limit

If more than five years have elapsed since the date of the comprehensive examination, the candidate will be required to take another comprehensive examination before admission to the final examination.

### Advancement to Candidacy

A student will be formally advanced to candidacy upon the successful completion of the comprehensive examination, the recommendation of the committee, and the approval of the graduate dean.

A minimum of nine credits must be taken after successful completion of the comprehensive exam. A student may not register for dissertation credits (700) prior to successful completion of the qualifying exam. The dissertation preparation shall

total at least 18 credits of courses numbered 700. The doctoral committee can impose additional requirements for courses numbered 700.

A student is admitted to the doctoral program after successful completion of the qualifying examination. After successful completion of the comprehensive examination, a student must continue to register for at least three credits of dissertation or graduate course work each regular semester until the dissertation is approved by the Graduate School and the copies have been accepted by the binding section in Branson Library. A student who fails to abide by this regulation will be considered withdrawn from the university, and, in order to resume studies, must formally apply for readmission and satisfy the requirements in effect at time of reapplication.

### Final Examination

Every student working toward the doctoral degree will submit a dissertation embodying the results of original research. The dissertation is expected to demonstrate the student's ability in independent investigation and to be a contribution to human knowledge. The dissertation shall display a mastery of the literature of the subject field and present an organized, coherent development of ideas with a clear exposition of results, and provide a critical discussion of the limits and validity of the student's conclusions.

When a complete draft of the dissertation has been prepared, the student's doctoral committee (appointed after the qualifying examination) will conduct the final examination. The final examination is concerned primarily with the research work of the student as embodied in the dissertation, but it may be much broader and extend over the candidate's entire field of study. The intention of the final examination is to verify that the candidate has a satisfactory grasp of the major subject as a whole and has a general acquaintance with the fields of knowledge represented by the course of study. The final examination is entirely oral and is open to the public.

The final examination must be completed in accordance with the schedule provided in the academic calendar. The form requesting this examination is to be submitted by the department to University Admissions ten working days before the examination is taken. This form may be found on the Web at <http://gradschool.nmsu.edu/forms-index.html> and is also available from the Graduate School and departmental offices.

The student must ensure that each member of the examining committee receives a copy of the dissertation no later than seven working days before the date of the final examination.

Any candidate who fails the final oral examination may (a) upon recommendation of the committee and approval of the graduate dean be granted a second examination after a lapse of at least one semester; or (b) be terminated from the doctoral program. Failure in the second examination disqualifies the candidate from obtaining the degree.

### Registration during Regular Semesters and Summer Session

After successful completion of the comprehensive examination, a student must continue to register for at least three credits of dissertation or graduate course work each spring and fall semester until the dissertation is approved by the Graduate School and the copies have been accepted by the binding section in Branson Library. A student who fails to abide by this regulation will be considered withdrawn from the university and, in order to resume studies, must formally apply for readmission and satisfy the requirements in effect at time of reapplication.

During spring and fall semesters the doctoral candidate must register for three units of dissertation or other graduate course work. The candidate must have also applied for the degree by filing the "Application for Degree (Diploma)" by the deadline specified in the academic calendar.

If the final examination is to be held during the summer or the dissertation is to be completed during the summer, the student must register for one credit hour during the summer session in which the final examination will be held or the dissertation will be completed.

In order to graduate in the summer the student must have filed the "Application for Degree (Diploma)" by the posted deadline for the semester in which degree requirements will be completed.

### Finalizing the Doctoral Dissertation

After successful completion of the final examination a copy of the dissertation must be submitted to the Graduate School for format review on or before the deadline. The deadlines are posted to the Graduate School website at <http://gradschool.nmsu.edu/deadlines/deadlines.htm>.

The form and style of the dissertation must comply with the regulations given in the Guidelines for Preparing a Thesis or Dissertation <http://gradschool.nmsu.edu/Guidelines>. These guidelines also contain detailed information on the dissertation-approval process and binding. Candidates are encouraged to consult with the Graduate School on format, deadlines, and procedures before final typing.

The dissertation is not complete until copies have been accepted for binding by the binding section staff and until the microfilm agreement form has been completed and received in Branson Library.

## Residency

The requirements for the doctoral degree ordinarily cannot be met in less than three years following the bachelor's degree.

The minimum campus residency requirement for the doctoral degree shall include enrollment in at least two semesters of classes taught by New Mexico State University faculty.

## DECLARATION OF APPROVED MINOR

Any doctoral applicant for candidacy may declare up to two approved minors in addition to the major area of study. The list of approved minors can be found in the Graduate Catalog in the section called Graduate Degree Programs, Specializations/Concentrations, and Approved Minors. Demonstration of competency in the minor area will be required at both comprehensive and final examinations.

## FOREIGN LANGUAGE REQUIREMENTS

The Graduate School has no foreign language requirement. However, some departments require foreign languages for research. These requirements must be met before comprehensive orals are scheduled. For specific requirements for each doctoral degree, refer to the departmental sections of this catalog.

# RESEARCH FACILITIES

The university recognizes and supports the concept of off-campus study and research as a valuable experience for graduate students. These experiences may take the form of internships, intensive study of specialized techniques with personnel at other institutions, and conducting research at specialized research facilities. Arrangements for such off-campus activities should be made with the student's committee and the graduate dean and should represent opportunities not normally available at this university. When the bulk of a student's research is to be conducted off-campus, both on- and off-campus advisors should be appointed and periodic meetings with the student's committee held to ensure timely progress. Such opportunities offer students considerable flexibility in their training and promote valuable contacts between the student, the university, industry, and research institutions. Students are encouraged to pursue these opportunities with their advisors and the graduate dean.

## Agricultural Experiment Station

The Agricultural Experiment Station is the research division of the College of Agricultural, Consumer and Environmental Sciences. Faculty, professional personnel, and graduate students conduct basic and applied research concerned with biological, physical, and economic phases of food and fiber production, processing, and distribution; consumer health and nutrition; and the social and economic aspects of rural living. Energy, environmental, and natural resource conservation aspects of these broad disciplines offer many opportunities for the graduate student to undertake meaningful research investigations in both the laboratory and the field.

There are eight departments on the main campus with excellent laboratory facilities for research. In addition, the station maintains 13 field research centers including eight agricultural science centers, a forestry research center, a livestock research center, an animal insect lab, and two research ranches.

The station provides financial support to graduate research assistants and cooperates with research institutes at the university and with various state and federal agencies in providing opportunities for graduate research programs covering a wide scope of student interests. For further information, contact [aesdean@nmsu.edu](mailto:aesdean@nmsu.edu) or visit <http://aces.nmsu.edu/aes/>.

## Arts and Sciences Research Center

The research center is the coordinating office for all scholarly activities within the College of Arts and Sciences. The primary functions are service to departments and faculty members, and the administration of grants and contracts. The center encourages and stimulates individual research and creative efforts in all areas of the college, and it facilitates the development of potential research programs within the college, and with other colleges, institutes, the Physical Science Laboratory, and external organizations. The center assists individual faculty members by providing small grants of "seed" money. Typically, support services fall within, but are not limited to, the following areas:

- Location of funding sources
- Administration of grants and contracts
- Financial management of grants and contracts
- Liaison with the Office of the Vice President for Research

Contact: Dr. Jeffrey Brown at [jbrown@nmsu.edu](mailto:jbrown@nmsu.edu)  
<http://www.nmsu.edu/~artsci/Research/Center.html>

## Apache Point Observatory (APO-ARC)

Apache Point Observatory (APO) is located in the mountains of south-central New Mexico and is operated by New Mexico State University. The observatory is a major astronomical research facility that is home to four telescopes. The largest is a fully equipped 3.5-meter telescope that can be used for optical and infrared imaging, photometry, and spectroscopy. Apache Point Observatory is also the site of the Sloan Digital Sky Survey 2.5-meter telescope, which is running several different wide-field surveys touching on many facets of astronomy. NMSU owns and operates a 1-meter telescope at APO for wide field imaging. There is also a 0.5-meter telescope at the site.

Apache Point Observatory is owned by the Astrophysical Research Consortium (ARC). The consortium members include: New Mexico State University, Princeton University, the University of Colorado, the University of Chicago, the University of Virginia, the University of Washington, the Institute for Advanced Study, and Johns Hopkins University. NMSU manages and operated the observatory for the ARC consortium. Astronomy faculty and graduate students use the facility for various research projects. For further information, e-mail [astro@nmsu.edu](mailto:astro@nmsu.edu).

## Biology Research Facilities

The Department of Biology houses multiple core facilities and individually faculty-maintained research laboratories that have been successful in the acquisition of millions of dollars in research grants from the NIH and NSF, as well as other agencies. The core facilities and equipment include a 454 pyrosequencing facility, real time quantitative PCR, a cell culture facility, an isotopic signature analysis laboratory, insect and invertebrate rearing and microbiology culturing facilities, diverse microscopy laboratories, as well as a well-maintained herbarium and vertebrate museum holding more than 100,000 specimens from our region and beyond. Individual research laboratories are equipped to investigate organismal genomics, transcriptomics, and microbiome analysis; nutrient cycles in plant and soil samples; isotopic signatures from environmental samples; organismal and microbial evolutionary mechanisms and physiology; vaccine development; host-symbiont interactions; cell mitosis and cytokinesis; plant pathology; neuronal and muscular tissues; animal vocalization and behavior; computational modeling of biological phenomena; and molecular systematics.

Contact: Dr. John Gustafson ([jgustafs@nmsu.edu](mailto:jgustafs@nmsu.edu))

## Bureau of Business Research and Services

Founded in 1969, the bureau has two basic objectives. The first is to provide business and economic research services to both public and private sectors of the state, the region and the nation. Research capabilities in the behavioral and managerial sciences, business systems, economic and social sciences, marketing, and regional planning can be applied to problems relating to economic growth, business development, and community needs in New Mexico.

The second objective of the bureau is to provide management training services to business organizations and associations, to government agencies, and to the public as well. Management development seminars, training programs, and analytical services are designed to meet specific organizational needs.

The Bureau of Business Research and Services is a member of the Association for University Business and Economic Research.

Contact: Dr. Kevin Boberg ([kboberg@cs.nmsu.edu](mailto:kboberg@cs.nmsu.edu))

## Carlsbad Environmental Monitoring and Research Center

Created in 1991 with a grant from the U.S. Department of Energy, the Carlsbad Environmental Monitoring & Research Center (CEMRC), a department of the College of Engineering, conducts environmental research, provides special analytical services, assists with technology development, and disseminates information for federal, state, and private sponsors. CEMRC is housed at Light Hall, a 26,000-square-foot facility located in Carlsbad, in southeast New Mexico. The facility's laboratories include radiochemistry and associated nuclear spectroscopy, environmental organic and inorganic chemistry, in vivo bioassay, and field sampling. A primary activity of CEMRC is long-term environmental monitoring for contaminants in the region of the Waste Isolation Pilot Plant (WIPP), located near Carlsbad. The data produced from this project are summarized in periodic reports and are presented on the CEMRC web site at [www.cemrc.org](http://www.cemrc.org). Primary research areas of the CEMRC include studies of atmospheric dust and inorganic contaminants, human and ecological risk assessment, and development of radioanalytical and spectroscopic methods for measurement of naturally occurring and human-produced radioactive elements. Results of CEMRC research projects appear in peer-reviewed scientific journals and are presented at national and international meetings.

Contact: Dr Russell Hardy at (575) 234-5555

## Center for Latin American and Border Studies

The Center for Latin American and Border Studies (CLABS) was established in 1979 by the College of Arts and Sciences and is located at the Nason House. CLABS supports Frontera NorteSur, an on-line journal about the

U.S.-Mexico border. In addition, CLABS supports the collection at the NMSU library, travel for faculty to conferences, language training in Spanish and Portuguese, lectures by visiting speakers, curriculum development for teachers, the student Latin American organization, and other outreach activities. It has a faculty governance organization and helps administer the Nason foundation fund. In recent years the center has pursued an active program of research on U.S.-Mexico border policy issues, in cooperation with several universities in Mexico.

Contact: Inigo Garcia-Bryce (igarcia@nmsu.edu)

### Chemistry and Biochemistry Research Facilities

The Department of Chemistry and Biochemistry has a comprehensive equipment base that supports research in nearly all phases of chemistry. It also has instrumentation dedicated to the department's teaching mission. Major instruments supporting both missions include five nuclear magnetic resonance (NMR) spectrometers ranging from low field (200 MHz) to high field (500MHz), two atomic absorption spectrometers, several UV-Vis spectrometers, two mass spectrometers (LS/MS) and four gas chromatograph instruments. Details about all instruments located in the department's facilities can be accessed at [http://www.chemistry.nmsu.edu/instrumentation/NMSU\\_MainInstrument.html](http://www.chemistry.nmsu.edu/instrumentation/NMSU_MainInstrument.html).

Instrumentation Facilities Manager: Jaime Rodriguez (jarodrig@nmsu.edu)

### Cooperative Extension Service

As a land-grant institution, New Mexico State University has a tripartite mission—instruction, research, and extension. The three parts of this mission are closely interrelated and mutually reinforcing. New Mexico State University's Cooperative Extension Service serves a unique role in New Mexico. As the state's land-grant university, and as mandated by its charter, it is the "leading object" for agriculture, home economics, engineering, business, health sciences, as well as educational programs in the liberal arts and natural sciences. NMSU's uniqueness arises from its vision of teaching/learning, research, and extension/outreach functions—interdependent, mutually supportive, and central to its land-grant mission.

The extension aspect of the university's mission is the process of extending the intellectual expertise and resources of the university through teaching and applied research to address the social, civic, economic and environmental challenges and opportunities facing our state, region, nation, and global community. Extension entails an organized and planned program of activities; these activities bring the resources of the university to bear in a coherent and strategic fashion for the benefit of the citizens of New Mexico and the nation. Many faculty have split appointments with the Agricultural Experiment Station and serve as graduate advisors for students interested in extension as a career. For more information see <http://extension.nmsu.edu/>.

### DISSECT Laboratory

DISSECT (DIScovering SciEnce through Computational Thinking) is a laboratory established by a joint team of researchers from the Department of Computer Science and the College of Education. The lab is housed in Computer Science on the second floor of the Science Hall. DISSECT provides physical space and facilities to nurture interactions between computational scientists and educational researchers in order to develop innovative technologies that will expose K-12 students to fundamental principles of computing. The laboratory provides workspaces and high performance workstations for graduate students as well as a dedicated network and offices for researchers and visitors.

Director: Dr. Enrico Pontelli (epontell@cs.nmsu.edu).

### Educational Research Center (EDRC)

The Educational Research Center (EdRC) in the College of Education is the administrative office which supports faculty in obtaining and managing external funding. The academic which supports faculty in obtaining and managing external funding. The academic component of the ERC, under the direction of the Associate Dean for Research, Dr. Karin Wilburg, facilitates faculty involvement in research, publishing and outreach initiatives with the goal of building a strong research agenda for the college. For more information contact (kwilburg@nmsu.edu). The business component of the ERC is the Education Research and Budgeting Office (ERB) which assists in proposal submission, account setup and monitoring and provides oversight for the College's unrestricted, restricted and legislative funds.

ERB Director: Juanita Hannan (juamendo@nmsu.edu)

### Electron Microscopy Core Laboratory

The Electron Microscopy Laboratory (EML) is a campus-wide, core facility providing all levels of technical support and consultation for investigators needing analytical and routine transmission, scanning electron microscopy, and light microscopy services. The integrated imaging facility is administered through the Office of the Vice President for Research and is considered a core research facility. The facility was established to furnish state-of-the-art microscopy instrumentation and techniques to investigators and their students for research and training. The laboratory is located in Skeen Hall, RM W152, and W160.

Director: Dr. Peter Cook

### Engineering Research Center

Research studies in engineering were started at New Mexico State University as early as 1930. The development since World War II has been relatively rapid and, since 1957, with the appointment of a full-time staff, the Engineering Research Center (ERC) has been well established to serve faculty and students in the College of Engineering as part of the organized research program of the university.

The financial support for ERC research activities comes from local, state, and federal agencies; state appropriations and industry. ERC strives to encourage, foster, and promote research, and assist individual research projects in the college. ERC also administers research funds, integrates multidisciplinary research projects, and facilitates interactions with other university administrative units as well as nonuniversity organizations including local, state, and federal agencies.

Contact: Martha Mitchell, martmitc@nmsu.edu

### Geochemistry Research Laboratory

The Department of Geological Sciences houses a number of analytical instruments, all of which are available for use by graduate students, undergraduate researchers, and faculty. The department houses a fluorescence spectrometer for geochemical analysis of rocks and other solid materials, a thermal ionization mass spectrometer for analysis of isotopic ratios of solids and liquids, and a laser-induced breakdown spectrometer for the analysis of solid materials. Sample preparation equipment is available to support research on these instruments. In addition, mineral separation equipment including a jaw crusher, Gemini shaker table, Franz magnetic separator, and heavy liquids, is available for geochronologic or other mineralogic research projects.

Director: Dr. Nancy McMillan (nmcmillan@nmsu.edu)

### Information and Communication Technologies

Information and Communication Technologies (ICT) supports all facets of NMSU's information technology and provides state-of-the-art resources to students. Students have access to a wide variety of Internet resources, including the high-speed research network and computing facilities ranging from PCs to Unix to mainframes. There are 16 university computer labs with major labs in Jacobs Hall and the Computer Center building, some available every hour every day of the year. Labs are equipped with software for word processing, spreadsheets, databases, statistics, desktop publishing, and more. Laser printers furnish students with high-quality output. The campus network, NMSU Net, interconnects all labs with other computing resources across the campus and around the world, providing students with access to research resources, electronic mail, remote archives, electronic bulletin boards, news groups, and web resources. For further information, contact ICT, MSC 3AT, NMSU, PO Box 30001, Las Cruces, NM 88003-8001; phone (575) 646 - 1840; or send e-mail to [help@nmsu.edu](mailto:help@nmsu.edu).

NMSU's web home page is located at [www.nmsu.edu](http://www.nmsu.edu)

### Institute for Energy and the Environment

The Institute for Energy & the Environment (IEE) is a unit within the Chemical Engineering Department at the New Mexico State University. IEE's programmatic efforts focus on interdisciplinary research, education, and outreach to develop comprehensive solutions for environmental, energy, and water challenges in the southwestern United States and worldwide. IEE offers opportunity for conducting research to the graduate and undergraduate students at NMSU and also encompasses WERC that focuses on environmental education and technology development.

IEE's major objectives include:

- Developing, transferring and commercializing technologies in:
  - renewable energy
  - biofuel
  - advanced water treatment and desalination
- Advancing education, training and outreach in areas of environment, energy and water by offering formal college level courses, short courses and training opportunities.

The IEE website is <http://ieenmsu.org>.

Director: Dr. Abbas Ghassemi, aghassem@nmsu.edu

### Institute of Tectonic Studies (ITS)

The institute was established in July of 1998 in collaboration with the College of Arts and Sciences at New Mexico State University and the Department of Geological Sciences as an independent fiscal entity. The mission of the institute is to pursue the understanding of tectonic processes and the evolution of tectonic provinces. The immediate goal of the institute is to foster the growth of expertise in tectonic studies of all Department of Geological Sciences faculty, graduate students and undergraduate majors.

Director: Dr. Timothy Lawton (tlawton@nmsu.edu)

### Knowledge Representation, Logic and Advanced Programming Laboratory (KLAP)

The KLAP lab was established in 1994 through an RIMI grant from the National Science Foundation and has developed into a focal research laboratory of international reputation. It is housed in the Department of Computer Science. KLAP's research focus is to advance state-of-the-art knowledge in Artificial Intelligence and High Performance Computing and its application in diverse interdisciplinary domains such as bioinformatics and assistive technologies.

The lab provides a full meeting space (with multimedia projection capabilities), access to eight high performance work stations, a dedicated high performance computing server and a 40-core Infiniband Beowulf cluster. The lab has hosted international researchers and has graduated approximately 100 graduate students with M.S. and Ph.D. degrees. It has attracted almost \$10,000,000 in external funding.

Director: Enrico Pontelli (epontell@cs.nmsu.edu)

### New Mexico Department of Agriculture

The New Mexico Department of Agriculture (NMDA), under the control of the NMSU Board of Regents, is responsible for administering laws and regulations that daily affect the lives of every citizen of the state. These laws and regulations (concerning the production, preparation, processing, sale, and use of agricultural products; weights and measures; and petroleum products) are designed to assist producers, processors, and consumers. NMDA's marketing program provides guidance to commodity groups in the promotion of agricultural products. A broad consumer service in many areas other than agriculture is provided by the department. NMDA's director is New Mexico's secretary of agriculture and serves on the governor's cabinet as a liaison between state government and the agricultural industry. For further information, e-mail: [pv@nmda.nmsu.edu](mailto:pv@nmda.nmsu.edu) NMDA's web site is at <http://www.nmda.nmsu.edu>

### New Mexico Water Resources Research Institute

The New Mexico Water Resources Research Institute (WRRI) at NMSU, established in 1963, was one of the first of 54 water institutes in the United States. The WRRI program encompasses all state universities in New Mexico and public agencies sponsoring water research. The institute serves as a coordinator, assisting researchers in obtaining funds, working with granting agencies, and serving as the administrator for projects. The annual budget of approximately \$1 million is made available from federal, state, and/or private sources through a variety of grants and contracts. All research projects administered by the institute encourage graduate student participation. As a result, about 30 students a year receive scientific training through institute-sponsored projects. WRRI also sponsors the Annual New Mexico Water Conference, which has provided a public forum for state water issues since 1956. Public participation helps the institute focus its research program on areas of greatest need. The WRRI publishes research results of every project it administers and other miscellaneous reports. The WRRI also maintains a water resources library of more than 11,000 water-related documents on water issues facing New Mexico. E-mail may be sent to [nmwrr@nmsu.edu](mailto:nmwrr@nmsu.edu). The WRRI's home page address is <http://wrrri.nmsu.edu/>.

### New Mexico State University Library

The New Mexico State University Library is proud to assist NMSU students with its dedicated staff, print and electronic research collections, user-friendly online catalog, library instruction program, helpful services, computer clusters, and interesting programs and workshops. In addition, the Library offers unique archival resources, the notable Zuhl geological collection, artworks on display, and an award-winning faculty. Students enjoy working in groups in the colorful new spaces in Branson and Zuhl libraries, and they consider the Library their "home away from home." They also like the Library's quiet study spaces. Keep in touch with all the Library has to offer at <http://lib.nmsu.edu>.

### Oak Ridge Associated Universities Program (ORAU)

Since 1991, students and faculty of New Mexico State University benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of 98 colleges and universities and a contractor for the U.S. Department of Energy (DOE) located in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal research facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship, and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOA facility that ORAU operates, undergraduates, graduates, postgraduates, as well as faculty enjoy access to a multitude of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines including business, earth sciences, epidemiology, engineering, physics, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment and program length range from one

month to four years. Many of these programs are especially designed to increase the numbers of underrepresented minority students pursuing degrees in science- and engineering-related disciplines. A comprehensive listing of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the ORISE Catalog of Education and Training Programs, which is available at <http://www.orau.gov/orise/educ.htm>, or by calling either of the contacts below.

ORAU's Office of Partnership Development seeks opportunities for partnerships and alliances among ORAU's members, private industry, and major federal facilities. Activities include faculty development programs, such as the Ralph E. Powe Junior Faculty Enhancement Awards, the Visiting Industrial Scholars Program, consortium research funding initiatives, faculty research and support programs as well as services to chief research officers.

For more information about ORAU and its programs, contact:

Vimal Chaitanya  
Vice President for Research, Graduate Studies and International Programs  
(575-646-2481)  
ORAU Councilor for New Mexico State University  
Monnie E. Champion  
ORAU Corporate Secretary (865-576-3306); or  
Visit the ORAU Home Page (<http://www.orau.org>)

### Psychology Research Facilities

The Department of Psychology emphasizes research in social psychology, engineering psychology, and cognitive psychology. Faculty investigate such issues as mother-infant interactions and the impact of cortisol responses to stress upon development; trust in automation; human factors research; auditory perception; prospective memory; emotion and social decision-making; evolutionary psychology; skill acquisition; social cognition; language processing; perception and action; embodied cognition; cognitive neuroscience (control of attention, neural dynamics; and brain-computer interfaces); and research and statistical analysis methods.

All faculty have designated labs with a large central area and 3-4 smaller adjacent rooms. This facilitates data collection from small groups or individuals. The department maintains a Survey Monkey account for online data collection. Research using the department's subject pool is managed with an online system.

The department has specialist facilities that include an EyeLink 1000 eye tracking system with experiment builder software; two 128 channel Biosemi ActiView-2 EEG systems and two shielded rooms; eight analysis workstations; and a Neuroconn DC Stimulator Plus tDCS stimulator. The lab collaborates with the Mind Research Network that has access to a Siemens 3T Trio research MR scanner, a Magvis 132 channel MEG system, and Biosemi and Geodysics EEG systems. The Auditory Perception Lab has a remote-controlled robot with binocular vision and stereo audition that is used to assess auditory performances in applied settings; another remote controlled robot to test perceptual interfaces for remotely-operated vehicles; a 30-element speaker array to simulate real-world auditory environments; and two portable eye trackers housed in the PACMANE (Perception, Action and Cognition in Mediated, Artificial and Naturalistic Environments) lab.

Contact: Dr. Dominic Simon ([domsimon@nmsu.edu](mailto:domsimon@nmsu.edu))

### Research Initiatives in the College Of Education

The College of Education has research initiatives and labs in the following areas: The Speech and Hearing Center's Benfer Lab purchased equipment from the endowment for voice and speech science research (Dr. Charlotte Mason, [cmason@nmsu.edu](mailto:cmason@nmsu.edu)). Special Education/Communication Disorders Department's Autism Research Initiative provides educational and research opportunities on the Autism Spectrum Disorder (Dr. Kathleen Cronin, [kacronin@nmsu.edu](mailto:kacronin@nmsu.edu)). Alliance for the Advancement of Teaching and Learning in collaboration with the Southwest Regional Educational Lab REL (Institute for Educational Services, IES) provides research for partner school district practitioners on accountability, special education/response to intervention, literacy, leadership development, math and science achievement, and program evaluation (Dr. Eric Lopez, [Leric@nmsu.edu](mailto:Leric@nmsu.edu)). The Institute for Mathematics and Science Education oversees multiple mathematics and science grants as well as serving as the STEM Outreach Center for K-12 education (Dr. Susan Brown, [susanbro@nmsu.edu](mailto:susanbro@nmsu.edu)). The Counseling and School Psychology Training and Research Center provides counseling services for students, training for graduate students in counseling, school psychology and counseling psychology, and conducts research on counseling outcomes and processes (Dr. Mike Waldo, [mivaldo@nmsu.edu](mailto:mivaldo@nmsu.edu)). The Southwest Institute for Early Childhood Studies in Poverty and Educational Equity is the research arm of multiple early childhood and family initiatives in the college (Dr. Candace Kaye, [Kaye@nmsu.edu](mailto:Kaye@nmsu.edu)). A new Reading Research Center was recently established in the NMSU Children's Village and provides reading diagnostic services including analysis of reading using eye-tracking software.

Director: Dr. Koomi Kim ([koomi@nmsu.edu](mailto:koomi@nmsu.edu))

### Southwest Institute for Health Disparities Research

To address the substantial health disparities that exist in Southern New Mexico and the U.S./Mexican Border Region, New Mexico State University has recently established the Southwest Institute for Health Disparities Research within the College of Health and Social Services. The purpose of the Institute is to assist faculty to secure external funding and conduct research which has the potential to reduce health disparities and improve minority health, provide health related community outreach programming, provide training for researchers, lay groundwork for additional funded research, and attract highly qualified minority faculty and graduate students to NMSU. Additionally, the Institute serves as the coordinating office for all scholarly activities within the College of Health and Social Services.

### Spatial Applications and Research Center (SPARC)

The SpARC laboratory was established in 1982 as an applied contract research laboratory for the NMSU Geography Department. SpARC provides a variety of services including planning and research, GIS, image processing, modeling and training. The original purpose of the laboratory was to undertake externally funded projects under the direction of geography faculty and employ students within the department. Thirty-one years later, the laboratory continues to do project related work. It has employed more than 150 students, and provided assistance to more than 35 faculty members inside and outside Geography. The primary clients of the lab have been federal state and local government agencies, with an emphasis on applied transportation, water resource, and environmental research projects. The lab houses 11 high performance workstations, a range of mapping grade GPS units, and a large scanner/plotter. Software available for use includes database software, ERDAS and ENVI image processing software, TransCAD, and the entire suite of ESRI GIS software.

Director: Dr. Christopher Brown (brownchr@nmsu.edu; 575-646-1892)

## POSTDOCTORAL FELLOWSHIPS

Those individuals who are exemplary scholars, who have recently been awarded a doctoral degree, but who wish to continue their education and research experience under the direction of a professor at New Mexico State University are classified as postdoctoral. The postdoctoral fellowship is a regular professional appointment normally for one or two years. Under no circumstances will an individual remain in this classification for more than three years.

Postdoctoral fellowships are advertised and applications are submitted to the hiring department in compliance with the guidelines for hiring professional staff, but without the requirement for a position description questionnaire. An "E-Hire" staffing authorization request must be submitted to the office of Human Resources by the hiring department. No offer of employment may be made until approval has been given by Human Resources.

A postdoctoral fellow has the following privileges:

- may take six credits in spring and fall semesters, four credits per summer session without tuition charge
- is eligible to purchase an employee parking permit
- is eligible for other employee benefits available to regular employees, including annual and sick leave, as well as health, dental, and life insurances
- may purchase athletic tickets, activity tickets, and gymnasium privileges
- is eligible for library privileges

Persons classified as postdoctoral fellows pay Social Security and New Mexico State Educational Retirement.

## RESOURCES FOR STUDENTS

### ACADEMIC

#### Edgar R. Garrett Speech and Hearing Center

Combining instruction, evidence-based practical experience, state of the art technology, and service, the center provides training for students in Communication Disorders and provides service to the community. Students have opportunities to participate in diagnostic evaluations and to provide therapy in the areas of speech, language, and hearing for clients across the lifespan.

Referrals are accepted from all sources (self, medical, school, nonprofessionals). The Edgar R. Garrett Speech and Hearing Center is a fee-for-service clinic where university students, staff, faculty and their immediate family

receive a reduced rate. All services are supervised by speech-language pathologists licensed in New Mexico and holding the Certificate of Clinical Competence in Speech-Language Pathology or Audiology from the American Speech-Language-Hearing Association. Services are available in English and Spanish. For further information, contact the Edgar R. Garrett Speech and Hearing Center, MSC 3SPE, New Mexico State University, P. O. Box 30001, Las Cruces, New Mexico 88003-8001, (575) 646-3906; (TTY) (575) 646-6191.

### Office of International and Border Programs (IBP)

The Office of International and Border Programs oversees the comprehensive internationalization of the university. It is the primary unit responsible for the welfare of incoming international students and outgoing education abroad students. IBP also represents the university with U.S. government agencies, foreign governments, international education professional associations, and the private sector concerning international activities. The office also advocates for effective practices, policies, and procedures to internationalize the university. The major program areas of the office are:

**International Development and Cooperation Management** - IBP facilitates the interests of faculty who wish to participate in international interdisciplinary projects requiring technical assistance, training or public outreach. This includes project identification, proposal development, project management, and development of international cooperative agreements with international entities or institutions.

**Education Abroad Programs and Exchange Student Services** - IBP's Education Abroad Office oversees all study, research, internship, and service abroad programs, as well as coordinates faculty led study abroad programs through its Faculty Led International Programs (FLIP) office. This office also coordinates programs and services for visiting exchange students.

**Community Outreach and Public Service** - IBP adheres to the land-grant philosophy by providing programs and services to increase international understanding and awareness in the local and campus community, including southern New Mexico and the state of Chihuahua, Mexico.

**International Student and Scholar Services (ISSS)** - IBP's ISSS Office is charged with ensuring that the needs of NMSU's international students and scholars are met. This includes orientation, advising, and institutional compliance with U.S. Department of State and U.S. Department of Homeland Security regulations as they pertain to the F and J visa programs.

**International Initiatives, Development and Cooperation** - IBP facilitates the interests of faculty who wish to participate in international interdisciplinary projects requiring technical assistance, training or public outreach. This includes project identification, proposal development, project management, and development of international cooperative agreements with international entities or institutions.

**US-Mexico Border Programs** - IBP is responsible for coordinating the university's involvement in US-Mexico cooperative projects including research, economic development and educational outreach.

### Study Abroad Programs and Exchange Visitor Services

This division of International and Border Programs is the international education program development and coordination unit that assists colleges and departments to integrate study abroad into the undergraduate and graduate curriculum. It manages support services for outbound study abroad students and inbound international exchange students and scholars and coordinate all international partner exchange agreements, such as the International Student Exchange Program (ISEP). The division also sponsors the Study Abroad Ambassadors Club, the NMSU Rotaract Service Club and the Global Village Living and Learning Community.

Students on the main campus and at all the branch community colleges in the NMSU system may apply to study abroad while maintaining NMSU student status to receive regular course credit (graded A-F), international distance education language and teacher education credit (graded A-F), and/or transfer credit (graded CR). For exchanges with international partner institutions, students must have completed two full semesters of university study, maintained a 2.75+ grade-point-average, and obtained permission of their college to receive transfer credit. For other programs, students must be in good standing academically at NMSU, and receive permission to enroll from the course instructor or program coordinator. International Business majors must receive permission from their department for study abroad to count as required in their degree plan. At least four weeks of a study abroad program may count for 3 credits of Viewing the Wider World (<http://studyabroad.nmsu.edu>).

The unit is also responsible for implementing the Exchange Visitor Program sponsored by NMSU under authority of the U.S. Department of State in support of the Mutual Educational and Cultural Exchange Act (Fullbright-Hayes Act) of 1961. The objective of the Exchange Visitor (J visa) Program is "to increase mutual understanding between the people of the United States and the people of other countries by means of educational and cultural exchanges." J Visa immigration services and other support services are coordinated for incoming exchange

students, professors, research scholars, short-term scholars, and specialists invited to NMSU (<http://iexchange.services.nmsu.edu>).

### Testing Services

Testing Services (575) 528-7294 provides test information and registration materials for the following tests: American College Testing Assessment (ACT); College Level Examination Program (CLEP); General Education Development (GED); Graduate Management Admission Test (GMAT); Graduate Record Exam (GRE); Miller Analogies Test (MAT); PRAXIS Series; Pre-Professional Skills Test (PPST); and New Mexico Teacher Assessments, and others.

### Western Interstate Commission For Higher Education

NMSU collaborates with the Western Interstate Commission for Higher Education (WICHE) in recommending graduates of the university for programs in dentistry, graduate library studies, occupational therapy, optometry, osteopathy, podiatry, public health, and veterinary medicine in universities of other western states. The State of New Mexico subsidizes the education of New Mexico residents when approved for training in these fields in other states. This subsidy is a loan-for-service program which permits New Mexico residents to attend state-supported institutions at in-state tuition rates and private institutions at approximately one-third the standard tuition cost if they practice in New Mexico for an equal number of years after graduation. This program is contingent upon funding by the state legislature. For further information write the Certifying Officer for New Mexico, WICHE's Student Exchange Program, New Mexico Higher Education Department, 2048 Galisteo St., Santa Fe, NM 87505-2100.

## STUDENT INVOLVEMENT

### Campus Activities

The Office of Campus Activities offers involvement outside the classroom, an essential component of the student's academics. Campus Activities collaborates with campus and community entities to create opportunities for student involvement, group and individual leadership, and personal development through participation in Student Organization, Union Program Council and the National Student Exchange program. Students are encouraged to take advantage of the Student Involvement Log to document their co-curricular experience. Campus Activities also coordinates activities and events through the Activity Registration process, administers the University Sales and Solicitation Policy and serves as the university liaison to the Interfaith Council.

## ON-CAMPUS SERVICES

### Campus Dining

It is mandatory for Undergraduate freshman who live on campus housing to participate in one of the available Meal Plans that the university offers. Continuing and commuter students will find different Meal Plans that suit their lifestyle. A dining contract runs for the whole academic year and charges are applied to a student's university account every semester.

Graduate students living in campus housing, as well as students who choose not to live on campus, may participate in the Meal Plan program. A variety of plans which combine dining hall entrances with flex money are available.

Application procedures and additional information may be obtained from the ID Card Services Office by calling 575-646-4835 or via e-mail at [idsvs@nmsu.edu](mailto:idsvs@nmsu.edu), or by stopping by Room 137 in Corbett Center Student Union between 8am - 4:30pm Monday-Friday. The mailing address is MSC 3AUX, NMSU PO Box 30004, Las Cruces, NM 88003.

### Other Food Service Options

In addition to the Meal Plans, food service is available at various locations throughout the campus by using cash, NMSU Aggie Cash, the NMSU Enhanced Aggie Access Card, a credit card or in some areas, the Aggie Dining Dollars included with a Meal Plan package. Food service location hours are available at [dining.nmsu.edu](http://dining.nmsu.edu). Additional information can be obtained by contacting the ID Card Office at 575-646-4835, [idsvs@nmsu.edu](mailto:idsvs@nmsu.edu), by visiting their office on the 1st floor of the Corbett Center Student Union, between 8am and 4:30pm. Monday through Friday, or online at [idcard.nmsu.edu](http://idcard.nmsu.edu)

### Corbett Center Student Union

Corbett Center Student Union (CCSU) serves as the center for campus life, providing programs and services for students and other members of the university community. A place to study, relax, meet with student groups, work or play, CCSU offers students, faculty and staff a variety of services and activities. The union is the home to several administrative offices, Campus Activities, ASNMSU, Housing & Campus Life, the student radio station and student newspaper. Services offered by CCSU include meeting rooms, an auditorium, multiple dining facilities (both retail and residential), ATMs, a computer lab, study areas, post office and a

convenience store. For more information call (575) 646-4530 or visit [CCSU.nmsu.edu](http://CCSU.nmsu.edu)

### Housing and Residential Life

Living on campus can help ease the transition into college and help students meet new and diverse individuals. As campus residents, students are part of the campus community and have more opportunities to join clubs, attend campus events, be closer to classes, the Activity Center, the library, and many other campus resources. While campus living is not required, the university strongly encourages students to take advantage of the many opportunities available through campus residency. For more information about housing options and application procedures, visit our Web site at [www.nmsu.edu/~housing](http://www.nmsu.edu/~housing).

### Vista del Monte Graduate Community

Our Graduate Community is part of the Vista del Monte Apartment Complex and is a place where graduate students live with and near other graduate students in a community of diverse individuals who share similar academic interests. Two bed-room apartment units include a private bedroom with shared bathroom, kitchen and living area. Apartments are fully furnished. The charge includes all utilities, high speed internet and cable T.V.

### Residence Halls

NMSU offers three different residence halls to choose from, available to all students ranging from freshman to seniors, but required for all first-year on-campus students. Options include Garcia Hall, Piñon Hall, or Rhodes-Garrett-Hamiel Hall. The semester housing cost includes all utilities, cable TV, and high-speed data connectivity.

### Campus Apartments

Campus apartments offer students more than just affordable housing; campus apartments offer a unique college atmosphere where neighbors share similar goals (such as graduating) and together form an academic community unlike any found off campus. Available for second-year to graduate students, on-campus apartments have the benefits of on-site staff, prompt maintenance and amenities such as a computer lab and laundromat. Two and four bedroom options are available and include living rooms and kitchens. Apartments are fully furnished and the semester's charge includes all utilities, cable TV and high-speed data connectivity.

### Chamisa and Cervantes Village Apartment Complexes

In these locations, the amenities of apartment living are combined with the convenience of an on-campus location. Individual apartments are designed to accommodate sophomores and above, as well as graduate students. Available options include four bedroom, two bedroom and one bedroom suite apartments. Each apartment occupant has a private bedroom and shared bathroom, kitchen and living area. Apartments are fully furnished. The charge includes all utilities, high speed internet and cable T.V.

### Student Family Housing

Student family housing is available for students who are married and/or have dependents living with them. Two-story townhouse apartments and single-story houses include two bedrooms, a bath, kitchen and living room. Four-bedroom apartments include four bedrooms, two bathrooms, a kitchen and living room. All units are unfurnished except for the stove and refrigerator. Washing machine hook-ups are provided in the single-story houses and townhouses only. The monthly rent includes all utilities, local phone service, cable TV, and high-speed data connectivity. Some pets are allowed in parts of Student Family Housing.

### Availability of Units for Students with Disabilities

There are a limited number of specially equipped residence hall rooms, single student apartments and family housing units available to students with disabilities (including students who use wheelchairs) who wish to reside in campus housing. These are assigned on a first-come, first-served basis. Specific needs or requirements (i.e., roll-in showers, special door openers, etc.) should be discussed with the Office of Student Accessibility Services on an individual basis prior to submitting an application.

### Application Procedures and Acceptance Policy

The university reserves the right to refuse to give a housing assignment to any student. Examples of reasons for refusal include, but are not limited to, individuals who have criminal histories, individuals who have behavioral problems which may, in the opinion of the university, negatively impact the group-living environment, individuals who have been previously evicted from campus housing, or individuals who have poor rental histories. The university will assign accommodations subject to the space available. The university will not guarantee assignments to a particular building, nor will it guarantee types of accommodations, specific rooms or apartments, roommates or single rooms. The university reserves the right to change or cancel assignments in the interest of order, health, safety or discipline with appropriate written notice. Completed applications for housing and dining services\* should be submitted as early as

possible, preferably one regular semester in advance. Single student housing and meal plan applications require a prepayment at the time of application. Submission of housing and dining applications indicate acceptance of the terms and conditions of the applicable agreement. The Director of Housing and Residential Life is responsible for administration of the housing agreement. The manager of ID Card Services is responsible for the administration of the Dining Agreement.

All housing areas require at least part-time enrollment during the regular academic year. Continuing housing residents are not required to enroll during summer sessions.

Completed applications for Student Family Housing\*\* should be submitted at least six to eight months in advance. Family Housing occupants are assigned based on the date of application. Family Housing occupancy is month-to-month, with thirty (30) days notice required to vacate.

\*Application procedures for current campus residents differ from those stated above.

\*\*Certain qualifications apply for summer housing, single student apartment and family housing occupancy. Consult the main Housing Office for details.

#### For More Information

Specific information on services offered, qualifications, and application procedures may be obtained from the Department of Housing and Residential Life, MSC 3BB, NMSU, P.O. Box 30001, Las Cruces, NM 88003-8001, by phone at (575) 646-3202, or via e-mail at [housing@nmsu.edu](mailto:housing@nmsu.edu).

#### ID Card Services

The NMSU Aggie ID Card is the primary source of student identification for the campus. The Aggie ID Card serves as a membership card for meals, Aggie Cash, as a key in some residential buildings, carries proof of eligibility for access to athletic events and allows for other student services. This information is added to your card after registration for classes and financial arrangements have been completed. Please visit [idcard.nmsu.edu](http://idcard.nmsu.edu) for more information.

Aggie Cash is a pre-paid account that allows you to use your Aggie ID Card to make purchases at locations all over campus. The NMSU Enhanced Aggie ID Card allows your student card to also be your Wells Fargo debit card. The ID Card Services Office in Corbett Center Student Union has the information and applications you will need.

#### International Student Services (ISS)

The International Student Services office administers processes and programs at NMSU that relate specifically to international students, coordinates the admissions process for international applicants at NMSU, and serves as the liaison office for international students at NMSU. Direct contacts with U. S. government agencies, foreign governments, and the private sector concerning international students at NMSU are handled through this office. Professional staff in ISS are appointed by NMSU and authorized by the U.S. Department of Homeland Security (DHS) to serve as "designated officials" regarding DHS regulations governing international students.

International Student Services provides a full range of services to international students, including orientation programs, immigration and financial advising, community outreach programming, and international student admission to the university. International students or agencies sponsoring international students receiving special services are expected to pay additional administrative fees, normally not to exceed \$550 annually. The current "International Student Special Service Fee Schedule" is available upon request. ISS is responsible for the issuance of I-20 and DS-2019 immigration documents to international students admitted to NMSU. Staff members maintain up-to-date information on all regulations of the Department of Homeland Security governing student visas and help international students retain their legal status while attending NMSU. They coordinate contact between various community groups and the international student population. ISS requires all international students to have Student Health Center coverage and adequate health insurance, including their dependents.

The ISS office is located in Educational Services Building, Room 8. (575) 646-2017. For further information, e-mail [gradinfo@nmsu.edu](mailto:gradinfo@nmsu.edu) and visit our web page at <http://prospective.nmsu.edu/international/>.

#### Parking Office

NMSU requires a parking permit to park in campus parking lots or curbside on streets. Parking meters require payment. Free parking is available near the Pan American Center. The campus parking map is available at [www.nmsuparking.com](http://www.nmsuparking.com). Parking regulations are enforced between the hours of 7:30 a.m. and 4:30 p.m. Disabled parking spaces, emergency/fire zones, service zones and yellow curbs are enforced 24 hours a day. Parking Regulations are available at [www.nmsuparking.com](http://www.nmsuparking.com).

Information on purchasing a parking permit is available at: [www.nmsuparking.com](http://www.nmsuparking.com) or at the Parking Department located at 1400 E. University Ave. (southwest corner of the Auxiliary Services building between Barnes & Noble and Panda Express) Monday through Friday from 8:00am to 4:30pm. When visiting, you may park for free in designated spots just south of the building. Aggie Transit is

a free campus shuttle service available to all students. Bus route maps area available at [www.nmsuparking.com](http://www.nmsuparking.com).

Transportation and Parking Services is responsible for issuing parking permits, enforcing parking regulations, developing parking lots, operating the campus motor pool and fleet fueling station as well as maintaining information related to the university fleet.

#### Campus Health Center

The university maintains a well-equipped health center on campus, with a comprehensive laboratory, pharmacy, and x-ray services. Hospitalization is available in the community. Graduate students enrolled for 9 or more credits (4 in a summer session) may use the Campus Health Center. Graduate students enrolled for 6-8 credits (3 in summer session) may choose to pay the wellness fee at registration to become eligible for medical care. For a description of the graduate assistant health insurance benefit see that section earlier in this catalog.

Information on Supplemental Health Insurance can be picked up at the Campus Health Center or by calling (575) 646-5706. For more information regarding the Campus Health Center or the health insurance policy, call the number listed above, e-mail [debramon@nmsu.edu](mailto:debramon@nmsu.edu), or visit our web page at <http://www.nmsu.edu/~shc/>.

#### SUPPORT FOR SUCCESS

##### Career Services

The mission of Career Services is to offer programs, services, and resources that will contribute to students life-long career planning efforts. Staff members work closely with deans, department heads, faculty, and employers to assist students and alumni in developing suitable career opportunities based on their education, experiences and interests. Additionally, Career Services coordinates interviews between prospective employers and graduate students and alumni. The staff advises students on the career-planning process and career-search strategies. Current information on employment trends, a comprehensive library of career literature, and electronic career products help students make educated decisions. Also, career fairs are held throughout the academic year. Students can launch their career plans through registration in AggieCAREER Manager.

Excellent experiential opportunities, through the following programs, contribute to forming students' career goals:

**On-Campus Employment:** Information is available for part-time employment through the federal work-study, student employment and graduate assistant programs. Available opportunities are advertised on AggieCAREER Manager.

**Off-Campus Employment:** Part- and full-time jobs in Las Cruces, requiring general or very specific qualifications, are listed and referrals are made for students.

**Cooperative Education and Internship Program:** Information is available on Cooperative Education and internship opportunities offered by government, nonprofit organizations, and business/industry. During the summer months and throughout the academic year, interns may arrange for academic credit for internships.

For comprehensive information on all programs and services offered by Career Services, please visit [careerservices.nmsu.edu](http://careerservices.nmsu.edu) or call (575) 646-1631.

##### Counseling and Student Development

The Counseling Center provides students and the campus with a variety of services including individual, couples and group counseling, crisis intervention, career exploration, outreach programs, and consultation. We assist students with issues such as relationship conflicts, depression, anxiety, stress management, and self-esteem concerns. All services are strictly confidential and are free. The Counseling Center is located in Garcia Annex Room 100, and is open Monday through Friday, 8:00 a.m. - 5:00 p.m. and other times as needed. The Counseling Center is staffed by professional counselors and psychologists and is accredited by the International Association of Counseling Services, Inc.

The Career Exploration Center, in Room 132 of Garcia Annex provides students with assistance in career choice and selecting an appropriate area of study. Monday-Friday, 8-5 by walk-in or appointment. For more information check our web site at [www.nmsu.edu/~counsel/](http://www.nmsu.edu/~counsel/).

WAVE: Wellness, Alcohol, and Violence Education Program is comprised of the Choices program that provides campus organizations, classes and other groups with information concerning the decisions that surround drinking alcohol and provides presentations on sexual assault and violence prevention. The Crisis Assistance Crisis Line (CALL) is a 24-hour crisis line that is available to students and residents in southern New Mexico. To contact the CALL, dial 575-646-CALL.

Social Work Services (accessed through the Counseling Center at 646-2731) provides assistance in locating community resources such as food, shelter, health care, child care, or locating financial assistance when a student's educational goals are impeded by a lack of such resources. Social Work Services operates the Aggie Cupboard, an on-campus food pantry that provides free and



confidential service to NMSU students, faculty, and staff. For questions regarding the Aggie Cupboard, please contact Lori Haussamen at [mlori@nmsu.edu](mailto:mlori@nmsu.edu).

### Student Accessibility Services

Students Accessibility Services (SAS) coordinates university efforts, to provide access and opportunity to students with disabilities, including students who have disabilities that are apparent and non-apparent. Students wanting to learn more about services or accommodations available to those with a documented disability should contact the SAS office. Advanced notice in planning services is strongly encouraged. NMSU is committed to providing an accessible institution to all individuals. For more information, please visit the SAS office in Corbett Center: Rm. 244, MSC 4149, P.O. Box 30001, Las Cruces, NM 88003-0001, call 575-646-6840. Visit our website at [sas.nmsu.edu](http://sas.nmsu.edu) or e-mail [sas@nmsu.edu](mailto:sas@nmsu.edu).

### Student Special Care Policy

To ensure the safety and well-being of its students, New Mexico State University may, on occasion, require that students receive a particular type of care or treatment (i.e., emergency medical attention, live-in attendants, or vaccinations) as a condition of continued enrollment or eligibility to reside in university-operated housing. When this care or treatment is required by the cognizant university administrator, the student will be obligated to assume any financial responsibility associated with the treatment. Furthermore, the university may, on occasion, contact a student's parents, legal guardian, or spouse in cases of extreme emergency, or where a possibility of imminent harm exists. This will occur only when, in the judgment of the appropriate official, the best interests of the student and the university will be served.

When practical, the university will, in writing, notify the student of the university's intention to undertake the steps authorized by this policy. This decision may be appealed by the student to the associate provost for student affairs and community colleges within 24 hours of notification. The appeal should be in writing and clearly state the reason why the student objects to the proposed action. The associate provost will review the facts in the case and convey a decision to all parties within 48 hours. The decision of the associate provost shall be final.

### Student Success Centers

New Mexico State University offers a variety of learning assistance, advising, and tutorial services via the Student Success Center, located on the Las Cruces campus in Corbett Student Union, Room 148. The Student Success Center provide services to assist NMSU students in reaching their academic potential. Services provided at the Student Success Centers are described below:

The Student Success Center provides study skills assistance in such areas as time management, memory, concentration, note taking, reading, test preparation, test taking, math/science study skills, speed reading, critical thinking, financial literacy, and graduate school and professional skills test preparation. The services are available to students in the following formats:

1. Individualized assistance is provided to any student who walks in at The Student Success Center
2. Degree credit is offered under UNIV 110, Personal Learning Skills; UNIV 112, Academic and Personal Effectiveness; UNIV 113, Speed Reading; UNIV 150, The Freshman Year Experience; UNIV 300, Preparing for the GRE; UNIV 350, Peer Education; and UNIV 395, Independent Study.
3. Learning strategies and study-skills workshops provide quick assistance in one-hour presentations offered throughout the semester.
4. Professional and graduate school workshops provide development in such areas as speed reading, getting into graduate school, preparing for the GRE, GMAT, LSAT, MCAT, or NMTA.
5. Student Success Center staff provide outreach presentations on learning and study-skills topics to classes, programs, and organizations on campus.
6. The Campus Tutoring Service (CTS) provides walk-in and online tutoring at no charge; and the QuickConnect Early Alert and Intervention Program is an early warning and intervention system, utilized by faculty, focused on first-year students.

The Student Success Center also houses a 16 station student computer lab.

## TECHNOLOGY

### Information and Communication Technologies

Information and Communication Technologies (ICT) provides the university community with the computing resources and services that support the educational, research, and public service missions of the university. The resources include NMSU's central computing systems, the network that supports the systems and the wired and wireless functionality through which the internet is accessed. ICT operates the student computer labs found throughout the main

campus, manages computer checkout, network registration of computers required for access to the NMSU network, discounts for purchases of computers and Aggie print at the university. ICT also provides support for NMSU technology users through its Help Desk.

For further information, contact ICT: MSC 3AT, NMSU P.O. Box 30001, Las Cruces, NM 88003-8001, (575) 646-1840 or email [help@nmsu.edu](mailto:help@nmsu.edu). ICT's web homepage is located at [help.nmsu.edu](http://help.nmsu.edu)

# COLLEGE OF AGRICULTURAL, CONSUMER AND ENVIRONMENTAL SCIENCES

Dean and Chief Administrative Officer and Regents Professor • *Lowell B. Catlett*  
 Associate Dean and Director of Academic Programs • *James D. Libbin*  
 Associate Dean and Director of the Cooperative Extension Service • *Jon C. Boren*  
 Associate Dean and Director of the Agricultural Experiment Station • *David Thompson*  
 Scholarship Coordinator • *Will Waller*  
 Assistant Director of Student Services • *Kristy Mason*

## AGRICULTURAL AND EXTENSION EDUCATION

Department website: <http://aces.nmsu.edu/academics/axed/>  
 (575) 646-4511  
[fhodnett@nmsu.edu](mailto:fhodnett@nmsu.edu)

*F. Hodnett, department head, Ph.D. (New Mexico State)– youth development, youth leadership, youth program development; B. Chamberlin, Ph.D. (University of Virginia)–informal and non-formal learning, educational media design; T. J. Dormody, Ph.D. (Cornell)– agricultural education, leadership, and agricultural communications; J. Gleason, Ed.D. (Virginia Tech)– instructional technology, agricultural communications, and multimedia education; C. Rosencrans, Ph.D. (Iowa State)– agricultural mechanics, technology education and youth development; B. Seevers, Ph.D. (Ohio State)– adult and extension education; P. Skelton, Ph.D., (University of Nebraska)– youth development, sustainable agriculture and natural resource management; D. VanLeeuwen, Ph.D. (Oregon State)– statistics and research design*

**DEGREE: Master of Arts**  
**MAJOR: Agricultural and Extension Education**

**MINORS: Agricultural and Extension Education**  
**International Agricultural Development and Extension**

The department offers major work for a Master of Arts in Agricultural and Extension Education. The degree can be obtained with emphasis in agricultural or technology teacher education, Extension education, international extension and development, and adult non-formal education.

Courses in research methods, teaching methods, and data collection and analysis; a graduate seminar; and a thesis or creative component are required for the major. A nine-credit minor is available to students completing major work in other departments.

The Department of Agricultural and Extension Education requires the following items for admission:

- Three letters of recommendation - Applicants should request letters of recommendation from individuals who know them well enough to comment on their professional skills and abilities, and on their ability to complete graduate-level work.
- Career statement - The two-page letter of application should clearly identify applicant's professional and career goals as well as reasons for pursuing graduate school.
- Personal Interview - Upon receipt of all application materials, a personal interview may be required at the discretion of the Departmental Graduate Committee.

The above requested materials should be sent directly to the department. Do not send to the Graduate School as this will cause a delay on your admission status.

A minimum of 30 semester credits (including 4-6 credits of thesis) is required under the thesis plan. A non-thesis plan is available and requires 32 semester credits of course work (includes a focused creative component). Both plans require a final oral examination.

Flexibility in each program allows students to pursue professional interests and to develop specialized competencies in agricultural and Extension education, technology education, and in technical and scientific areas. The department delivers courses in evening, weekend, and distance formats (go to <http://distance.nmsu.edu> and click on degree programs, and then Agricultural

and Extension Education) to accommodate student needs. Previous experience in teaching, Extension, and/or other professional education positions is highly recommended to be considered for a graduate teaching assistantship.

## AGRICULTURAL ECONOMICS AND AGRICULTURAL BUSINESS

Department Website: <http://aces.nmsu.edu/academics/aeab/>  
 (575) 646-3215  
[crawford@nmsu.edu](mailto:crawford@nmsu.edu)

**DEPARTMENT OF AGRICULTURAL ECONOMICS AND AGRICULTURAL BUSINESS:**

*Terry L. Crawford, department head, Ph.D. (Cornell University)– marketing, policy and pricing, quantitative methods, trade; R.N. Acharya, Ph.D. (Auburn University)– food safety, logistics management, technology adoption, and marketing; S. Archambault, Ph.D. (University of New Mexico)– economic development natural resource, applied econometrics; L.B. Catlett, Ph.D. (Iowa State)– marketing, futures, economics; J. A. Diemer, Ph.D. (emeritus) (Colorado State)– natural resources, regional economics; J.M. Fowler, Ph.D. (Iowa State)– forestry and range economics; W. D. Gorman, Ph.D. (Emeritus/Adjunct) (Oregon State)– agricultural business management, international marketing; P. Gutierrez, Ph.D. (Oklahoma State)– extension, ranch economics, economic development; J. Hawkes, Ph.D. (New Mexico State)– extension, range management; B. H. Hurd, Ph.D. (California-Davis)– water and natural resource economics; J. D. Libbin, Ph.D. (Iowa State)– farm management, production economics; J. Lillywhite, Ph.D. (Purdue)– agribusiness marketing; M. Patrick, Ph.D. (Michigan State University)– Economic Development; R. Skaggs, Ph.D. (Utah State)– agriculture and natural resource policy; L. A. Torell, Ph.D. (Utah State)– range, ranch economics, production economics; F. A. Ward, Ph.D. (Colorado State)– resource economics, welfare economics*

**DEPARTMENT OF ECONOMICS, APPLIED STATISTICS AND INTERNATIONAL BUSINESS:**

*R. Adkisson, department head, Ph.D., (Nebraska)– international economics, public finance, institutional economics; Larry Blank, Ph.D. (University of Tennessee, Knoxville)– microeconomic theory, managerial economics and regulatory economics; K. Brook, Ph.D. (Texas-Austin)– macroeconomic theory, monetary policy; D. L. Clason, Ph.D. (Kansas State)– linear models, government statistics; D. L. Daniel, Ph.D. (Southern Methodist)– nonparametrics; C. M. Downes, Ph.D. (University of New Mexico)– environmental/resource economics, development, international business; M. Ellis (Emeritus), Ph.D. (California-Riverside)– comparative economic systems, medical economics; C. Enomoto, Ph.D. (Texas A&M)– econometrics, economic theory; C. A. Erickson, Ph.D. (Arizona State)– monetary theory, macroeconomics; D. A. Gegax, Ph.D. (Wyoming)– public utility economics, industrial organization; W. R. Gould, Ph.D. (North Carolina State)– biological sampling, wildlife and fisheries estimation; S.M. Knapp, Ph.D. (Purdue)– fish & wildlife, biometrics; Y. L. Lee, Ph.D. (Southern Illinois-Carbondale)– international finance, international trade, international system, economic developments; B. N. Matta, Ph.D. (Emeritus) (Texas-Austin)– labor economics, managerial economics; Randy McFerrin, Ph.D. (Texas A & M University)– micro theory, principles and American economic history; J. T. McGuckin, Ph.D. (Wisconsin-Madison)– production economics, resource economics and policy; M. Pan, Ph.D. (Nebraska)– economic development, international economics, applied*

econometrics, general regional economics; J. T. Peach, Ph.D. (Texas-Austin)—quantitative economics, border studies, economic development; A.V. Popp, Ph.D. (Emeritus) (Northern Illinois)—public finance; N. E. Schmidt, M.S. (New Mexico State)—experimental statistics; R. L. Steiner, Ph.D. (Oklahoma State)—likelihood methods, discrete distributions; D. Van Leeuwen, Ph.D. (Oregon State)—statistics; B. Widner, Ph.D. (Colorado State)—urban/regional, public finance, development; E. S. Willman, Ph.D. (Indiana)—monetary policy, macroeconomic theory

**DEGREE: Master of Agriculture**  
**SPECIALIZATION: Agribusiness**

**DEGREE: Master of Business Administration**  
**SPECIALIZATION: Agribusiness**

**DEGREE: Master of Science**  
**MAJOR: Agricultural Economics**

**MINOR: Agricultural Economics**

The Department of Agricultural Economics and Agricultural Business cooperates with the Department of Economics, Applied Statistics, and International Business and the College of Business to offer graduate programs in agricultural economics and economics, and a Master of Business Administration with specialization in Agribusiness. The programs are jointly administered by faculty from the two colleges. Graduate degrees include a Master of Science in agricultural economics, a Master of Agriculture with an agribusiness emphasis, and an MBA degree with specialization in agribusiness. The objectives of the 3 programs differ in emphasis. The two departments also offer a doctoral program, Doctor of Economic Development.

- **Master of Science (MS) in Agricultural Economics** program provides rigorous training in economic theory, applied economic analysis and quantitative methods and is designed to prepare students for professional careers in business, government, and research, and for continued education in pursuit of a Ph.D.
- **Master of Business Administration with Specialization in Agribusiness (MBA-AB)** prepares students for business and public sector careers in agriculture and the food and fiber industry. Graduates from this program are knowledgeable about U.S. and international food and fiber sectors and hold an AACSB International accredited MBA degree.
- **Master of Agriculture (MAG-AB) with Specialization in Agribusiness** provides students with backgrounds or interests in agriculture with graduate-level training in agribusiness and applied economics. It is a degree alternative for individuals holding undergraduate degrees in various agricultural and food science fields.
- **Doctor of Economic Development (DED)** is a professional doctorate designed to provide advanced training for economic development professionals. It is not designed to prepare graduates for academic careers.

All students in these programs must meet the requirements specified in the general regulations and requirements for admission to the Graduate School and to candidacy. To transfer between the three program options requires a change of major form be submitted through the Graduate School and approved by the program to which the application is made.

Teaching and research assistantships are available to qualified applicants on a competitive basis. It is not necessary to have a degree in economics or agricultural economics to enter the graduate program or to qualify for a teaching or research assistantships. An application and three letters of reference are required to be considered for any available assistantships. These forms can be obtained from the department.

**DEGREE: MASTER OF SCIENCE**  
**MAJOR: AGRICULTURAL ECONOMICS**

Students entering the MS program are required to have completed intermediate microeconomics and intermediate macroeconomics (completed with a B grade or better), a college-level calculus class, and a course in statistics that included linear regression analysis. Students that have not completed these courses may be admitted with the requirement that they take them as deficiencies at the beginning of their graduate program. Prospective graduate students must have at least a 3.0 undergraduate GPA and complete the GRE.

Completion of the Master of Science degree in agricultural economics requires completion of a minimum of 33 graduate credit hours. Twenty-one of the credits must have one of the following three prefixes: AECC, ECON, or ECDV. Twenty-four of the credits must be associated with course numbers greater than 500. All students in the MS program must successfully complete the following core courses: AECC 501, AECC 502, AECC 540, and AECC 585, MS students may write a

thesis (AECC 599 (4-6 credit hours)). Non-thesis options that include a non-thesis research project (AECC 597, 3 cr) or an internship (AECC 595, 3 cr) must have approval from the student's committee and the graduate chairman. Students pursuing the MS degree may not complete the graduate program with more than one C grade in the core courses. If a student receives C grades in two of these core classes one of the classes must be repeated with a grade of at least B. In addition to core courses, nine additional credits must be completed from an agricultural economics and agricultural business (AEAB) course block. AECC 545 must be taken in the graduate program if an agricultural policy course was not taken as an undergraduate. Individual study (AECC 596) is limited to 3 credits hours. Electives and up to 3 credits from the AEAB course block can be used to pursue a minor. A thesis is generally required, but a non-thesis option can be followed, AECC 597. An oral defense of the thesis will be scheduled and completed according to the guidelines of the Graduate School. The oral defense must be preceded by an open seminar to present major research findings to faculty, fellow students, and the interested public.

**DEGREE: MASTER OF BUSINESS ADMINISTRATION**  
**SPECIALIZATION: AGRIBUSINESS**

Candidates for the Master of Business Administration with specialization in Agribusiness (MBA-AB) must successfully complete a minimum of 36 graduate credit hours. Admission to the MBA-AB program is through the College of Business. The program includes numerous prerequisites in economics, accounting, and business as defined in the Business Administration and Economics section of this catalog. AECC 545 must be taken in the MBA- Agribusiness program if an agricultural policy course was not taken at the undergraduate level. A written paper and presentation following the guidelines described for BA 590 is required. MBA-AB students can take the required minimum 4 thesis credit hours to substitute for BA 590. If a thesis (AECC 599) is written in-lieu of taking BA 590 an examining committee and thesis defense must be organized similar to that of the MS degree program. For more information about the requirements for the MBA specialization refer to the section of this catalog.

**DEGREE: MASTER OF AGRICULTURE**  
**SPECIALIZATION: AGRIBUSINESS**

Candidates for the Master of Agriculture (MAG) with specialization in Agribusiness must successfully complete 33 graduate credits. Students entering the Master of Agriculture program are required to have completed intermediate microeconomics and intermediate macroeconomics, a college-level calculus class, and a course in statistics that included linear regression analysis. All prerequisite courses must be completed with a B grade or better. AECC 545 must be taken in the graduate program if an agricultural policy course was not taken as an undergraduate. Those students not having completed these courses may be admitted with the requirement that the deficiencies be completed at the beginning of the graduate program. Prospective graduate students must have at least a 3.0 undergraduate GPA and complete the GRE or GMAT exam.

All students in the MAG program must successfully complete the following core courses: AECC 551, AECC 556, FIN 503, and ACCT 503. Six additional credits must be completed from an agricultural economics and agricultural business block. An internship (AECC 595, 3 cr.) or individual investigation (AECC 598, 3 cr.) is also required. A thesis (AECC 599, 4-6 cr.) is not required but can substitute for the internship or individual investigation. Individual study (AECC 596) is limited to 3 credits. An oral defense must be scheduled and completed as prescribed by the Graduate School. The defense must be preceded by a public seminar to present major findings, experiences, and contributions of the individual investigation, internship, and/or thesis research to faculty, fellow students, and the interested public.

**DEGREE DOCTOR OF ECONOMIC DEVELOPMENT DED**

The Doctor of Economic Development (DED) is a professional doctorate designed to provide advanced training for economic development professionals. It is not designed to prepare graduates for academic careers.

Candidates for the DED enter the program with the equivalent of a master's degree. DED students must successfully complete approximately 60 graduate credits beyond the hours required for entry. All students must meet the requirements specified in the general regulations and requirements for admission to the Graduate School and to candidacy. DED minimum admission requirements include: (a) related master's degree or equivalent coursework; (b) one course in intermediate microeconomic theory and one course in macroeconomic theory with minimum grades of B; (c) one course in college-level calculus with a minimum grade of B; and (d) one course in statistics, including simple regression with a minimum grade of B. Additionally, students who have not completed graduate level courses in microeconomic theory, macroeconomic theory, and econometrics with grades of B or better will be required to successfully complete these courses early in the DED program.

All students in the DED program must successfully complete the following core courses: AECC 501, AECC 502, ECDV 550, ECDV 651, ECDV 661, ECDV 662,

ECDV 664, ECDV 668, ECDV 671, and ECDV 692 (twice). In addition, students will complete ECDV 681, ECDV 682, and ECDV 683; plus a specialty area (six semester hours); 12-15 semester hours of internship and a final project; and sufficient elective credits to fulfill the 60 hour requirement. Comprehensive and oral exams will be given and will determine eligibility to continue in the program and/or to graduate.

Detailed and updated information is available at the following website <http://business.nmsu.edu/~econ/ded/DEDweb.html>.

### Economics

Descriptions for the following courses may be found under the section "Economics and International Business" later in this chapter.

ECON 450	International Economics	3
ECON 453	Introduction to Health Services Policy	3
ECON 455	Public Utilities Regulation	3
ECON 457	Mathematical Economics	3
ECON 460	Intelligence Research and Analysis	3
ECON 465	Economics of Human Resources	3
ECON 489	Senior Economics Seminar	3
ECON 490	Selected Topics	1-3
ECON 498	Independent Study	1-3
ECON 503	Managerial Economics	3
ECON 545	Econometrics II	3
ECON 550	Special Topics	1-3
ECON 571	Regulatory Policy and Industry Analysis: Electricity I	3
ECON 572	Regulatory Policy and Industrial Analysis: Water and Natural Gas	3
ECON 573	Regulatory Policy and Industry Analysis: Electricity II	3
ECON 574	Advanced Seminar Regulatory Policy and Industry Analysis	3
ECON 581	International Economics	3
ECON 582	Economics of Health Care	3

## ANIMAL AND RANGE SCIENCES

Department website: <http://anrs.nmsu.edu>  
(575) 646-2514  
[tross@nmsu.edu](mailto:tross@nmsu.edu)

*T. T. Ross, department head, Ph.D. (North Carolina State-Raleigh)— physiology of reproduction and sheep production; L. B. Abbott, Ph.D. (University of Arizona)— range ecology; K. W. Allred, Ph.D. (Texas A&M)— plant taxonomy; R.L. Ashley, Ph.D. (Colorado State University)— physiology of reproduction; D.W. Bailey, Ph.D. (Colorado State)— rangeland management; A.F. Cibils (Colorado State)— grazing management and ecology; G.M. Fassenko, Ph.D. (North Carolina State University)— companion animal management; A. G. Fernald, Ph.D. (Colorado State)— land use hydrology and water quality hydrology; D. M. Hallford, Ph.D. (Oklahoma State)— physiology of reproduction; J. L. Holechek, Ph.D. (Oregon State)— range ecology; M.E. Hubbert, Ph.D. (University of Alaska-Fairbanks)— ruminant nutrition; S. L. Ivey, Ph.D. (New Mexico State)— ruminant nutrition/microbiology; C. A. Löest, Ph.D. (Kansas State)— ruminant nutrition; K. C. McDaniel, Ph.D. (Texas A&M)— brush management; E.J. Scholljegerdes, Ph.D. (University of Wyoming)— ruminant nutrition; S. Soto-Navarro, Ph.D. (New Mexico State)— ruminant nutrition; J. D. Thomas, Ph.D. (University of Missouri-Columbia)— meat science; J. L. Turner, Ph.D. (Kansas State)— equine immunology and physiology; L. M. White, Ph.D. (Clemson)— equine science; M. W. Wise, Ph.D. (University of Nebraska)— physiology of reproduction.*

*Adjunct faculty: C. D. Allison, Ph.D. (Texas A&M)— range management; D.N. Anderson, Ph.D. (Texas A&M)— animal behavior; R.L. Byford, Ph.D. (Oklahoma State University)— veterinary entomology; K. M. Harvstad, Ph.D. (Utah State)— range animal nutrition; J.E. Herrick, Ph.D. (Ohio State)— soils; D.P. Peters, Ph.D. (Colorado State)— landscape ecology.*

**DEGREE: Master of Agriculture**  
**SPECIALIZATION: Domestic Animal Biology**

**DEGREE: Master of Science**  
**MAJOR: Animal Science**

**DEGREE: Doctor of Philosophy**  
**MAJOR: Animal Science**

**DEGREE: Master of Science**  
**MAJOR: Range Science**

**DEGREE: Doctor of Philosophy**  
**MAJOR: Range Science**

**MINORS: Animal Science**  
**Range Science**

The Department of Animal and Range Sciences offers graduate work leading to the Master of Science and the Doctor of Philosophy degrees with majors in animal science and range science. The Doctor of Philosophy degree in animal science is only in the areas of reproductive physiology or ruminant nutrition.

Prerequisite for admission as a regular graduate student in the department is the completion of a curriculum, substantially equivalent to that required of undergraduate students in animal or range science at this institution, 3.0 GPA, and three letters of reference.

For the Master of Science degree, a minimum of 30 semester credits of graduate work in the major and related subjects will be required, together with a thesis for most majors. A non-thesis option is available for certain students.

For the Master of Agriculture with specialization in Domestic Animal Biology, students must complete 32 credit hours of graduate courses which include 2 credits of ANSC 598 for the creative component.

The Doctor of Philosophy student must demonstrate proficiency in a foreign language or research tool, such as experimental statistics, philosophy of science, computer science, or mathematics. Choice of the research tool will remain the option of the student subject to approval by the student's graduate committee. Demonstration of proficiency may be accomplished by satisfactory completion of courses or by other suitable evidence acceptable to the student's committee. In addition, doctoral students are required to complete advanced courses in a field of study closely related to animal science or range science. The number of courses to be completed in the related area will be determined by the student's committee. Related areas of study often are biology, chemistry, or experimental statistics.

The Department of Animal and Range Science is a sponsoring department in the recently approved interdisciplinary graduate degree program that offers both a M.S. and Ph.D. degree in Water Science Management. The degree program is being handled through the College of Agricultural, Consumer and Environmental Sciences (ACES), and the program description, including application guidelines, classes involved, and topic areas being supported can be found in the catalog under the section describing ACES Programs. Interested students are encouraged to contact the Department Head of Animal and Range Sciences, Tim Ross, at (575) 646-2515 or [tross@nmsu.edu](mailto:tross@nmsu.edu) for more information.

Graduate work in the department is designed to prepare the student for work in the fields of research, extension, teaching, production, and conservation.

Facilities available to graduate students include herds and flocks of the major livestock species, animal nutrition laboratories, physiology laboratories, meats laboratory, small animal laboratory, 25,000-specimen herbarium, two ranches of approximately 92,000 acres, and a 1,000-head experimental feedlot. Active cooperation is maintained with federal research agencies located on and off the campus.

A number of graduate assistantships will be available each year. Inquiries should be addressed to the head of the department.

## ENTOMOLOGY, PLANT PATHOLOGY, AND WEED SCIENCE

Department website: <http://eppws.nmsu.edu>  
(575) 646-3225  
[gksims@nmsu.edu](mailto:gksims@nmsu.edu)

*Gerald K. Sims, department head, Ph.D. (Purdue)— soil microbiology; R. N. Arnold, M.S. (New Mexico State)— weed science; J. Ashigh, Ph.D. (Guelph)— weed science; C. S. Bundy, Ph.D. (Georgia)— entomology; R. Creamer, Ph.D. (California-Davis)— plant pathology; N.P. Goldberg, Ph.D. (Arizona)— plant pathology; T. R. Grasswitz, Ph.D. (California-Riverside)— IPM specialist; S. Hanson, Ph.D. (University*

*of Wisconsin*)—molecular plant pathology; H. G. Kinzer, Ph.D. (Oklahoma State)—veterinary entomology; B. E. Lewis, M.S. (New Mexico State)—economic entomology; Abdel O. Mesbah, Ph.D. (University of Wyoming)—weed science; J. Breen Pierce (Rutgers)—entomology; Jennifer Randall, Ph.D. (New Mexico State University)—plant pathology; A. Romero, Ph.D. (University of Kentucky)—Entomology; S. Sanogo, Ph.D. (Pennsylvania State)—plant pathology; B. Schutte, Ph.D. (Ohio State)—Horticulture & Crop Science; C. A. Sutherland, Ph.D. (Oregon State)—extension entomology; S. H. Thomas, Ph.D. (Iowa State)—nematology; D.C. Thompson, Ph.D. (Colorado State)—entomology.

**DEGREE: Master of Science**  
**MAJOR: Agricultural Biology**

### MINOR: Agricultural Biology

The complexity of managing insects, plant diseases, and weeds is increasing environmental concerns, costs, and regulations necessitate an integrated approach to management strategies. Future professionals in integrated pest management will be ecologically oriented, trained to manipulate biological and cultural technologies while minimizing chemical control options. The Master of Science degree program in agricultural biology is designed to produce graduates with the academic and research background needed to facilitate effective, innovative, and environmentally sound protection of plants and animals from a wide and varied spectrum of pests. Students will be prepared for careers in research, extension, teaching, private consulting, industry, and government or to continue in a broad range of Ph.D. programs. Specific opportunities will include positions as agricultural consultants, technical and sales representatives for industry, state departments of agriculture and USDA specialists, agricultural extension agents, and industry research and environmental technicians. There is currently a strong need for M.S. graduates trained in these areas, and the demand is expected to increase dramatically.

Students may wish to concentrate their graduate program in entomology, plant pathology, or weed science, or conversely may wish to be broadly trained in all three pest-management disciplines. Most students will be expected to complete a thesis. A non-thesis option is available, depending on prior training and experience and subject to approval by the department head. A nonthesis research option requires completion of a research paper, suitable as judged by the student's graduate committee, for journal publication. Completion of an undergraduate degree essentially equivalent to that offered by the department is required for admission to the M.S. graduate program. Qualifications for admission will be reviewed by the departmental Graduate Admissions committee. Prospective graduate students must have at least a 3.0 undergraduate GPA, complete the GRE, and submit an official transcript, a letter of intent, and three letters of recommendation.

## FAMILY AND CONSUMER SCIENCES

**Department website:** <http://aces.nmsu.edu/academics/fcs/>  
**(575) 646-3936**  
**fcs@nmsu.edu**

E. Devall, department head, Ph.D. (Georgia)—child and family development; M. F. Abdul-Rahman, Ph.D. (Ohio State)—family resource management; S. Bartley, Ph.D. (Tennessee)—family studies; G. Blanch, Ph.D. (Claremont)—education; P. Bloomquist, Ph.D. (New Mexico State)—education management and development; M. Bock, Ph.D. (Kansas State)—foods and nutrition; M. Chavez, Ph.D. (New Mexico State)—educational management; W. Eastman, Ph.D. (Texas Woman's)—nutrition and food service systems management; W. Fedio, Ph.D. (University of Alberta-Canada)—food microbiology; N. Flores, Ph.D. (Kansas State)—food science; J. Green, Ed.D. (New Mexico State)—education administration; W. Hamilton, Ed.D. (Montana State)—adult education and administration; S. Koukel, Ph.D. (Texas Tech)—family and consumer sciences education; K. Mandabach, Ed.D. (Houston)—higher education cultural and historical studies; M. Marin, Ph.D. (New Mexico State)—counseling and educational psychology; L. McKee, Ph.D. (Texas Tech)—food science and nutrition; M. Montanez, Ph.D. (Michigan State)—developmental psychology; S.H. Munson-McGee, Ph.D. (University of Delaware)—food processing and engineering; R. Smitley, Ph.D. (Texas Woman's)—clothing, textiles, and fashion merchandising; B. Stringam, Ph.D. (University of Northern Arizona)—education; C. Turner, Ph.D. (New Mexico State)—curriculum and instruction; K. Vaillancourt, Ph.D. (Virginia Tech)—family studies

**DEGREE: Master of Science**  
**MAJOR: Family and Consumer Sciences**

### MINOR: Family and Consumer Sciences

The candidate for the master's degree should have an undergraduate degree in a field related to the intended area of specialization. In addition to the Graduate School requirements, the admissions criteria for the Department of Family and Consumer Sciences Graduate Program include letters of reference, standardized test scores, and other materials. Suggested departmental deadlines for review of admission materials are six weeks prior to the first day of the semester of desired start. A complete description of admission requirements should be obtained from the department. The Master of Science degree in Family and Consumer Sciences can be obtained with an emphasis in one of the following areas: hotel, restaurant and tourism management; clothing, textiles and fashion merchandising; family and child science (marriage and family therapy emphasis or teaching and research emphasis); human nutrition and dietetic sciences; food science and technology; family and consumer sciences education; or general family and consumer science. A minor may be taken in a variety of supporting fields that fit the particular interests of the candidate. A minimum of 30 credits (including 4-6 credits of thesis) is required under the thesis plan and is the recommended program for most students. A non-thesis plan is available that requires a minimum of 32 credits of course work with a written comprehensive examination. Both plans require a final oral examination.

Students will take 3 credits of statistics and 3 credits of research methodology at the graduate level. Students may be required to take a graduate-level technical writing course based on demonstrated writing ability in initial graduate courses. Students who do not have degrees related to their intended areas of specialization may be required to do some leveling work. Prior to the completion of 12 credits, a program advisory committee will be established to determine, with the student, the courses that will be taken for the degree work.

## FISH, WILDLIFE AND CONSERVATION ECOLOGY

**Department website:** <http://aces.nmsu.edu/academics/fws/>  
**(575) 646-1544**  
**fwce@nmsu.edu**

K.E. Stoner—department head, Ph.D. (University of Kansas)—ecology and conservation of neotropical mammals; M. Andersen, Ph.D. (University of Washington)—ecological modeling; W.J. Boeing, Ph.D. (Louisiana State University)—aquatic ecology; K.G. Boykin, Ph.D. (New Mexico State University)—spatial ecology and conservation; J. W. Cain, Ph.D. (University of Arizona)—large mammal ecology, conservation and management; C. A. Caldwell, Ph.D. (University of Tennessee)—fish biology; S.A. Carleton, Ph.D. (University of Wyoming)—physiological ecology and avian ecology; D. E. Cowley, Ph.D. (University of Wisconsin-Madison)—fish conservation genetics; M.J. Desmond, Ph.D. (University of Nebraska)—avian ecology and conservation; J.K. Frey, Ph.D. (University of New Mexico)—ecology and conservation of mammals; G. W. Roemer, Ph.D. (UCLA)—behavioral, population and community ecology and conservation biology; R. Salleneve, Ph.D. (University of Guelph)—aquatic benthic ecology, outreach, education.

**DEGREE: Master of Science**  
**MAJOR: Wildlife Science**

The Department of Fish, Wildlife and Conservation Ecology offers graduate work leading to the Master of Science degree with a major in wildlife science. The fishery science major is an option within wildlife science. Faculty members in the department also may advise Ph.D. candidates through the graduate program in the Department of Biology, the Department of Animal and Range Sciences, as well as other Ph.D. granting departments. For additional information please see the graduate catalog entries for the respective departments.

By selecting appropriate courses, the student can meet basic requirements for becoming a Certified Wildlife Biologist and/or a Certified Fisheries Professional.

Minimum qualifications for admission to the graduate program include the following:

- 3.0 grade-point average in the last two years of undergraduate work
- Students who are most competitive for admission are those with a combined average GRE score > 70<sup>th</sup> percentile on the verbal and quantitative parts of the GRE.
- Course work in zoology, botany, and animal ecology and a basic appreciation of sustainable use of natural resources, with

supporting courses in mathematics, chemistry, physics and written and oral communication.

Applicants should submit a written composition of approximately 350 words that indicates the applicant's reasons for pursuing advanced study, explains personal and educational goals, and any additional experiences (e.g., military or career) or skills that might provide a foundation for graduate study. Applicants should submit three letters of recommendation (it is preferred that at least two letters come from university instructors) along with official GRE scores (the department code is 0115). Applicants should also contact a faculty member in the department that they would like to work with as an advisor, and that faculty member needs to agree to serve as the student's advisor. Application forms, application fee and transcripts, GRE scores, letters of recommendation and letter of application should be submitted online to the Graduate School. Successful applicants will be selected from those who meet the criteria of grade-point average, GRE scores, and educational background described above and who appear to have professional promise as indicated by personal history and written references.

For the Master of Science degree, a minimum of 30 semester credits of graduate work in the major and related subjects is required, together with a thesis for most students. Of these credits, at least 15 must be in courses numbered 500 or above, and at least 15 must be for courses with the FWCE prefix. Those programs involving a thesis or research project include 4 to 6 credits of research (FWCE 598 or 599). Students electing a minor are required to take at least 8 credits in the minor field. A nonthesis option is available to some students, depending on prior training and experience, and subject to approval by the advisor and department head.

All students in the program must complete the following requirements:

- A ST 505 or equivalent
- One semester of Graduate Seminar (FWCE 515- may be repeated for credit)
- A minimum of 6 credits from the Quantitative Methods category (eligible courses listed below)
- One course each from the Ecological Concepts, Organismal Biology, and Ecological Techniques categories (eligible courses listed below)
- 4 to 9 credits from the Independent Study category (eligible courses listed below)

In addition, a student may petition to have up to 3 credits of special topics courses (FWCE 548) to apply to one of the three areas. Courses other than those listed may be acceptable, given permission by the student's supervisory committee.

#### Quantitative Methods: Eligible courses

A ST 503	SAS Basics	2
A ST 506	Statistical Inference II	3
A ST 507	Advanced Regression	3
A ST 523	Biological Sampling (s)	3
A ST 550	Special Topics	1-4
FWCE 509	Population Ecology (s)	3
FWCE 455	Environmental Risks and Decisions	3

(Other courses, particularly in Applied Statistics, may be eligible with consent of the advisory committee)

#### Ecological Concepts: Eligible courses

BIOL 467	Evolution	3
BIOL 484	Animal Communication	3
BIOL 489	Genetic Aspects of Population Biology	3
BIOL 567	Individuals and Populations	3
BIOL 568	Communities and Ecosystems	3
BIOL 570	Ecological Biogeography	3
BIOL 587	Behavioral and Evolutionary Ecology	3
FWCE 488	Conservation Genetics	3
FWCE 459	Aquatic Ecology	4
FWCE 540	Wildlife Habitat Relationships	3
GEOG 557	Fundamentals of Biogeography	3

#### Organismal Biology: Eligible courses

BIOL 547	Advanced Ornithology (so)	4
FWCE 530	Large Mammal Ecology, Management and Conservation	3
FWCE 532	Environmental Biology of Fishes	4
FWCE 536	Advanced Avian Ecology	3

FWCE 567	Herpetology	4
FWCE 582	Ichthyology	3

#### Ecological Techniques: Eligible courses

FWCE 464	Management of Aquatic and Terrestrial Ecosystems	4
FWCE 522	Fishery and Wildlife Research Methods (f)	3
FWCE 533	Fisheries Management	3
FWCE 534	Aquatic Contaminants and Toxicology	4
FWCE 537	Wildlife Damage Management	3
FWCE 571	GIS for Natural Resources	3
FWCE 580	Advanced Management of Aquatic Systems	3
GEOG 521	GIS & T Applications and Modeling	3
RGSC 452	Rangeland Analysis	4
RGSC 518	Watershed Methods and Management	3

#### Independent Study: Eligible courses:

FWCE 548	Graduate Problems	1-3
FWCE 598	Special Research Programs	1-3
FWCE 599	Master's Thesis	0-15

Graduate work in the department is intended to prepare students for careers in research, teaching, extension, and management. Facilities available to graduate students include two ranches of approximately 90,000 acres, a large suite of shared laboratories, and a large fish-culture facility. We actively cooperate with state and federal natural resource management agencies, and graduate students have access to national forests and extensive public lands, as well as the Jornada Basin Long-Term Ecological Research site and associated databases (see <http://jornada-www.nmsu.edu> for details). Additional research opportunities for graduate students are available in the New Mexico Cooperative Fish and Wildlife Research Unit, located in the department since 1988.

Additional information on the graduate program and faculty is available at <http://aces.nmsu.edu/academics/fwv>

## PLANT AND ENVIRONMENTAL SCIENCES

Department Website: <http://aces.nmsu.edu/pes>  
(575) 646-3406  
[esramire@nmsu.edu](mailto:esramire@nmsu.edu)

R. Pratt, Department Head, Ph.D. (Purdue University)—plant breeding and genetics; S. Angadi, Ph.D. (University of Manitoba, Canada)—crop physiology; J. Ashigh, Ph.D. (University of Guelph-Ontario)—weed science; D.L. Auld, Ph.D. (Montana State University)—plant genetics; B.T. Bestelmeyer, Ph.D. (Colorado State University)—landscape and land use change; W. Boeing, Ph.D. (Louisiana State University)—aquatic ecology; P.W. Bosland, Distinguished/Regents Professor, Ph.D. (University of Wisconsin, Madison)—chile breeding and genetics; C. S. Cramer, Ph.D. (North Carolina State University)—onion breeding and horticulture; D. DuBois, Ph.D. (University of Nevada)—atmospheric science; M.C. Duniway, Ph.D. (New Mexico State University)—agronomy; R. Flynn, Ph.D. (Auburn University)—soil and water quality; R.M. Goss, Ph.D. (University of Nebraska, Lincoln)—turf science; K. Grover, Ph.D. (Pennsylvania State University)—agronomy; S.J. Guldán, Ph.D. (University of Minnesota)—sustainable agriculture; S.F. Hanson, Ph.D. (University of Wisconsin-Madison)—genetics and microbiology; R.J. Heerema, Ph.D. (University of California, Davis)—pecans; J. Idowu, Ph.D. (Cranfield University, United Kingdom)—agronomy and land management; B. Leinauer, Ph.D. (Hohenheim University, Germany)—turfgrass; W. Lindemann, Ph.D. (University of Minnesota)—soil microbiology; K. Lombard, Ph.D. (New Mexico State University)—horticulture; M. Lucero, Ph.D. (New Mexico State University)—molecular biology and toxicology; M. Marsalis, Ph.D. (Texas Tech University)—forages; H.C. Monger, Distinguished Professor, Ph.D. (New Mexico State University)—pedology and environmental science; M. Monteros, Ph.D. (University of Georgia, Athens)—plant breeding and genetics; A. Nalim, Ph.D. (Pennsylvania State University)—plant pathology; G. Niu, Ph.D. (Chiba University, Japan)—horticulture; M.A. O'Connell, Distinguished/Regents Professor, Ph.D. (Cornell University)—plant biochemistry and molecular genetics; M. O'Neil, Ph.D. (University of Arizona)—agronomy; D.P.C. Peters, Ph.D. (Colorado State University)—landscape ecology and simulation modeling; G.A. Picchioni, Ph.D. (Texas A&M University)—plant-mineral relations; N. Puppala, Ph.D. (New Mexico State University)—plant breeding and genetics; I.M.

Ray, Ph.D. (University of Wisconsin-Madison)—alfalfa breeding and genetics; J. Schroeder, Ph.D. (University of Georgia)—weed science; C. Sengupta-Gopalan, Distinguished Professor, Ph.D. (Ohio State University)—biochemical genetics; M.K. Shukla, Ph.D. (University of Agricultural Sciences Vienna, Austria)—environmental soil physics; R. St. Hilaire, Assistant Department Head, Ph.D. (Iowa State University)—plant stress physiology and landscape horticulture; B. Stringam, Ph.D. (Utah State University)—biological and agricultural engineering; C. Steele, Ph.D. (King's College, University of London, United Kingdom)—range soils; M.E. Uchanski, Ph.D. (University of Illinois at Urbana-Champaign)—vegetable physiology; A.L. Ulery, Professor of Exemplary Teaching, Ph.D. (University of California, Riverside)—environmental soil chemistry; A. Unc, Ph.D. (University of Guelph, Canada)—environmental soil and water microbiology; S. J. Walker, Ph.D. (New Mexico State University)—horticulture; S. Yao, Ph.D. (Cornell University)—pomology/horticulture; J. Zhang, Ph.D. (University of Arkansas, Fayetteville)—cotton breeding, genetics, and genomics

**DEGREE: Master of Science**  
**MAJOR: Horticulture**

**DEGREE: Master of Science**  
**MAJOR: Plant and Environmental Science**

**DEGREE: Doctor of Philosophy**  
**MAJOR: Plant and Environmental Science**

**MINORS: Plant and Environmental Science**  
**Horticulture**

More than ever, we are linked in an interconnected world: both in agriculture and sustainability of environmental systems. The department has programs in plant sciences, environmental science, soil science, water management, natural resources management, and turf management. Students trained in these areas are in demand for U.S. and international positions. This demand is at all levels of training—B.S., M.S., and Ph.D. Therefore, the course work and original research in Plant and Environmental Sciences leading to the Master of Science and Doctor of Philosophy are designed for and have proven to be successful in preparing students for commercial companies, educational institutions, governmental agencies, and private production enterprises.

The student may emphasize study in several discipline areas described in the following pages. The agronomy section emphasizes sustainable crop production, plant-pest/disease/weed interactions, soil-water-plant relations, crop physiology, and breeding and genetics of cotton, alfalfa, maize and peanuts. The genetics section places special emphasis on genetic basis of agronomic or horticultural traits, applied bioinformatics, gene regulation and genomics. The environmental and soil science sections emphasize environmental quality and ecosystem services, bioremediation, recycling of organic wastes and wastewater, water use efficiency, soil-plant relations, soil-geomorphology and desert ecology, and the fertility, chemistry, physics, and microbiology of soils, including forest soils. The horticulture section emphasizes the creative use of plants by humans, and studies on the technical advancements in the husbandry of most economic commodity groups of fruits, vegetables, or ornamentals as well as managed turf. Emphasis may be in breeding and genetics of chile or onions, plant growth and development, nutrition, dormancy and cold hardiness, plant stress (water and/or salinity) response, fruit and vegetable physiology, forestry, and turfgrass.

Most students will be expected to complete a thesis. The research detailed in a thesis should be of a scope and quality to merit publication in a refereed journal. Depending on prior training and experience, a non-thesis option is available subject to approval by a departmental committee. The non-thesis option requires completion of a research project and paper of limited scope. In both the thesis and non-thesis options, suitability of the research project and resulting thesis or paper will be judged by the student's graduate committee. A minor is recommended and may be taken in chemistry, biology, molecular biology, environmental management, applied statistics, toxicology or other areas.

Prerequisite to major graduate work is completion of a curriculum essentially equivalent to that required by the department for the B.S. degree at New Mexico State University.

Qualifications for admission will be reviewed by the departmental graduate faculty. Applications should include a letter of interest. A 3.0 undergraduate grade-point average is needed for admission to study for the M.S. degree and a 3.3 grade-point average for Ph.D. studies. The department requires the GRE scores and three letters of recommendation, as well as the student's letter of interest as an admission requirement. Acceptance requires that a graduate faculty member in the applicant's area of interest accept the student into their program.

A student planning a program leading to a Ph.D. must satisfy one of the following departmental requirements approved by the doctoral committee:

1. A thorough knowledge of a language other than English
2. A reading ability in two foreign languages

3. Reading ability in one foreign language and proficiency with a research tool
4. Reading ability in one foreign language and one semester of supervised teaching experience
5. Proficiency with a research tool and one semester of supervised teaching
6. Two semesters of supervised teaching

A number of graduate assistantships are available each year. Inquiries should be addressed to the department.

## WATER SCIENCE AND MANAGEMENT

**Department Website:** [www.wsn.research.nmsu.edu](http://www.wsn.research.nmsu.edu)

**Department Contact Information:**

(575)646-4198

[wsm@nmsu.edu](mailto:wsm@nmsu.edu)

**Coordinating Institute**

Water Resources Research Institute, 575-646-4337

**Sponsoring Departments**

Agricultural Economics and Agricultural Business, 575-646-3215

<http://aces.nmsu.edu/academics/aeab/>

Animal and Range Sciences, 575-646-2514

<http://anrs.nmsu.edu>

Civil and Geological Engineering, 575-646-3509

<http://cagesun.nmsu.edu>

Geography, 575-646-3509

<http://geography.nmsu.edu>

Plant and Environmental Sciences, 575-646-3405

<http://aces.nmsu.edu/pes>

**Affiliated Faculty** – Tilahun Adera, Ph.D. (Oregon State); Steve Archambault, Ph.D. (New Mexico); A. Salim Bavazir, Ph.D. (NMSU); Max P. Bleiweiss, M.S. (California State-Los Angeles); Wiebke Boeing, Ph.D. (Louisiana State); Christopher Brown, Ph.D. (San Diego State/California-Santa Barbara); Susan Brown, Ph.D. (NMSU); Colleen A. Caldwell, Ph.D. (Tennessee); K.C. Carroll, Ph.D. (University of Arizona); David E. Cowley, Ph.D. (Wisconsin-Madison); Michael N. DeMers, Ph.D. (Kansas); Shuguang Deng, Ph.D. (Cincinnati); Cara Downes, Ph.D. (New Mexico); David W. DuBois, Ph.D. (Nevada-Reno); Daniel P. Dugas, Ph.D. (Oregon); Constance L. Falk, Ph.D. (Oklahoma State); A.G. Sam Fernald, Ph.D. (Colorado State); Jose Z. Garcia, Ph.D. (New Mexico); Abbas Ghassemi, Ph.D. (NMSU); Ryan M. Goss, Ph.D. (Nebraska-Lincoln); William R. Gould, Ph.D. (North Carolina State); Steven J. Guldan, Ph.D. (Minnesota); Jeffrey Herrick, Ph.D. (Ohio State); Brian H. Hurd, Ph.D. (Colorado State); Michael D. Johnson, Ph.D. (NMSU); J. Philip King, Ph.D. (Colorado State); Antonio S. Lara, Ph.D. (NMSU); Tim F. Lawton, Ph.D. (Arizona); Bernd Leinauer, Ph.D. (Hohenheim University, Germany); William Lindeman, Ph.D. (Minnesota); Greg H. Mack, Ph.D. (Indiana-Bloomington); J. Thomas McGuckin, Ph.D. (Wisconsin-Madison); John G. Mexal, Ph.D. (Colorado State); Martha C. Mitchell, Ph.D. (Minnesota); H. Curtis Monger, Ph.D. (NMSU); Mick O'Neill, Ph.D. (Arizona); Lambis Papelis, Ph.D. (Stanford); Jim T. Peach, Ph.D. (Texas-Austin); Geno A. Picchioni, Ph.D. (Texas A&M); Richard C. Pratt, Ph.D. (Purdue); Albert Rango, Ph.D. (Colorado State); David A. Rockstraw, Ph.D. (Oklahoma); Rossanna Sallenave, Ph.D. (University of Guelph-Canada); Zohrab A. Samani, Ph.D. (Utah State); Jill Schroeder, Ph.D. (Georgia); Manoj K. Shukla, Ph.D. (University of Agricultural Sciences-Vienna, Austria); Rhonda K. Skaggs, Ph.D. (Utah State); Geoffrey B. Smith, Ph.D. (North Carolina State); Robert G. Smits, Ph.D. (Purdue); Rolston St. Hilaire, Ph.D. (Iowa State); Caiti M. Steele, Ph.D. (King's College, University of London-UK); Kenny Stevens, M.S. (NMSU); Blair L. Stringam, Ph.D. (Utah State); April L. Ulery, Ph.D. (California-Riverside); Adrian Unc, Ph.D. (University of Guelph-Canada); Jacob Urquidí, Ph.D. (Texas Tech); Hugo Vilchis-Lincon, M.D., Ph.D. (UNAM, Utah State); Frank A. Ward, Ph.D. (Colorado State); Benjamin Widner, Ph.D. (Colorado State); Pei Xu, Ph.D. (Ecole Nationale de Genie Rural, Des Eaux Et Des Forets, France)

**DEGREE: Master of Science**  
**MAJOR: Water Science and Management**

**DEGREE: Doctor of Philosophy**  
**MAJOR: Water Science and Management**

### THE WATER SCIENCE AND MANAGEMENT PROGRAM

New Mexico faces serious challenges concerning the supply, development, quality, management, and administration of water resources; responses to the challenges will have major impacts on the regional economy, environmental quality, and the quality of life of the residents of New Mexico. A

major need exists to train the next generation of water resource researchers, educators, and managers to address these challenges, both inside and outside New Mexico. To help meet these needs, an interdisciplinary program in Water Science & Management (WSM) has been developed at NMSU by the departments of Agricultural Economics and Agricultural Business, Animal and Range Science, Civil Engineering, Geography, and Plant and Environmental Sciences. The primary purposes of the interdisciplinary masters and doctoral degree programs in WSM are to provide graduate education for addressing state, national, and international water issues, and to train the next generation of water professionals needed to meet the challenges noted above. A Master of Science WSM degree can be earned with 26 credits of formal course work, plus additional thesis research credits, and a Doctor of Philosophy WSM can be earned with 30-40 credits of formal course work beyond the masters, plus additional dissertation research credits.

Five fields of study are offered in the program and are detailed below (suggested classes for each area are detailed in the following section):

- **Agricultural Water Resources** relates to the major use of ground and surface water in providing safe and secure food systems while ensuring ecosystem services. This field of study includes water allocation, water conservation, and water management issues facing urban water supply and irrigated agriculture.
- **Watershed, Riparian, and Aquatic Systems** includes the processes of organizing and guiding land and other resources used in a river basin to provide desired goods and services without adversely affecting soil and water resources. Watershed, riparian, and aquatic system management involves an array of nonstructural (vegetation management) practices, as well as an array of structural (engineering) activities, when conditions warrant.
- **Water Quality and Treatment** includes processes used to make water acceptable for desired end-uses. These can include use as drinking water, industrial processes, agricultural uses, and environmental management. The goal of water treatment processes is to remove existing contaminants in the water or reduce the concentration of such contaminants so the water becomes fit for its desired end-use.
- **Water Economics and Policy** examines the demand for water by all its competing uses, including irrigated agriculture, energy, urban supply, and environmental restoration and management. Policies are examined for their influence on water supplies, water demands, and economic values of water reallocations among agricultural, environmental, energy, and urban users. It examines the role of water markets, water user decisions, institutional adjustments, and water-related policies with respect to resource costs, water quality, profitability, and environmental effects.
- **Water Informatics** is an interdisciplinary science primarily concerned with the collection, classification, manipulation, storage, retrieval and especially the dissemination of water information, including both human and machine readable documents. Examples of human readable documents include maps, field data sheets, operational schedules, and long term asset management plans with narrative text. Machine readable documents include files for geographic information systems (GIS), Global Positioning Systems (GPS), relational database management systems, and emerging applications.

Admission Requirements for the Master of Science in water science and management include all general requirements for a graduate degree as set forth in the NMSU Catalog, plus the following:

- Possession of a bachelor's degree from an accredited university grade point average of 3.5 or higher on a 4.0 scale. However, students with grade point averages between 3.0 and 3.5 will be given consideration, this degree being preparatory to the Water Science and Management degree.
- Three letters of recommendation submitted directly from persons who know the applicant professionally, including a recommendation from the candidate's current employer/sponsor. These letters should provide evidence of professional ability, research experience, and the potential for professional development. A letter of intent or statement of purpose that addresses individual professional and personal goals related to water science and management and discusses how these goals fit within the degree programs at NMSU. It is expected that the candidate will have made contact with prospective advisor(s) at NMSU and speak to how he or she would work with said advisor(s) to advance their research and study.
- A brief resume or curriculum vitae not to exceed five pages that summarize the candidate's background and qualifications.

Admission Requirements for the Doctor of Philosophy (Ph.D.) in water science and management include all general requirements for a graduate degree as set forth in the NMSU Catalog, plus the following:

- Possession of a master's degree from an accredited university with a grade point average of 3.5 or higher on a 4.0 scale. However, students with grade point averages between 3.0 and 3.5 will be given consideration. This degree being preparatory to the Water Science and Management doctorate.
- Three letters of recommendation submitted directly from persons who know the applicant professionally, including a recommendation from the candidate's current employer/sponsor. These letters should provide evidence of professional ability, research experience, and the potential for professional development.
- In addition, applicants to the Ph.D. program should provide evidence of research experience. This could include a master's thesis, a professional paper, peer reviewed manuscripts, consulting reports, or other evidence of experience conducting research.
- A letter of intent or statement of purpose that addresses individual professional and personal goals related to water science and management and discusses how these goals fit within the degree programs at NMSU. It is expected that the candidate will have made contact with prospective advisor(s) at NMSU and speak to how he or she would work with said advisor(s) to advance their research and study.
- A brief resume or curriculum vitae not to exceed five pages that summarize the candidate's background and qualifications.

**Core Courses** – the following courses are core courses required for the Master of Science and Doctor of Philosophy programs, respectively.

**Master's Degree** – This degree is designed primarily for students who wish to complement their primary discipline by obtaining scientific, technical, and managerial expertise in water. The Master's degree can be earned with 26 credits of formal course work, plus six additional thesis research credits, as detailed below.

- AEEC 575 Advanced Water Resource Management and Policy (3 credits)
- RGSC 518 Watershed Methods and Management, OR SOIL 456 Irrigation and Drainage (3 credits)
- A ST 505 Statistical Inference I (4 credits)
- Seminar (1 credit)
- Electives from designated water list for the relevant field of study (10 credits)
- Free electives in consultation with the student's committee (5 credits)
- Thesis (6 credits)

**Doctoral Degree** – This degree is designed to give students a thorough and comprehensive knowledge of water science and hydrology and training in methods of research. The Ph.D. degree can be earned in about 30-40 credits of formal course work beyond the Masters Degree, plus additional dissertation research credits, for a minimum total of 75 credits beyond the B.S. degree, as detailed below.

- AEEC 575 Advanced Water Resource Management and Policy (3 credits)
- RGSC 518 Watershed Methods and Management, OR SOIL 456 Irrigation and Drainage (3 credits)
- CE 557 Water Resources Development (3 credits)
- TOX 523 Environmental Toxicology (3 credits)
- GEOG 578, Fundamentals of Geographic Information Systems (4 credits) OR GEOG 521 GIS Applications (3 credits)
- A ST 505 Statistical Inference I OR C E 582 Statistical Hydrology (3-4 credits)
- Seminar (Two different departments) (2 credits)
- Electives from designated water list for the relevant field of study (10 credits)
- Free electives in consultation with the student's committee (5 credits)
- Dissertation (18 credits)

Students are expected to have a basic foundation in Geographic Information System (GIS) within a classroom, research experience, or professional experience. Students without this background are required to take an appropriate GIS class as advised by their advisor such as: GEOG 578-Fundamentals of Geographic Information System, or GEOG 521- GIS Application, or FWCE 535- GIS for Natural Resources.

### **Graduate Minor in Geographic Information Science and Technology (GIS&T)**

Student interested in completing a Geographic Information Science and Technology minor should consult with the geography department (<http://geography.nmsu.edu>)



**Master of Science in Applied Statistics Minor**

Students interested in completing a Geographic Information Science and Technology minor should consult with the Economics, Applied Statistics and International Business department (<http://business.nmsu.edu/academics/economics-ib/>).

**DEGREE REQUIREMENTS**

**Water Science & Management Graduate Courses** – The following courses are courses deemed likely to support each of the five fields of study, but this list is not meant to be all inclusive. Variations from or additions to this list may be made by the candidate, subject to the approval by the thesis or dissertation committee chairperson.

**Agricultural Water Resources**

A EN 459	Design of Water Wells/Pumping Systems	3
A EN 475	Soil and Water Conservation	3
A EN 478	Irrigation and Drainage Engineering	3
AGRO 620	Instrumentation in Agronomy	3
C E 452	Geohydrology	3-4
C E 482	Hydraulic Structures	3
C E 483	Surface Water Hydrology	3
C E 485	Design of Earth Dams	3
C E 506	Advanced Soil Mechanics	3
C E 525	Advanced Analysis of Engineering Systems	3
C E 531	Open Channel Hydraulics	3
C E 557	Water Resources Development	3
C E 581	Ground Water Hydrology	3
C E 582	Statistical Hydrology	3
C E 682	Topics in Hydrodynamics II	3
GEOG 467	Transportation Geography	3
GEOG 552	Landscape Ecology	3
GEOG 553	Geomorphology	3
GEOL 474	Ground Water Geology	3
GEOL 515	Advanced Principles of Geochemical Equilibria	3
GEOL 560	Geochemistry of Diagenetic and Hydrochemical Systems	3
M E 530	Intermediate Fluid Mechanics	3
M E 533	Computational and Theoretical Fluid Mechanics	3
M E 535	Turbulence and Chaos	3
SOIL 456	Irrigation and Drainage	3
SOIL 477	Environmental Soil Physics	3
SOIL 477 L	Environmental Soil Physics Laboratory	1
SOIL 479	Environmental Soil Chemistry	3
SOIL 651	Advanced Soil Chemistry	3
SOIL 652	Advanced Soil Physics	3

C E 482: Also E S 452 and GEOL 452

**Watersheds, and Aquatic and Riparian Wetlands**

AEEC 580	Natural Resources and Environmental Policy	3
BIOL 533	Environmental Physiology of Plants	3
C E 483	Surface Water Hydrology	3
C E 557	Water Resources Development	3
C E 581	Ground Water Hydrology	3
C E 682	Topics in Hydrodynamics II	3
FWCE 459	Aquatic Ecology	4
FWCE 482	Ichthyology	4
FWCE 532	Environmental Biology of Fishes	4
FWCE 534	Aquatic Contaminants and Toxicology	4
FWCE 578	Advanced Limnology (s) (a)	3
GEOL 452	Geohydrology	4
GEOG 577	Geographic Information Science and Technology	3
RGSC 518	Watershed Methods and Management	3
SOIL 456	Irrigation and Drainage	3

SOIL 472	Soil Morphology and Classification	4
SOIL 477	Environmental Soil Physics	3
SOIL 477 L	Environmental Soil Physics Laboratory	1
SOIL 652	Advanced Soil Physics	3

**Water Quality and Treatment**

BIOL 477	Applied and Environmental Microbiology	4
CHEM 472	Analytical Methods for Toxic Organics and Metal Ions in the Environment	3
ENVE 456	Environmental Engineering Design	3
ENVE 462	Sampling and Analysis of Environmental Contaminants	3
ENVE 551	Unit Processes/Operation of Water Treatment	3
ENVE 551 L	Unit Processes/Operation of Water Treatment Laboratory	1
ENVE 552	Unit Processes/Operation of Wastewater Treatment	3
ENVE 552 L	Unit Processes/Operation of Wastewater Treatment Laboratory	1
ENVE 553	Chemical Theories of Environmental Engineering	3
ENVE 557	Surface Water Quality Modeling	3
ENVE 630	Fate and Transport of Environmental Contaminants	3
FWCE 534	Aquatic Contaminants and Toxicology	4
MPH 554	Environmental Epidemiology	3
TOX 523	Environmental Toxicology	3

**Water Economics and Policy**

AXED 485	Methods of Teaching Biological Science in Agriculture	3
AEEC 575	Advanced Water Resource Management and Policy	3
AEEC 580	Natural Resources and Environmental Policy	3
AG E 475	Water Resource Management & Policy	3
ECON 455	Public Utilities Regulation	3
HL S 452	Environmental Health	3
ECDV 651	Economic Development Theory	3
ECDV 661	Regional Economic Modeling I	3
ECDV 662	Regional Economic Modeling II	3
ECDV 664	Population Economics	3
ECDV 668	Economic Development Finance	3
ECDV 671	Sustainable Economic Development	3
MPH 550	Environmental Public Health Issues	3
MPH 565	International Health Problems	3
MPH 567	Rural Health Issues	3
MPH 569	U.S.-Mexico Border Health Issues	3

**Water Informatics**

GEOG 521	GIS & T Applications and Modeling	3
GEOG 571	Cartography and Geographic Information Systems	4
GEOG 572	Geodatabase Design	3
GEOG 573	Introduction to Remote Sensing	4
GEOG 577	Geographic Information Science and Technology	3
GEOG 578	Fundamentals of Geographic Information Science and Technology (GIS & T)	4
GEOG 581	System Design for Geographic Information Science and Technology (GIS & T)	3
GEOG 582	Advanced Remote Sensing	4
GEOG 585	Advanced Spatial Analysis	3
GEOG 586	Geospatial Techniques for Natural Resource Assessments	3

# COLLEGE OF ARTS AND SCIENCES

Dean • Christa D. Slaton

Associate Dean (Research and Graduate Affairs) • Jeffrey P. Brown

Associate Dean (Academics) • Beth Pollack

Associate Dean (Academic Planning and Resources) • Lisa Bond-Maupin

Associate Dean (Development and External Affairs) • Kenneth Van Winkle

Associate Director, Research Center • Olga Ostos

Director, Academic Advising • Jennifer Hodges

Coordinator, Student Records • Hilda M. Olivas

## ANTHROPOLOGY

Department website: <http://anthropology.nmsu.edu/>  
(575) 646-2725

*M. Chaiken, department head, Ph.D. (California - Santa Barbara)– Participatory development, resettlement, and rural health and nutrition, gender, applied anthropology, Africa and Southeast Asia; R. T. Alexander, Ph.D. (New Mexico)– Mesoamerican archaeology, historical archaeology of Yucatan, ethnohistory and colonialism, agrarian ecology, fauna analysis; F. Arakawa, Ph.D. (Washington State)– Southwest archaeology, ceramic analysis; B. R. Benefit, Ph.D. (NYU)– biological anthropology, African paleoanthropology, dental anthropology, paleoecology; W. Thomas Connelly, Ph.D. (California - Santa Barbara)– Agricultural systems, ecological anthropology, applied/development anthropology, Southeast Asia, East Africa, rural communities in the US; S. Marinas, MA (NMSU)– museum conservation; M. McCrossin, Ph.D. (California-Berkeley)– biological anthropology, human evolution, African paleoanthropology, primatology; B. O’Leary, Ph.D. (New Mexico)– Southwest archaeology, cultural resource management, arctic ethnography; D. Pepion, Ed.D. (Montana State)– Native American studies, ethnohistory, anthropology and education; S. Rushforth, Ph.D. (Arizona)– cultural anthropology, anthropological linguistics, Native American ethnology; M. A. T. Scott, Ph.D. (Kentucky)– medical anthropology, Latin America; L. Stanford, Ph.D. (Florida)– agriculture, organizations, food studies, globalization, sociocultural anthropology, Latin America; A.M. Strankman, MA (UWashington)– museum studies, Native American art; W. Walker, Ph.D. (Arizona)– Southwestern archaeology, theory and field method in archaeology, ritual prehistory. Emeritus Faculty: C.E. Eder, Ph.D. (emeritus) SUNY- Buffalo– art, drugs, gender, religion, Mesoamerica, women’s studies and writing about culture; B. O’Leary, Ph.D. (emeritus) (Arizona)– historical archaeology, urban anthropology, ethnic relations; W. Trevathan, Ph.D. (Regent’s Professor Emerita) Colorado-Boulder– reproduction, evolutionary medicine, medical anthropology, nutritional anthropology*

**DEGREE: Master of Arts**

**MAJOR: Anthropology**

**MINORS: Anthropology**  
**Archaeology**  
**Food Studies**  
**Native American Studies**

**GRADUATE CERTIFICATES:**

**Cultural Resource Management**  
**Museum Studies**

**DEGREE: MASTER OF ARTS**

**MAJOR: ANTHROPOLOGY**

The M.A. program in anthropology is designed for students who are interested in the traditional subdisciplines of anthropology and in selected areas of applied anthropology. The program is directed both toward students who intend to take a terminal M.A. degree and students who intend to enter a Ph.D. program.

A bachelor’s degree in anthropology is not required for entry into the program. Nevertheless, students who lack the equivalent of ANTH 301, ANTH 315,

ANTH 320, and ANTH 355 may be required to take these courses or corresponding sections of ANTH 502.

### PROGRAM REQUIREMENTS

Students selecting the thesis option must complete 33 hours of basic course work, as described below, plus 6 hours of thesis credit. Students selecting the non-thesis option must complete 39 hours of course work including an internship or special research project for 6 credits.

The 33 hours of basic course work for students selecting either the thesis or non-thesis options are distributed as follows:

- ANTH 505, Issues in Anthropological Practice
- Students will be required to take a core theory course in their respective subfield and one additional core theory course in another subdiscipline:
- Students in the archaeology subfield must complete ANTH 585 (Method and Theory in Archaeology), earning a grade of B or better.
- Students in the biological anthropology subfield must complete ANTH 513 (Biological Anthropology), earning a grade of B or better.
- Students in the cultural anthropology and anthropological linguistics subfields must complete ANTH 500 (Seminar in Anthropological Theory), earning a grade of B or better.
- Students will be required to take an additional topical/methodological/areal course in their respective subfield, earning a grade of B or better.

**Students in the archaeology subfield will choose from the following options:**

ANTH 507	Advanced Studies in Archaeology	1-3
ANTH 510	Southwestern Anthropology	3
ANTH 511	Mesoamerican Anthropology	3
ANTH 514	Advanced Issues in the Archaeology of Religion	3
ANTH 516	Advanced Archaeology of the American Southwest	3
ANTH 517	Advanced Topics in Mesoamerican Archaeology	3
ANTH 518	Advanced Historical Archaeology in Latin America	3
ANTH 519	Advanced Topics in Prehistoric Archaeology	3
ANTH 526	Historical Archaeology in Latin America	3
ANTH 540	Cultural Resource Management	3
ANTH 577	Faunal Analysis	3
ANTH 578	Advanced Lab Methods in Archaeology	3

**Students in the biological anthropology subfield will choose from the following options:**

ANTH 506	Advanced Studies in Physical Anthropology	1-3
ANTH 531	Issues in Nutritional Anthropology	3
ANTH 534	Advanced Human Evolution	3
ANTH 537	Applied Medical Anthropology	3
ANTH 572	Advanced Primate Behavior and Ecology	3
ANTH 573	Advanced Primate Adaptation and Evolution	3

ANTH 574	Advanced Human Osteology	3
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**Students in the cultural anthropology and anthropological linguistics subfields will choose from the following options:**

ANTH 455	Federal Indian Policy	3
ANTH 504	Cultures of Africa	3
ANTH 508	Advanced Studies in Cultural Anthropology	1-3
ANTH 509	Advanced Studies in Anthropological Linguistics	1-3
ANTH 510	Southwestern Anthropology	3
ANTH 511	Mesoamerican Anthropology	3
ANTH 515	Applied Anthropology	3
ANTH 520	Ethnographic Field Methods	3
ANTH 525	Issues in Language and Culture	3
ANTH 526	Historical Archaeology in Latin America	3
ANTH 531	Issues in Nutritional Anthropology	3
ANTH 532	Advanced Issues in the Anthropology of Religion	3
ANTH 533	Advanced Issues in Women, Gender, and Culture	3
ANTH 535	Economic Anthropology	3
ANTH 536	Anthropology of Development	3
ANTH 538	Plants, Culture, and Sustainable Development	3
ANTH 539	Culture and Foodways	3

Students will earn an additional 21 credits, at least 15 of which must be in anthropology. Finally, students will earn 6 credits of thesis (ANTH 599), internship (ANTH 597), or special research problems (ANTH 598), or additional courses.

### Admission Requirements

To be considered for admission to the M.A. program in anthropology, submit the following:

- Application form and fees
- Official undergraduate and graduate transcripts from all colleges and universities attended
- A letter from the candidate addressing his or her interests and graduate school objectives
- Letters of recommendation from three persons familiar with the candidate's academic record
- A Curriculum Vita
- An undergraduate grade-point average of 3.0 or higher

Application materials are available on the Anthropology website <http://anthropology.nmsu.edu>

### GRADUATE MINOR IN NATIVE AMERICAN STUDIES

The purpose of the Native American Studies Graduate Minor are to:

- Provide an opportunity for all students to learn about Native American cultures and societies.
- Facilitate research and other creative activities that concern Native American peoples and that have potential benefit for them,
- Serve the University and State of New Mexico in ways that support and illuminate the rich heritage of Native American peoples.

NAS focuses on Native American cultures and societies, deals with contemporary and historical experiences of American Indians, and examines the contributions of Indigenous peoples to life in the United States and other American nations. This specialization field has developed in reaction to Western academic views of Native Americans and to the frequently restrictive, assimilationist approach within universities to issues concerning Native peoples. NAS contributes to a new understanding of Native American cultures and societies from contemporary and historical perspectives.

To qualify for a graduate minor in Native American Studies- Anthropology, students are required to complete 9 credit hours (3 classes) of graduate level courses. To record a minor on a student's transcript, the minor must be listed on the "Application for Admission to Candidacy," and the Native American Studies advisor in the Department of Anthropology must sign this form.

**Core courses for the minor are as follows:**

ANTH 541	Decolonizing Methodologies in Native American Studies	3
ANTH 543	Indigenous Ways of Knowing	3
ANTH 455	Federal Indian Policy	3

Alternative and support classes are identified below in the list of cognate classes, and one class or alternative classes may be substituted with the approval

of the student's M.A. chair and the Coordinator for the Graduate Minor in Native American Studies.

### Cognate Area Courses

ENGL 557	American Indian Literatures	3
GOVT 524	American Indian Politics	3
HIST 509	Native American History	3
MSW 564	Social Work with Native American Populations	3

### GRADUATE CERTIFICATE IN CULTURAL RESOURCE MANAGEMENT

Graduate Certificate programs typically require 12-18 credits, and must be completed within 3 years. Our certificate program will require the student to take 18 credits, 6 credits from two required courses and 12 credits from a comprehensive list of electives in anthropology and cognate fields. All these courses are designed to promote expertise in cultural resource management.

#### Required Courses (9 credits)

ANTH 540	Cultural Resource Management	3
ANTH 542	Cultural Resource Management II	3
HIST 583	Advanced Historic Preservation	3

#### Elective Courses: 9 credits from this list of options

note: some of these courses have prerequisites, consult the graduate catalog for details

ANTH 455	Federal Indian Policy	3
ANTH 507	Advanced Studies in Archaeology	1-3
ANTH 512	Analytical Methods in Anthropology	3
ANTH 516	Advanced Archaeology of the American Southwest	3
ANTH 522	Archaeological Field School-Graduates	2-6
ANTH 523	Archaeological Mapping	3-6
ANTH 574	Advanced Human Osteology	3
ANTH 574 L	Advanced Osteology Laboratory	1
ANTH 577	Faunal Analysis	3
ANTH 578	Advanced Lab Methods in Archaeology	3
ANTH 596	Readings	1-6
ANTH 597	Internship	1-9
GEOG 521	GIS & T Applications and Modeling	3
GEOG 553	Geomorphology	3
GEOG 573	Introduction to Remote Sensing	4
GEOG 578	Fundamentals of Geographic Information Science and Technology (GIS & T)	4
HIST 579	Oral History	3
HIST 586	Interpreting Historic Places for the Public	3
HIST 594	Public History Seminar	3

Other classes maybe included in the list of elective courses at the discretion of the Department and with approval of the Anthropology Department Head

### GRADUATE CERTIFICATE IN MUSEUM STUDIES

The Certificate in Museum Studies is a 3-semester (or one year and one summer) program designed for individuals who want to enhance their understanding of museum work but do not need a master's degree, or to be completed in conjunction with a Master's degree in Public History, History, Art History, Anthropology, or Studio Art or other disciplines by permission.

#### Core Curriculum: (12 credits)

ANTH 545	Advanced Museology I	3
ART 503	Preventive Conservation/Collections Care	3
HIST 586	Interpreting Historic Places for the Public	3
	INTERNSHIP (credits from ANTH, ART, or HIST)	3

#### Controlled Electives: (6 credits, 3 courses chosen from the following)

ANTH 540	Cultural Resource Management	3
ANTH 542	Cultural Resource Management II	3
ANTH 547	Museum Field Methods	3
ANTH 548	Museums & Society	3
ART 501	Museum Conservation Techniques I	3

ART 502	Museum Conservation Techniques II	3
ART 579	Graduate Seminar: Art Theory, Criticism, Historiography	3
ART 587	Exhibition Studies	3
HIST 579	Oral History	3
HIST 581	Time Traveling Through New Mexico's Past	3
HIST 583	Advanced Historic Preservation	3
HIST 594	Public History Seminar	3

This list can be modified as new courses are added to the catalog, or old ones are phased out. Eligible courses to be determined by a committee with at least one representative from Art, Anthropology and History.

## ART

Department website: [www.nmsu.edu/~artdept](http://www.nmsu.edu/~artdept)  
(575) 646-1705  
[artdept@nmsu.edu](mailto:artdept@nmsu.edu)

*J. Barella, department head, M.F.A. (University of Wisconsin-Milwaukee)– metals, T. Cole-Dorn, M.F.A. (New Mexico State University)– painting and drawing, C. Cully, M.F.A. (University of Arizona)– painting and drawing, J. Edgar, MFA (Cranbrook)–Ceramics; J. Fitzsimmons, M.A. (New Mexico State University)– art history, M. F u ruhashi, M.F.A. (University of Illinois- Champagne)- jewelry and metals; M. Goehring, Ph.D. (Case Western)– art history, S. Marinas, M.A. Art Conservation (Universidad Complutense de Madrid, Spain) and M.A. Anthropology (New Mexico State University)– Art Conservator; K. Reka, M.F.A. (Indiana University)– graphic design; R. Stevens, M.F.A. (Syracuse University)– sculpture; S. Taylor, Ph.D. (Boston University)– art history/interim gallery director; E. Zarur, M.F.A., Ph.D. (University of Georgia)– art history; A. Jaffe, M.F.A. (University of Montana-Missoula)– professor emeritus; L. Ocepek, M.F.A. (University of Iowa)– professor emeritus; J. Rose, M.F.A. (Yale University)– professor emeritus; J. St. Aubyn, M.F.A. (University of New Mexico)– professor emeritus*

**DEGREE: Master of Arts**  
**MAJOR: Art**  
**EMPHASIS: Art History**

**DEGREE: Master of Fine Arts**  
**MAJOR: Art**  
**EMPHASIS: Studio Art**

**DEGREE: Master of Arts**

**EMPHASIS: Art History**

An emphasis in art history requires a minimum of 33 credits of art history courses, 6 of which may be thesis credits. Of the required minimum, 6 credits of related courses may be substituted with the approval of the department head and the student's major advisor.

Reading proficiency in a foreign language is also required and should be acquired prior to the beginning of thesis research for which it will be employed. A reading proficiency exam will be arranged in conjunction with the major advisor. Admission to the M.A. program with an emphasis in art history is based on an accredited B.A. or B.S. degree (or equivalent) with a major in art history, including at least 33 art history credits and 9 studio credits. Undergraduate deficiencies must be completed before advancement to candidacy.

### Candidacy and Thesis Committee Selection

Upon satisfactory completion of all required course work (except thesis credits) and foreign language requirement, the student will prepare a thesis proposal under the direction of the major professor. The student will then select the second member of his or her thesis committee and submit the proposal to this committee member for approval. With the backing of these two advisors, the student must then present the proposal to the department faculty. After a successful presentation, the student will advance to candidacy and select the third committee member, who may be from outside the art department.

### Admission

All applicants for admission to the M.A. program must submit

1. A polished undergraduate research paper
2. A written statement of intent
3. Letters of recommendation from three qualified people of the applicant's choice

### 4. Official undergraduate transcripts.

Research papers, statement of intent, and letters of recommendation should be sent to the Department of Art. Applications and official undergraduate transcripts should be sent directly to the Graduate School. Psychometric test scores are not required.

### Application Deadline

The final submission date for all application materials and teaching assistantship applications is January 20 for the fall and spring semesters.

## DEGREE: MASTER OF FINE ARTS

### EMPHASIS: Studio Art

Art requirements for an M.F.A. degree with an emphasis in studio art include a minimum of 60 credits of academic work, usually completed in three years. Of those 60 credits, 9 must be taken in art history, 6 in non-art courses numbered 450 or above, 6 in thesis work, 3 in graduate seminar: art theory, criticism, historiography and 12 in ART 596. In order to remain in good standing in the MFA program, a student must maintain an average GPA of 3.0. A grade of C or lower in an Art Department graduate course is considered failing. In the event that a student fails a required course, they must repeat the class in order to get credit for it. If a student is awarded a graduate assistantship, he or she must maintain an average GPA of 3.0.

### Program Requirements (60 cr.)

Art history courses	9
Non-art courses	6
Studio thesis	6
Graduate Seminar: Art Theory, Criticism, Historiography (ART 579)	3
Graduate Studio Seminar: ART 596	12-18
Studio Electives	18-24

### Semester Reviews

At the end of the first two semesters, each graduate student's creative production will be reviewed by the assembled faculty. Participation in semester reviews are required for successful completion of graduate level studio courses.

### Candidacy

Candidacy occurs during the third semester of study in residency. Candidacy consists of a formal review of the student's work by the assembled graduate faculty. The graduate faculty advances the student to his or her final 3 semesters of study by a majority vote. If the faculty does not advance the student, candidacy may be repeated one additional time at the end of the next consecutive semester. The final three semesters of thesis work will commence from that point. Students who are not successful in their second candidacy attempt will be disenrolled from the MFA program.

### Thesis Committee

At the end of the third semester and after a successful candidacy the student will propose his or her thesis committee, consisting of three art department graduate faculty members, and one faculty member from outside the department.

### Thesis Exhibition

The studio thesis will culminate in an exhibition of the candidate's creative works and a written thesis statement. A successful oral examination and defense of the thesis and exhibition is required for graduation. Two copies of the thesis and a photographic record of the final exhibition are required; other requirements may be determined by the graduate faculty. Students who do not satisfactorily complete their oral examination may not participate in the thesis exhibition.

Thesis exhibitions for the M.F.A. degree will be held in the spring semester in the University Art Gallery. Students who wish to graduate at mid-year are obligated to find an exhibition space other than the NMSU Art Gallery that meets with the approval of the graduate committee. In this case the student is responsible for making all arrangements for the thesis exhibition.

### Admission

Admission to the M.F.A. program in studio art is based on an accredited B.A., B.S., or B.F.A. degree (or equivalent) with a major in art, including at least 45 credits in studio art courses and 15 credits in art history. Any deficiencies must be corrected by undergraduate course work to be completed before advancement to candidacy. Exceptions to these requirements will be considered by the graduate committee. Students with an earned M.A. may be considered with the consent of the faculty, for advancement to candidacy for the M.F.A. degree upon completion of one semester or 9 credits in residence at NMSU. The number of transferable

credits from a previous graduate program will be determined by the department head and the graduate advisor before consideration for candidacy.

All applicants for admission to the M.F.A. program in studio art must submit

1. A CD/DVD with a PDF or jpeg portfolio of 20 images and an image list that identifies each piece by title, date, media and size
2. A written statement of intent, including scholarly and professional goals and the applicant's interest in studying at NMSU
3. Letters of recommendation from three qualified people of the applicant's choice
4. Official undergraduate transcripts

Admission to the M.F.A. program in studio art will be decided upon consideration of all materials. Application guidelines are available on the Departmental website. The majority of teaching assistantships and studio spaces are awarded in the fall. Psychometric test scores are not required.

### Application Deadline

The final submission date for all application materials and teaching assistantship applications is January 20 for the fall and spring semesters.

## ASTRONOMY

Department website: <http://astronomy.nmsu.edu>  
(575) 646-4438  
[holtz@nmsu.edu](mailto:holtz@nmsu.edu)

*J. Holtzman, department head, Ph.D. (California - Santa Cruz)– stellar populations in galaxies; R. F. Beebe, Ph.D. (Indiana-Bloomington)– planetary astronomy and stellar spectra; N. Chanover, Ph.D. (New Mexico State)– planetary astronomy; C. Churchill, Ph.D. (California-Santa Cruz)– galaxies and intergalactic medium; T. Harrison, Ph.D. (Minnesota)– cataclysmic variables and gamma-ray burst sources; J. Jackiewicz, Ph.D. (Boston College)– Helioseismology, theoretical condensed matter physics; A. Klypin, Ph.D. (Moscow)– cosmology; R. T. J. McAtteer, Ph.D. (Queen's University, Belfast)– solar physics, Sun-Earth connection; B. J. McNamara, Ph.D. (California-Santa Cruz)– stellar photometry, star clusters, and gamma-ray astronomy; J. Murphy, Ph.D. (U. Washington)– planetary atmospheres and exploration; N. Vogt, Ph.D. (Cornell)– galaxy evolution; R. Walterbos, Ph.D. (Leiden)– interstellar medium, star formation, and structure and evolution of galaxies; W. Webber, Ph.D. (Iowa)– high energy astrophysics*

**DEGREE: Master of Science**  
**MAJOR: Astronomy**

**DEGREE: Doctor of Philosophy**  
**MAJOR: Astronomy**

### MINOR: Astronomy

The Department of Astronomy offers graduate work leading to the Doctor of Philosophy and Master of Science degrees. An undergraduate astronomy minor degree is offered as well. To be admitted as a regular student to the NMSU Graduate School as a major in astronomy, a student must present a suitable undergraduate background with emphasis (12-16 credits) on junior-senior level physics, and mathematics. The prospective student is also required to take aptitude and physics (or approved specialized field) sections of the Graduate Record Examination (GRE).

Information on assistantships and fellowships in teaching and research can be obtained from the department.

Each entering graduate student will be assigned a committee that will guide the student in choice of courses, suggest training needed to remedy deficiencies and determine specific degree requirements in accord with the student's needs and objectives, and in agreement with departmental policies. The program requires 33 traditional course credit hours (11 classes), 4 seminar class credit hours, plus research in astronomy. Each student must demonstrate no later than during the second year sufficient academic and research ability to qualify for continuation in doctoral studies.

It is possible, through arrangement with the Department of Physics, to obtain a Master of Science degree in physics during progress toward the Ph.D. in astronomy. See the "Department of Physics" section in this catalog for details of that program.

The M.S. degree in astronomy is closely connected with the astronomy Ph.D. program, and questions concerning requirements should be directed to the department.

Qualifying, Comprehensive and Final examinations are described elsewhere in this catalog. Questions concerning styles of the examinations should be directed to the department head.

The department has access to several different observing facilities. NMSU operates the Apache Point Observatory on behalf of the Astrophysical Research Corporation and the observatory is home to several telescopes: the ARC 3.5m telescope, a 1m telescope fully owned by NMSU, the ARCSAT 0.5m telescope, and the Sloan Digital Sky Survey (SDSS) 2.5m telescope. The Department is a full partner in the SDSS project. The Department also operates a 24-inch telescope on Tortugas Mountain, near the NMSU campus.

The department is home to NASA's Planetary Data System's Planetary Atmosphere Node, where solar system exploration data are archived.

## BIOLOGY

Department website: <http://bio.nmsu.edu>  
(575) 646-3611  
[biomail@mvar.nmsu.edu](mailto:biomail@mvar.nmsu.edu)

*R. Preszler, department head, Ph.D. (Northern Arizona)– biology education; A.L. Dawe, associate department head, Ph.D. (Tennessee)– eukaryotic microbiology; C. D. Bailey, Ph.D. (Cornell)– plant systematics; W. J. Boecklen, Ph.D. (Northern Arizona)– plant/insect and community ecology; M. G. Castillo, Ph.D. (Wisconsin)– microbiology/immunology; J. Curtiss, Ph.D. (Colorado)– cell and development; K. A. Hanley, Ph.D. (California-San Diego)– evolution, ecology, and control of flaviviruses; I. A. Hansen, Ph.D. (University of Wurzburg)– molecular vector biology; P. W. Houde, Ph.D. (Howard)– avian systematics; K. E. Mabry, Ph.D. (California-Davis)– behavioral ecology; B. G. Milligan, Ph.D. (California-Davis)– plant evolutionary biology; M.K. Nishiguchi, Ph.D. (California-Santa Cruz)– evolutionary microbiology, marine symbiosis; E. E. Serrano, Ph.D. (Stanford)– biophysics, neuroscience; C. B. Shuster, Ph.D. (Tufts)– cell and developmental biology; M. Shuster, Ph.D. (Tufts)– biology education; G. B. Smith, Ph.D. (North Carolina State)– environmental microbiology; H. Throop, Ph.D. (Stony Brook)– Ecosystem Ecology; G. A. Unguez, Ph.D. (California-Los Angeles)– developmental biology; T. F. Wright, Ph.D. (California-San Diego)– animal behavior and evolution; J. Xu, Ph.D. (Military Medical University, Shanghai)– mosquito-malaria interactions.*

**DEGREE: Master of Science**  
**MAJOR: Biology**

**DEGREE: Doctor of Philosophy**  
**MAJOR: Biology**

The Department of Biology offers graduate study leading to the Doctor of Philosophy and Master of Science degrees. The Master of Science degree can be obtained through either a thesis option or a nonthesis option. Both options require 30 credits of course work. The non-thesis option can be completed as an accelerated (one-year) program concentrating on biotechnology. Our goal is to prepare students for careers in the various fields in biology through formal coursework and research experiences as well as through seminars and discussion groups.

All prospective applicants must submit the materials specified in the current Department Graduate Application Packet that is available at the Graduate Student section of the Biology website <http://bio.nmsu.edu/grads/>. The Departmental Graduate Application Packet also describes how to apply for Graduate Assistantships. These assistantships are awarded based on departmental needs and student merit; in general they are reserved for Ph.D. and thesis Master of Science students, and are not available to non-thesis Master of Science students.

For the accelerated non-thesis Master of Science students, the courses are designed to prepare students for biotechnology-related careers in basic and applied research; in product development and testing; and in policy-making, regulation, and law enforcement. The program of study includes practical training in molecular biology, genomics and bioinformatics, statistical analysis, business, bioethics, and professional development skills. Additional graduate course work will provide students with further expertise in their individual areas of interest, including cell, molecular, and microbial biology; environmental, ecological, and evolutionary biology; and general and integrative biology. Students who complete this training will be prepared for successful employment in academic, corporate, and government settings.

There are three formal course requirements for all Biology Graduate students, with the exception of students in the accelerated non-thesis MS Biotechnology option. These core courses are Current Topics in Biology (BIOL 510, 3 cr.), Science and Ethics (BIOL 541, 1 cr.; or PHIL 540, 1-3 cr.), and the biology Seminar course (BIOL 610, 1 cr.). Students are required to successfully complete the Seminar course once each year that they are in the program. For other Master of Science studies and for the Ph.D., students can choose among the Department's three areas of emphasis: 1) Behavioral, Ecological and Evolutionary Biology, 2) Cell and Organismal Biology, and 3) Microbiology. All graduate students should consult with their faculty advisor and their graduate committee in

developing a curriculum plan. Further details of typical course sequences in the different emphases are described in the Biology Graduate Handbook available for download from the Graduate Student section of the Biology website <http://bio.nmsu.edu/grads/>.

The Behavioral, Ecological and Evolutionary Biology program is appropriate for graduate students who wish to specialize in areas of biology that study the various processes that encompass the behavior, ecology, and evolution of living and extinct taxa.

The Cell and Organismal Biology program is appropriate for all Graduate students who wish to emphasize those areas of biology that integrate function and structure in cells, tissues, and organisms.

The Microbiology curriculum is appropriate for graduate students who wish to specialize in areas of biology that study the various processes that occur in microbes (bacteria, viruses, fungi, and protists) such as their physiology, ecology, development, or evolution.

Graduate students may also take a minor in other graduate departments and programs.

## CHEMISTRY AND BIOCHEMISTRY

Department website: <http://www.chemistry.nmsu.edu/>

(575) 646-2505

wquintan@nmsu.edu

*W. Quintana, Ph.D. Department Head, Ph.D. (Pennsylvania)— inorganic chemistry, boron chemistry, chemical education; J.B. Arterburn, Ph.D. (Arizona)— organic chemistry, synthetic medicinal and chemical biology; G. A. Eiceman, Ph.D. (Colorado-Boulder)— analytical chemistry: gas and liquid chromatography, mass spectrometry; A. Gopalan, Ph.D. (Ohio State University)— organic chemistry: synthetic methods, applications of enzymes in asymmetric synthesis; J. W. Herndon, Ph.D. (Princeton)— organic chemistry, organo-transition metal chemistry, synthesis of biologically important cyclic compounds; K. Houston, Ph.D. (University of Texas- MD Anderson)— biochemistry, molecular mechanisms of hormone action in tumorigenesis; M. D. Johnson, Ph.D. (New Mexico State University)— inorganic chemistry, kinetics, reaction mechanisms of transition metal complexes; A. S. Lara, Ph.D. (New Mexico State University)— analytical chemistry: exploitation of clays for remediation of environmental pollutants; F. Li, Ph.D. (Minnesota)— inorganic chemistry, bioinorganic chemistry, small molecule activation; S. L. Lusetti, Ph.D. (Wisconsin)— biochemistry: cell metabolism, disease etiology; B. A. Lyons, Ph.D. (Cornell University)— biochemistry: nmr spectroscopic studies of signal transduction pathways in breast cancer; W. A. Maio, Ph.D. (Johns Hopkins University)— organic chemistry, total synthesis of marine natural products and explorations of new chemical methods; synthesis of lactones and lactams, artemisinin- based antimalarial dimers, and total synthesis of (+)-iriomoteolide 1a; G. D. Rayson, Ph.D. (Texas-Austin)— analytical chemistry: spectroscopy; A. Rowland, Ph.D. (University of Utah)— toxicology, regulation of the orphan cytochrome P450 drug metabolism enzyme, CYP2S1, and its impact of human lung disease; S. N. Smirnov, Ph.D. (Novosibirsk State University)— physical chemistry: photo-induced charge separation; D. E. Smith, Ph.D. (California-Berkeley)— physical chemistry: molecular dynamics in condensed phase; H. Wang, Ph.D. (Wayne State)— physical chemistry: reaction kinetics in complex systems; E.T. Yuki, Ph.D. (Oregon Health and Science University)— biochemistry: x-ray crystallography and spectroscopy of bacterial metalloproteins; C. G. Zoski, Ph.D. (Queens University, Canada)— analytical chemistry: theoretical and experimental electrochemistry*

**DEGREE: Master of Science**

**MAJOR: Chemistry**

**DEGREE: Doctor of Philosophy**

**MAJOR: Chemistry**

**MINORS: Biochemistry  
Chemistry**

The Department of Chemistry and Biochemistry offers programs leading to the M.S. and Ph.D. degrees in the areas of physical, organic, inorganic, biological, and analytical chemistry. Admission to these programs without deficiency is based on an undergraduate program essentially equivalent to that pursued by a chemistry or biochemistry major at this university. An entering student is encouraged to take the Graduate Record Examination (aptitude) to increase his or her chances for financial support. All foreign students must take GRE and TOEFL and must demonstrate adequate English speaking and writing skills.

Students who wish may take a minor in chemical toxicology or molecular biology. The core course work required of students entering with no previous graduate study in chemistry or biochemistry consists of basic core courses

completed in one of the following options: (i) two courses chosen respectively from two of the five major areas represented in the department apart from a student's elected field of thesis research; or (ii) one course chosen from the five major areas apart from the student's elected field of thesis research plus one graduate-level course in a discipline outside the Department of Chemistry and Biochemistry. A master's candidate will plan an appropriate program of further study with his or her advisor and is also required to prepare a thesis. The thesis requirement may be waived upon application to the department head, after completion of the doctoral comprehensive examination requirements. A chemistry student who successfully completes the Ph.D. qualifying examination will begin writing the cumulative examinations, which constitute the written portion of the comprehensive examination. A biochemistry student who successfully completes the Ph.D. qualifying examination will begin preparation of a research proposal which will be orally defended for completion of the comprehensive examination. After completion of the qualifying exam, a doctoral committee is formed to assist the student in planning a program appropriate to his or her background and goals. Since research is central in both the master's and doctoral programs, the early selection of a research advisor is encouraged. The student is expected to participate in the colloquia and seminar programs. Financial support is available to graduate students in chemistry and biochemistry through numerous teaching and research assistantships as well as federally supported traineeships and fellowships. Inquiries regarding these opportunities should be directed to the head of the department.

## COMMUNICATION STUDIES

Department website: <http://web.nmsu.edu/~nmsucomm/>

(575) 646-2801

khacker@nmsu.edu;

*K. Hacker, Department Head, Ph.D. (Oregon)— new media networking, political communication, national security communication; G. Armfield, Ph.D. (University of Missouri-Columbia)— organizational communication, communication theory; I. Dylko, Ph.D. (Ohio State University)— communication theory, political communication, communication technology, research methods; J. Flora, Ph.D. (Kansas)— communication; A. Hubbell, Ph.D. (Michigan State)— organizational communication, health communication; E. Morgan, Ph.D. (University of Massachusetts-Amherst)— communication and culture, environmental communication*

**DEGREE: Master of Arts**

**MAJOR: Communication Studies**

**MINORS: Communication Studies  
Communication and National Security**

The Master of Arts in Communication Studies provides students with a social scientific approach to the study of human interaction, using quantitative and qualitative methods. Our curriculum is designed to explore how oral communication takes place interpersonally, within organizations, within our political system, and between and within cultures. Students take courses in interpersonal communication, organizational communication, political communication and/or cultural communication. All graduate students take courses in communication theory and research methods. In addition, students can take courses in topic areas such as conflict management, small group communication, persuasion, and nonverbal communication.

The program offers a wide variety of courses allowing students an opportunity to select topics pursuant to their special interests. In addition to courses, students have the opportunity to obtain practical experience by participating in professional activities offered by the department; for example, graduate teaching assistantships, research, and colloquia.

**DEGREE: MASTER OF ARTS**

**MAJOR: COMMUNICATION STUDIES**

The department offers both thesis and non-thesis options in its Masters of Arts program. Both options require a minimum of 36 credits, which includes not only Communication courses but courses from outside the department. The thesis option requires at least 30 credits of coursework, 3-6 credits of thesis (COMM 599), and an oral defense of the thesis and coursework. The non-thesis option requires 36 credits of coursework, plus a comprehensive written examination, followed by an oral defense. Both options require a minimum of 30 credit hours of Communication courses.

**Both of the following courses are required:**

COMM 505	Research Methods	3
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COMM 583	Seminar in Theories of Communication	3
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**Students must take three of the following four courses:**

COMM 540	Seminar in Political communication	3
COMM 570	Seminar in Organizational Communication	3
COMM 576	Seminar on Communication and Culture	3
COMM 584	Seminar in Interpersonal Communication	3

#### COMM Electives (15 credits)

	Electives in Related Fields (graduate levels; numbered 450+)	3-6
	Thesis Option: COMM 599, Thesis	3-6
	Non-thesis Option: Additional Graduate COMM Electives	3-6

A GPA of 3.0 or better must be maintained overall and grades in each course must be a B- or better.

#### Entrance requirements for graduate study in communication studies

The Graduate Record Exam (GRE) General Test is not required for admission; however, high GRE scores will strengthen a candidate's application and are highly regarded in the awarding of Graduate Assistantships. Students wishing to enroll in the Master program in Communication Studies must meet the following criteria:

1. Hold a BS degree, from an accredited institution of higher learning; Social Science disciplines are preferred
2. Hold a minimum grade point average of 3.25

#### To apply for an assistantship, please submit the following application materials

- Three letters of recommendation
- Current Vitae/Resume
- 750 word statement of intent
- A sample of scholarly writing

#### MINOR: COMMUNICATION STUDIES

Students who wish to take a minor in Communication Studies will need to accumulate a minimum of 9 graduate credits in Communication Studies courses. Students are encouraged to contact the Communication Studies Department Chair for directions in the selection of courses.

#### MINOR: COMMUNICATION AND NATIONAL SECURITY

This minor is aimed at graduate students who seek employment in national security, intelligence, international business, military affairs in other nations, and other positions which require knowledge of how communication affects the national image of the United States and how Americans communicate with members of other cultures about political matters. Graduate students will be required to write a special analysis for each course that is not required of the undergraduate students. Each graduate student will also be required to present a one-hour lecture on an area of research specialization.

Total required credit hours: 12.

**Students will take three of four courses below plus one outside course approved by the department. The list below is our expected course rotation.**

COMM 555	Seminar Fundamentals of Communication and National Security	3
COMM 556	Seminar Communication and the Intelligence Cycle	3
COMM 557	Seminar Strategic Communication and Public Diplomacy	3
COMM 558	Seminar Intercultural Communication and National Security	3

**The courses from other departments can include special topics courses or related courses relevant to this minor, as well as regular courses such as the ones listed below.**

GEOG 501	Research Design and History of Geographic Thought	3
GOVT 562	Advanced Issues in Security and Intelligence Studies	3
GOVT 568	Advanced Intelligence Studies	3
HIST 561	Islam and the West: Cultural Contacts, Conflicts and Exchanges	3
SOC 478	Sociology of Development and the World	3

	System	
SOC 489	Globalization	3

GEOG 501: should focus research project on national security  
HIST 561, pre-requisites or co-requisites include HIST 221G or HIST 222G

## COMPUTER SCIENCE

**Department website:** <http://www.cs.nmsu.edu>

**(575) 646-3723**

**csoffice@cs.nmsu.edu**

*E. Pontelli, department head, Ph.D. (New Mexico State)– parallel processing, logic programming, knowledge representation, bioinformatics, assistive technologies; H. Cao, Ph.D. (Hong-Kong)– data mining, databases, data integration; J. Cook, Ph.D. (Colorado)– software engineering, component-based systems; Y. Jin, Ph.D. (Texas A&M)– computer architectures, interconnection networks, multicore architectures; H. Leung, Ph.D. (Penn State)– automata theory; S. Misra (Arizona State)– communication networks, social networks, high performance computing, security and privacy; I. Pivkina, Ph.D. (Kentucky)– artificial intelligence, computer science education, data mining; M. Song, Ph.D. (Washington)– statistical computing, systems biology, computer vision; Z. Toups, Ph.D. (Texas A&M)– digital games, human-computer interaction, mixed reality; S. C. Tran, Ph.D. (Texas-El Paso)– artificial intelligence, knowledge representation, planning, logic programming, non-monotonic reasoning; W. Yeoh (Southern California)– artificial intelligence, heuristic search, distributed constraint reasoning*

#### Support and Adjunct Faculty:

*S. Cooper, Ph.D. (New Mexico State)– computer networks; R. T. Hartley, Ph.D.*

*(Brunel)– programming systems, computer music; J.J. Pfeiffer, Jr., Ph.D.*

*(Washington)– visual programming; E. Steiner, Ph.D. (Oklahoma State)– computer science education*

#### DEGREE: Master of Science MAJOR: Computer Science

#### DEGREE: Master of Science MAJOR: Bioinformatics

#### DEGREE: Doctor of Philosophy MAJOR: Computer Science

#### MINOR: Computer Science

#### Mission of the Department

The mission of the Department of Computer Science at New Mexico State University is to provide formal education in the core disciplines of computer science, as well as to prepare our graduates for research, development and academic careers. The department offers specific expertise in several research areas, such as bioinformatics, artificial intelligence and knowledge representation, software engineering and programming languages, computer and wireless networks, data mining and machine learning game design and human-computer interaction, high performance computing, theory of computing, computer architectures, and assistive technologies. A number of laboratories have been established to coordinate research activities, including the Knowledge representation, Logic and Advanced Programming (KLAP) laboratory, the Programming Languages, Environments, and Automated Software Engineering (PLEASE) laboratory, the Game Development laboratory, the Database Management and Data Mining laboratory, and the Network and Systems Optimization laboratory. The Department members are also directing the CREST Center for Research Excellence in Bioinformatics and Computational Biology, offering educational and research opportunities in bioinformatics.

#### Entrance Requirements for Graduate Study in Computer Science

The Graduate Record Exam (GRE) General Test is not required for admission; however, high GRE scores will strengthen a candidate's application and are highly regarded in the awarding of Graduate Assistantships. To be admitted without undergraduate deficiencies, an entering student must have completed undergraduate preparation substantially equivalent to that required for the Bachelor of Science degree in Computer Science at New Mexico State University; in particular, this includes courses equivalent to C S 172, C S 271, C S 272, C S 273, C S 278, C S 370, C S 371, C S 372, C S 471, C S 473 and C S 474. Deficiencies should be satisfied as early in the student graduate program as possible, through the regular undergraduate courses, the C S 460- 469 transition courses, or through tests administered by faculty members in the relevant areas.

Students should consult with their Graduate Advisor to address issues related to deficiencies. Deficiencies are also assigned to applicants whose transcripts denote low grades in selected areas. Admission is often denied to candidates with little background in Computer Science. Instructions for prospective applicants can be found at <http://www.cs.nmsu.edu>.

### Entrance Requirements for Graduates Study in Bioinformatics

The Graduate Record Exam (GRE) General Test is not required for admission; however, high GRE scores will strengthen a candidate's application and are highly regarded in the awarding of Graduate Assistantships. Students wishing to enroll in the Master program in Bioinformatics must meet the following criteria:

1. Hold a BS degree, from an accredited institution of higher learning, in either a computational field (e.g., Computer Science) or in life sciences (preferably Biology, Biochemistry, or Environmental Sciences)
2. Hold a minimum grade point average of 3.2

Applicants will be expected to provide a Career statement, motivating the interest in bioinformatics and a minimum of three letters of reference.

### Assistantships

Graduate assistantships - in the form of Teaching and Research assistantships - are expected to be available during the academic year. Inquiries should be addressed to the departmental Graduate Committee. Research assistantships are available at the discretion of individual research project leaders in the Department or elsewhere on campus. Submitting detailed vitae, letters of reference, and GRE test scores are encouraged when applying for any assistantship.

### DEGREE: DOCTOR OF PHILOSOPHY MAJOR: COMPUTER SCIENCE

Doctoral students may specialize in any of the areas in which computer science faculty members have active research interests. Through interdisciplinary arrangements with other doctoral departments at New Mexico State University, doctoral students may also specialize in such areas as computational biology, computer networks and architectures, and cognitive science.

Doctoral students are expected to join the program with a preparation equivalent to that required for the Master's degree in computer science at New Mexico State University. The requirements for the degree are as specified in the NMSU graduate catalog, with the following additional considerations:

- [For students who enrolled in the doctoral program before Fall 2014]: The qualifying examination is implemented as a written examination, which examines the depth of knowledge in five areas of computer science. The five areas are Formal Languages and Computability, Analysis of Algorithms, Programming Languages, one between Operating Systems and Computer Architectures, and a fifth area agreed between the student and the department's Graduate Committee. Doctoral students are required to take the qualifying examination on or before the date indicated in their departmental admission referral. Each student has three consecutive attempts to complete the five required areas.
- [For students who enrolled in the doctoral program on or after Fall 2014]: The qualifying examination consists of written exams in five subject areas: four of these are required areas, while the fifth is an elective area. The student will take four exams in the following required subjects: Operating Systems or Computer Architectures; Principles of Programming Languages; Design and Analysis of Algorithms and Data Structures; and Discrete Mathematics. The topics of each exam are listed on the departmental website. The student is required to enroll in an elective course offered in the first semester of his/her enrollment at NMSU, which identifies the fifth subject for the qualifying examination. The faculty in charge of the class will determine the exam topics of the elective subject. The student is required to take the qualifying examination at the end of the first semester of enrollment as a doctoral student at NMSU; the only exceptions will be granted to students entering the doctoral program with significant undergraduate deficiencies - in such case the deadline for the qualifying examination will be indicated in the admission records. It is the responsibility of the student to ensure that the qualifying examination is taken within the prescribed deadline. Students failing to meet the deadline will be automatically withdrawn from the doctoral program. If a student fails any of the exams, he/she must retake those exams in the following semester. If a student fails to pass all exams after the second attempt, he/she will be dismissed from the doctoral program.

- The comprehensive examination evaluates depth of knowledge in the specific research area selected by the candidate with the consent of his/her graduate committee. The comprehensive exam includes both a written part, in the form of an extensive survey paper, an annotated bibliography, and an oral examination.
- The student is required to submit and defend a prospectus, at the same time or after completing the comprehensive examination. The prospectus describes and motivates the specific research problem to be addressed in the doctoral dissertation.

Students should contact the department for information on additional graduation requirements, or visit the on-line Graduate Handbook (<http://www.cs.nmsu.edu/>).

### DEGREE: MASTER OF SCIENCE MAJOR: COMPUTER SCIENCE

Each master's student normally must write a thesis (C S 599) or, with the advisor's permission, undertake a research project (C S 598). In either case, the number of required graduate credits is 33, including 6 for the thesis or project. In all cases, the students are required to sustain a final exam, covering the thesis/research project and the graduate course-work. The two parts of the exam bring equal weight.

In no case may a C S course numbered below 500 be counted towards the required number of credits. In particular, graduate students are expected to register for C S classes numbered 500 or above.

#### The student's program must include:

C S 510	Automata, Languages, Computability	3
C S 570	Analysis of Algorithms	3

#### One of the following:

C S 573	Architectural Concepts II	3
C S 574	Operating Systems II	3
C S 584	Computer Networks II	3

#### One of the following:

C S 571	Programming Language Structure II	3
C S 575	Artificial Intelligence II	3
C S 580	Compiler Construction	3
C S 581	Advanced Software Engineering	3
C S 582	Database Management Systems II	3

#### One additional course selected from:

C S 550	Complexity Theory	3
C S 571	Programming Language Structure II	3
C S 572	Advanced Algorithms	3
C S 573	Architectural Concepts II	3
C S 574	Operating Systems II	3
C S 575	Artificial Intelligence II	3
C S 580	Compiler Construction	3
C S 581	Advanced Software Engineering	3
C S 582	Database Management Systems II	3
C S 584	Computer Networks II	3
C S 586	Algorithms in Systems Biology	3

#### One additional computer science course numbered above 550 and different from:

C S 598	Master's Project	1-6
C S 599	Master's Thesis	1-6
C S 600	Pre-dissertation Research	1-15
	and	
C S 700	Doctoral Dissertation	0-15

Courses not in Computer Science can be included in the student's program of study only if prior written approval has been obtained from the student's advisor and the departmental Graduate Committee. Further details can be found in the on-line Graduate Handbook (<http://www.cs.nmsu.edu/>).

With the advisor's consent, the student may instead complete a coursework-only Master degree; this requires 36 credits of regular course work, satisfying the same requirements listed above, except that the 6 credits of thesis or project are replaced by 9 credits of courses numbered 550 or above and distinct from C S 589, C S 598, and C S 599. Students pursuing a coursework-only degree are expected to complete a written exam covering a selected subset of the



students' plan of study. Further details can be found in the on-line Graduate Handbook (<http://www.cs.nmsu.edu/>)

### MAJOR: BIOINFORMATICS

The degree requirements include 30 graduate credit hours. The requirements are structured as follows:

#### Introductory Courses (9 credit hours):

These courses provide foundational preparation in biological sciences and computational sciences. They are organized in two tracks.

#### Computational Track:

these courses are intended for students with a Bachelor's degree in life sciences; the required courses are

C S 462	Object Oriented Programming Transition	3
C S 468	Software Development Transition	3
C S 469	Data Structure and Algorithms Transition	3

#### Life Sciences Track:

these courses are intended for students with a Bachelor's degree in computer sciences; the required courses are

BIOL 520	Molecular Cell Biology	3
MOLB 542	Biochemistry I	3
MOLB 545	Molecular and Biochemical Genetics	3

These courses can be replaced by more advanced courses with written permission of the graduate advisor.

#### Core Courses (9 credit hours):

The goal of these courses is to expose the students to the central issues and techniques in the field of bioinformatics. The core courses are:

C S 509	Bioinformatics Programming	3
C S 586	Algorithms in Systems Biology	3

#### One of the following:

C S 516	Bioinformatics	3
GENE 452	Applied Bioinformatics	3
BIOL 566	Advanced Bioinformatics and NCBI Database	3

#### Elective Courses (6 credit hours):

The goal of these courses is to allow students to specialize in a specific branch of bioinformatics. The courses can be selected among the following:

AGRO 506	Plant Genetics	3
BIOL 474	Immunology	3
BIOL 475	Virology	3
BIOL 490	Neurobiology	3
BIOL 557	Principles of Phylogenetic Inference	3
BIOL 566	Advanced Bioinformatics and NCBI Database	3
BIOL 567	Individuals and Populations	3
BIOL 586	Molecular Systematics	3
C S 502	Database Management Systems I	3
C S 505	Artificial Intelligence I	3
C S 508	Introduction to Data Mining	3
C S 516	Bioinformatics	3
C S 521	Parallel Programming	3
C S 570	Analysis of Algorithms	3
C S 572	Advanced Algorithms	3
C S 575	Artificial Intelligence II	3
C S 581	Advanced Software Engineering	3
C S 582	Database Management Systems II	3
HORT 506	Plant Genetics	3

#### Master's Project/ Thesis (6 credit hours):

Each master's student must write a thesis (C S 599) or, with the advisor's permission, undertake a research project (C S 598). In either case, the number of required graduate credits is 6 for the thesis or project. In all cases, the students are required to sustain a final exam, covering the thesis/ research project.

### 5-YEAR DUAL DEGREE BS+ MS PROGRAM

The dual degree program combines some of the requirements of the Bachelor of Science in Computer Science and the Masters of Science in Computer Science. Full details of the program can be found at <http://www.cs.nmsu.edu>. Admission occurs in two steps. First, students will apply to the Computer Science department to receive approval for the BS+MS program. The student submits the pre-application when he/she is within 48 credits of earning a BS in Computer Science; an application form is provided in the department web site. Qualification for the BS+MS program will be based on the cumulative (non-grade replaced) grade point average in Computer Science and Math courses taken to that point, including at least two out of C S 370, C S 371, and C S 372 (at least 3.5) and recommendations by faculty members listed on the departmental application. Additional factors might be taken into account when available (e.g., TOEFL/IELTS scores, GRE scores). Students having a grade point average below 3.5 may be admitted on a case-by-case basis, depending on faculty recommendations and evaluations of the individual academic and professional history. Once the Computer Science department has notified the applicant of acceptance in the combined BS+MS program, the applicant must then formally apply to the graduate school ([prospective.nmsu.edu/graduate](http://prospective.nmsu.edu/graduate)) for formal admission to the graduate program; this application to the graduate school is made during the semester of graduation from the BS in Computer Science.

### REQUIREMENTS

The curriculum for the first three years of the BS+MS program coincides with the requirements of the BS program. In particular, the general requirements include a grade of at least a C- in each course to satisfy the departmental and non-departmental requirements. No course may be counted as satisfying both a departmental and non-departmental requirement. No course taken to satisfy either a departmental or non-departmental requirement may be taken S/U. The following are the departmental requirements for the degree (the non-departmental requirements are identical to those of the BS in Computer Science).

#### Departmental Requirements for Years 1 through 4:

C S 172	Computer Science I	4
C S 271	Object Oriented Programming	4
C S 272	Introduction to Data Structures	4
C S 273	Machine Programming and Organization	4
C S 278	Discrete Mathematics for Computer Science	4
C S 370	Compilers and Automata Theory	4
C S 371	Software Development	4
C S 372	Data Structures and Algorithms	4
C S 419	Computing Ethics and Social Implications of Computing	1
C S 448	Senior Project	4
	or	
C S 449	Senior Thesis	4
C S 471	Programming Language Structure I	3
C S 473	Architectural Concepts I	3
C S 474	Operating Systems I	3

#### One of the following:

C S 501	Functional Programming	3
C S 502	Database Management Systems I	3
C S 503	Introduction to Robotics	3
C S 504	Computer Networks I	3
C S 505	Artificial Intelligence I	3
C S 506	Computer Graphics I	3
C S 508	Introduction to Data Mining	3
C S 511	Logic and Constraint Logic Programming	3
C S 512	Computer Systems Modeling and Simulation	3
C S 515	User Interface Design	3
C S 516	Bioinformatics	3
C S 521	Parallel Programming	3

#### One of the following:

C S 573	Architectural Concepts II	3
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C S 574	Operating Systems II	3
C S 584	Computer Networks II	3

**Departmental Requirements for Year 5:**

C S 510	Automata, Languages, Computability	3
C S 570	Analysis of Algorithms	3
C S 598	Master's Project	1-6
	or	
C S 599	Master's Thesis	1-6
	One additional course numbered 500 or above	
	One additional course numbered 550 or above	

**One of the following:**

C S 571	Programming Language Structure II	3
C S 575	Artificial Intelligence II	3
C S 580	Compiler Construction	3
C S 581	Advanced Software Engineering	3
C S 582	Database Management Systems II	3

**One of the following:**

C S 550	Complexity Theory	3
C S 571	Programming Language Structure II	3
C S 572	Advanced Algorithms	3
C S 573	Architectural Concepts II	3
C S 574	Operating Systems II	3
C S 575	Artificial Intelligence II	3
C S 580	Compiler Construction	3
C S 581	Advanced Software Engineering	3
C S 582	Database Management Systems II	3
C S 584	Computer Networks II	3
C S 586	Algorithms in Systems Biology	3

**MINOR: COMPUTER SCIENCE**

Students who wish to take a minor in Computer Science will need to accumulate a minimum of 9 graduate credits in Computer Science courses. Students are encouraged to contact the Computer Science Graduate Committee Chair for directions in the selection of courses.

**CRIMINAL JUSTICE**

Department website: <http://crimjust.nmsu.edu/>  
(575) 646-3316  
cposadas@nmsu.edu

C.E. Posadas, Department Head, Ph.D. (Arizona State)—immigration and justice, juvenile justice, research methods; F. Alatorre, Ph.D. (Arizona State)—immigration, race, ethnicity, gender in criminal justice; D. Greene, Ph.D. (John Jay)—corrections, restorative justice, sentencing and punishment policy; D. Keys, Ph.D. (Missouri-Columbia)—penology, narcotic policy; D. Lara\*, Ph.D. (University of California-Berkeley)—cultural studies, race & ethnicity, border justice; R. Maratea, Ph.D. (Delaware)—Media and Crime, Theory, Inequality and Crime  
\*MCJ Program Director

**DEGREE: Master of Criminal Justice****DEGREE: MASTER OF CRIMINAL JUSTICE**

The Department of Criminal Justice offers graduate study leading to the Master of Criminal Justice (M.C.J.) degree. Admission to the M.C.J. is competitive and prospective graduate students are expected to have at least a 3.0 undergraduate grade-point-average, coursework in research methods and statistics, and possess a bachelor's degree. Those not meeting these requirements may be admitted conditionally and required to make up deficiencies at the outset of their program of study. Applicants must submit three letters of recommendation and a three – five page essay introducing themselves and addressing the following topic: "the most important change needed in the criminal justice system is..." This essay serves as a sample of written work to be evaluated

by the M.C.J. Graduate Committee. The GRE is NOT required for admission into the M.C.J. program. The M.C.J. Graduate Committee reserves the right to require a student to complete additional English writing coursework. For more information, please visit our website: <http://crimjust.nmsu.edu/degrees.htm>

After completion of all core course requirements, candidates declare their intent to pursue a degree option and complete all chosen degree option requirements. There are two M.C.J. degree options: the thesis and focused coursework. The degree options are provided so that students may better match their education with career goals. The thesis option is often used by students interested in pursuing careers in basic and applied criminal justice research or a doctoral degree. The focused coursework option is often used by students pursuing administrative positions within criminal justice agencies. At this time, the Thesis Option is only available for Campus-Based students. Online students may only pursue the Focused Coursework Option.

All candidates, regardless of chosen degree option, must complete a final examination. Examination requirements vary by degree option. Please contact the director of the M.C.J. program or consult the Department of Criminal Justice web site <http://crimjust.nmsu.edu/degrees.htm> for details.

Thesis students must submit a thesis proposal to their faculty committee for approval and subsequently complete the approved thesis project. An approved thesis proposal is one wherein the thesis committee determines the student demonstrates a comprehensive understanding of the nexus of theory, method, and policy as it applies to the proposed thesis project. At the discretion of the thesis committee the proposal may be considered inadequate and the student is required to revise and resubmit the thesis proposal until the committee determines the proposal is satisfactory. The final examination minimally includes a defense of the completed thesis, but may also include a general examination based upon the candidate's program of study. The minimum coursework requirements are displayed below.

Focused coursework students must pass a written comprehensive examination following completion of the required courses. Students not passing the examination will be required to wait until the following semester to retake the examination. The minimum course requirements are displayed below.

**Online M.C.J. Coursework**

Distance-based graduate students taking courses online may also complete the M.C.J. degree. Online criminal justice courses are available only to those admitted to the M.C.J. program as online students, or with permission of the Director of the M.C.J. program. Students desiring to be admitted to the M.C.J. program as online students must declare that intent in writing to the M.C.J. director. Online students may not enroll in campus-based criminal justice courses. Online students may only pursue the Focused Coursework Option. For more information regarding the online M.C.J. degree option, consult the Department of Criminal Justice web page, <http://crimjust.nmsu.edu>, or contact the Director of the M.C.J. program.

**Assistantships**

Graduate assistantships - in the form of Teaching assistantships - are expected to be available during the academic year. Inquiries should be addressed to the Director of the M.C.J. Program.

**M.C.J. PROGRAM**

All candidates, regardless of chosen degree option, must complete a final examination. Examination requirements vary by degree option. Please contact the director of the M.C.J. program or consult the Department of Criminal Justice web site <http://crimjust.nmsu.edu/degrees.htm> for details.

**THESIS OPTION (33 CR.)**

Thesis students must submit a thesis proposal to their faculty committee for approval and subsequently complete the approved thesis project. An approved thesis proposal is one wherein the thesis committee determines the student demonstrates a comprehensive understanding of the nexus of theory, method, and policy as it applies to the proposed thesis project. At the discretion of the thesis committee the proposal may be considered inadequate and the student is required to revise and resubmit the thesis proposal until the committee determines the proposal is satisfactory. The final examination minimally includes a defense of the completed thesis, but may also include a general examination based upon the candidate's program of study. The minimum coursework requirements are displayed below.

**Required Courses (21 cr.)**

C J 511	Nature of Crime	3
C J 514	Advanced Race, Crime, and Justice	3
	or	
C J 521	Law and Social Control	3

C J 525	Issues in Ethics, Law, and Criminal Justice	3
C J 599	Master's Thesis	0-15

**One of the following:**

C J 501	Research Methods in Criminal Justice	3
C J 555	Advanced Feminist Research Methods	3

**One of the following course:**

C J 510	Advanced Criminal Justice Administrative Systems	3
C J 541	Seminar in Criminal Justice Policy Analysis and Planning	3

**General Electives (12 cr.)**

Students may not count Internship (CJ 593) or Independent Research (CJ 592) credit toward their elective requirement. No more than three total credits of Directed Readings (CJ 591) coursework may be used as electives; a minimum of 3 of the 9 credit general elective requirement must come from the Department of Criminal Justice. A minor is optional (contact the director of the M.C.J. program or consult the Department of Criminal Justice web site, <http://crimjust.nmsu.edu/degrees.htm>, for details) and may result in more than 33 total credits for the degree.

**Focused Coursework Option (36 cr.)**

Focused coursework students must pass a written comprehensive examination following completion of the required courses. Students not passing the examination will be required to wait until the following semester to retake the examination. The minimum course requirements are displayed below.

**Required Courses (15 cr.)**

C J 511	Nature of Crime	3
C J 514	Advanced Race, Crime, and Justice	3
	or	
C J 521	Law and Social Control	3
C J 525	Issues in Ethics, Law, and Criminal Justice	3

**One of the following:**

C J 501	Research Methods in Criminal Justice	3
C J 555	Advanced Feminist Research Methods	3

**One of the following course:**

C J 510	Advanced Criminal Justice Administrative Systems	3
C J 541	Seminar in Criminal Justice Policy Analysis and Planning	3

**C J Electives (12 cr.)**

Electives are to be chosen in consultation with a student's advisor. No more than three total credits of Internship or Directed Readings courses may be used as Criminal Justice electives. Independent Research may not be used as Criminal Justice Electives for this option.

**General Electives/Minor (9 cr.)**

Electives are to be chosen in consultation with a student's advisor. No more than three credits of Internship or Directed Readings may be used to fulfill the general elective requirement. Independent Research may not be used as Criminal Justice Electives for this option. A minor is optional (contact the director of the M.C.J. program or consult the Department of Criminal Justice web site, <http://crimjust.nmsu.edu/degrees.htm>, for details) and may result in more than 36 total credits for the degree.

**Online M.C.J. Coursework**

Distance-based graduate students taking courses online may also complete the M.C.J. degree. Online criminal justice courses are available only to those admitted to the M.C.J. program as online students, or with permission of the Director of the M.C.J. program. Students desiring to be admitted to the M.C.J. program as online students must declare that intent in writing to the M.C.J. director. Online students may not enroll in campus-based criminal justice courses. Online students may only pursue the Focused Coursework Option. For more information regarding the online M.C.J. degree option, consult the Department of

Criminal Justice web page, <http://crimjust.nmsu.edu>, or contact the Director of the M.C.J. program.

**Assistantships**

Graduate assistantships - in the form of Teaching assistantships - are expected to be available during the academic year. Inquiries should be addressed to the Director of the M.C.J. program.

## ENGLISH

**Department Website:** <http://www.nmsu.edu/~english>  
(575) 646-3931

**bathatch@nmsu.edu**

*B. Thatcher, Ph.D. (Purdue)– professional communication, intercultural rhetoric; R. Bradburd, M.F.A. (New Mexico State)– creative writing: fiction, creative nonfiction; C. Burnham, Ph.D. (Rhode Island)– rhetoric and composition, American literature; R. Cull, Ph.D. (Illinois)– modern and contemporary American literature; J. Garay, Ph.D. (Arizona State)– Chicano/a and Latino/a literature; R. Greenfield, Ph.D. (Denver)– creative writing, poetry; L. Hoang, M.F.A. (Notre Dame)– creative writing: fiction; H. Linkin, Ph.D. (Michigan)– British Romantic literature, gender and language theory; T. Miller-Tomlinson, Ph.D. (Yale)– Shakespeare, early modern literature and culture; B. Rourke, Ph.D. (Stanford)– modern British literature, critical theory; E. Schirmer, Ph.D. (California-Berkeley)– medieval literature, K. Sharp-Hoskins, Ph.D. (Illinois-State)– rhetoric, composition, culture, pedagogy; J. Sheppard, Ph.D. (Michigan Tech)– new media, technical and professional communication, pedagogy; C. Smith, M.F.A. (Iowa)– creative writing: poetry; T. Stolte, Ph.D. (British Columbia)– 19th-century British literature and culture; M. Torres, Ph.D. (New Mexico)– cultural studies, film; K. Valentine, Ph.D. (Michigan Tech)– rhetoric and composition, literacy studies, writing center theory and practice; C. Voisine, Ph.D. (Utah)– creative writing: poetry, creative nonfiction; P. Wojahn, Ph.D. (Carnegie Mellon)– professional communication, computers and writing*

**DEGREE: Master of Arts****MAJOR: English****EMPHASES: Creative Writing****English Studies for Teachers****Literature****Rhetoric and Professional Communication****DEGREE: Master of Fine Arts in Creative Writing****DEGREE: Doctor of Philosophy****MAJOR: Rhetoric and Professional Communication****DEGREE: MASTER OF ARTS****MAJOR: ENGLISH**

New Mexico State University offers M.A. programs in four areas of emphasis; each one requires 36 hours of graduate-level work.

**EMPHASIS: Creative Writing**

Students electing this emphasis complete 36 hours of graduate-level course work including creative writing and literature; submit a creative writing portfolio (totaling 20-50 pages), depending on genre choices, that includes original creative work in more than one genre and either an essay describing the writer's personal poetics or a critical piece of writing relevant to the portfolio; and pass an oral examination.

**Required Coursework (36 credits):**

	Workshop courses in at least two genres	12
	Graduate form and technique courses	6
	Graduate literature courses in the Department of English	9
	Elective courses	6

**In the final term:**

ENGL 520	Workshop: Advanced Composition	3
ENGL 574	Workshop: Advanced Writing Prose	3
ENGL 575	Workshop: Advanced Writing Poetry	3
ENGL 576	Workshop: Advanced Writing Playwriting	3

ENGL 591	Graduate Screenwriting	3
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Note: Graduate assistants must take 3 hours of ENGL 571, Composition Theory and Pedagogy, during their first semester of teaching.

### EMPHASIS: English Studies for Teachers

Students take 36 hours of graduate coursework, including core courses in creative writing, film, literature, and rhetoric and professional communication, as well as additional courses in an area of specialization approved by an advisor. Students in the program develop individualized plans of study in consultation with an advisor. They conclude their program by developing a master's portfolio or other approved capstone project and passing an oral examination. This portfolio may provide material for public schools' Professional Development Dossier. With advisor approval, students may take up to two related courses (six credit hours) in other departments, such as Communication Studies, Education, Journalism, and Theatre, and may also develop an alternative capstone experience and enroll for appropriate credits (such as independent study).

#### Required Coursework (36 credits):

	Core class in Composition, Rhetoric, and Professional Communication	3
	Core class in Creative Writing	3
	Core class in Literature	3
	Core class in Film	3
	Courses in core area of specialization	18-21

#### Courses typically meeting capstone requirement:

ENGL 577	Workshop: Advanced Technical and Professional Writing	3
	or	
	Portfolio	3-6

### EMPHASIS: Literature

Students electing this emphasis can choose to work in various areas of literature, criticism, and film. Students are required to complete 36 hours of coursework while satisfying area requirements (in early and modern literatures, in British and American Literatures, and in critical theory) with advisor-approved courses; demonstrate competency in a foreign language; deliver a public presentation on their research; write a master essay or thesis; and complete their program by passing an oral examination. See advisor for list of courses satisfying theory and distribution requirements.

#### Required Coursework (36 credits):

	Graduate course in critical theory	3
	Literature courses, including "early" and "late" periods, English and American	18
	Elective courses in English Department	9-12

#### Master's Thesis or Master Essay:

ENGL 598	Master's Essay	3
	or	
ENGL 599	Master's Thesis	0-15

Note: Students must take 6 credits of ENGL 599 to complete this requirement.

Note: Graduate assistants must take 3 hours of ENGL 571, Composition Theory and Pedagogy, during their first semester of teaching.

### EMPHASIS: Rhetoric and Professional Communication

Students electing this emphasis take core courses across a wide range of topics within rhetoric and professional communication and choose from one of four areas of specialization: Composition, Critical/Cultural Studies, Rhetoric, and Professional and Technical Communication. Students conclude their program by writing a thesis, composing a portfolio of work completed in the program, or writing a master essay, and by passing an oral examination. Students develop individualized plans of study in consultation with an advisor.

#### Required Coursework (36 credits)

	Core classes in area of specialization	6
	Core classes in additional area(s)	6
	Additional courses in area of specialization	12

#### Methods course:

One of the following courses

ENGL 548	Graduate Study in Empirical Research	3
ENGL 601	Qualitative Research	3
ENGL 602	Quantitative Research	3
ENGL 603	Rhetorical Criticism and Methodology	3

#### Elective courses:

One of the following

	Advisor-approved electives in English and/or related fields	
ENGL 597	Internship in Technical and Professional Communication	3-6
ENGL 599	Master's Thesis	0-15

Note: Students must take 6 credits of ENGL 599 to complete this requirement. ENGL 599: in lieu of portfolio or master essay

#### Capstone course:

ENGL 585	Advanced Writing Workshop: RPC Capstone	3
ENGL 598	Master's Essay	3
ENGL 599	Master's Thesis	0-15

Note: Students must take 6 credits of ENGL 599 to complete this requirement.

Note: Graduate assistants must take 3 hours of ENGL 571, Composition Theory and Pedagogy, during their first semester of teaching.

#### Core Courses:

Students take two core courses from their area of specialization. In addition, students take two core courses from any of the other three core areas.

#### Core Composition Courses:

ENGL 564	History and Theory of Composition Studies	3
ENGL 570	Graduate Study in Approaches to Composition	3
ENGL 571	Composition Pedagogy and Practicum	3

Note: Students may take either ENGL 570 or ENGL 571 as a core course. Taking a second course will count under the area of specialization.

#### Core Critical/ Cultural Studies Courses:

ENGL 517	Graduate Study in Critical Theory	3
ENGL 568	Rhetoric and Cultural Studies	3

#### Core Professional and Technical Communication Courses:

ENGL 512	Graduate Study in Writing in the Workplace	3
ENGL 572	Technical-Professional Communication: Theory and Pedagogy	3

#### Core Rhetoric Courses:

ENGL 518	History of Rhetoric	3
ENGL 519	Graduate Study in Modern Rhetorical Theory	3

#### Specialized Courses

Students take four additional courses in their area of specialization determined in consultation with an advisor. Students are encouraged to take ENGL 510, Proseminar in Rhetoric and Professional Communication early in their time as a graduate student. This course is appropriate for all areas of specialization. Appropriate courses for each specialization are suggested below, though the lists are not inclusive of all options.

#### Composition Courses:

ENGL 549	Graduate Study in Writing	3
ENGL 550	Graduate Study in Literacy	3
ENGL 561	Topics in Writing Program Administration	3
ENGL 573	Writing Assessment and Evaluation	3
ENGL 579	Computers and Writing	3

#### Critical/Cultural Studies Courses:

ENGL 511	Discourse and Theories	3
ENGL 549	Graduate Study in Writing	3
ENGL 550	Graduate Study in Literacy	3
ENGL 555	Graduate Study in Rhetoric of Scientific Literature	3

ENGL 590	Master's Seminar in Rhetoric	3
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**Professional and Technical Communication Courses:**

ENGL 451	Practicum in the Grammar of American English	3
ENGL 478	Document Design	3
ENGL 543	Multimedia Theory and Production	3
ENGL 549	Graduate Study in Writing	3
ENGL 562	Interdisciplinary, Client-Based Project Practicum	3
ENGL 565	Intercultural Rhetoric and Professional Communication	3
ENGL 577	Workshop: Advanced Technical and Professional Writing	3
ENGL 578	Topics in Rhetoric and Technology	3
ENGL 579	Computers and Writing	3

**Rhetoric Courses:**

ENGL 511	Discourse and Theories	3
ENGL 530	Argument Theory and Practice	3
ENGL 549	Graduate Study in Writing	3
ENGL 555	Graduate Study in Rhetoric of Scientific Literature	3
ENGL 590	Master's Seminar in Rhetoric	3

**DEGREE: MASTER OF FINE ARTS IN CREATIVE WRITING**

Students pursuing the M.F.A. in Creative Writing devote themselves to concentrated study and development of a chosen genre: poetry or fiction. Students complete 54 hours of graduate-level coursework, present a book-length thesis of original work with an introduction or afterward, perform a public reading from the thesis, and pass an oral examination in the final semester. A maximum of 12 credits in Form and Technique count for the degree

**Required Coursework (54 credits)**

	MFA workshop in the major genre (poetry, fiction)	12
	Form and Technique courses in major genre	6
	Workshop in a second genre	3
	Master Workshop (poetry, fiction)	6-12
	Graduate literature courses (may incl. 2 Form & Technique)	12
ENGL 599	Master's Thesis	0-15
	Elective courses	3-12

Note: Graduate assistants must take 3 hours of ENGL 571, Composition Theory and Pedagogy, during their first semester of teaching.

**DEGREE: DOCTOR OF PHILOSOPHY  
MAJOR: RHETORIC AND PROFESSIONAL COMMUNICATION**

Students in the doctoral program will develop individualized plans of study in consultation with advisors. Students are required to take 78 hours of graduate-level coursework including the doctoral proseminar in the first semester; courses in research methods; core courses in composition, critical/cultural studies, professional communication, and rhetoric; additional coursework in an area of specialization determined in consultation with an advisor; an internship; and a dissertation. The Ph.D. also requires a qualifying portfolio, a comprehensive examination and an oral examination. The dissertation must be completed and approved within 5 years after the comprehensive exam. Consult the department for additional instructions regarding the internship, qualifying comprehensive examinations, portfolio, and dissertation.

**Program Requirements (78 credits) including:**

ENGL 610	Proseminar in Rhetoric and Professional Communication	3
	Methods Courses	6
	Core courses	12
	Courses in area of specialization	15-18
ENGL 597	Internship in Technical and Professional Communication	3-6
ENGL 700	Doctoral Dissertation	0-15

**Note:** Students must take 6 credits of ENGL 597 to complete this requirement.  
**Note:** Students must take 18 credits of ENGL 700 to complete this requirement.

**One of the following:**

ENGL 548	Graduate Study in Empirical Research	3
ENGL 601	Qualitative Research	3
ENGL 602	Quantitative Research	3
ENGL 603	Rhetorical Criticism and Methodology	3

Note: Graduate assistants must take 3 hours of ENGL 571, Composition Theory and Pedagogy, during their first semester of teaching.

**Core Composition Courses**

ENGL 664	History and Theory of Composition Studies	3
ENGL 571	Composition Pedagogy and Practicum	3

**Core Critical/ Cultural Studies Courses**

ENGL 517	Graduate Study in Critical Theory	3
ENGL 668	Rhetoric and Cultural Studies	3

**Core Professional and Technical Communication Courses**

ENGL 512	Graduate Study in Writing in the Workplace	3
ENGL 572	Technical-Professional Communication: Theory and Pedagogy	3

**Core Rhetoric Courses**

ENGL 518	History of Rhetoric	3
ENGL 519	Graduate Study in Modern Rhetorical Theory	3

**Specialized Courses**

Students must successfully complete 15-18 credit hours in specialized area. Students define their specialized area, a coherent set of related courses drawn from both inside and outside the Department of English, in consultation with their doctoral committee. Possible specializations include Border Rhetorics and Cultures; Writing Program Administration/Writing Center Administration; Assessment; Pedagogy; Literacy Studies; Identity and Political and Social Rhetoric; New Media Rhetoric and Design; Intercultural Rhetorics; Writing Across the Curriculum; Workplace Communication; and the Rhetoric of Science.

**Transfer Courses (up to 18 credits):**

Students may apply 18 hours of master's level work to the 54-hour coursework requirement with departmental approval. In consultation with an advisor and the Doctoral Committee, students petition for transfer credits when they submit their qualifying portfolio and file the program of study with the Graduate School.

**Financial Support**

Students are eligible for teaching assistantships and a variety of positions that involve writing around campus and the community. Because many students work full time, many courses are offered in the late afternoon and evening to accommodate various schedules.

**Application Information**

Please refer to the online application process described on the NMSU Admissions website for specific instructions for each program.

## GEOGRAPHY

**Department website:** <http://geography.nmsu.edu/>  
(575) 646-3509

*C. P. Brown, Ph.D., department head (California-Santa Barbara/San Diego State)—geographic information systems, water resources, U.S.-Mexico border environmental issues; M. Buenemann, Ph.D. (Oklahoma)—geographic information science and technology, land change science, drylands; C. L. Campbell, Ph.D. (UCLA)—bio geography, landscape ecology, remote sensing; M. N. DeMers, Ph.D. (Kansas)—geographic information science, landscape ecology, geographic education; D. Dugas, Ph.D. (Oregon)—geomorphology, physical geography; J. B. Wright, Ph.D. (California-Berkeley)—environmental conservation, cultural geography, American West  
Emeritus Faculty—R.J. Czerniak, Ph.D. (Colorado-Boulder)—land use and transportation planning, Europe, urban geography*

**DEGREE: Master of Applied Geography**  
**MAJOR: Geography**

**MINOR: Geographic Information System**

The Department of Geography offers graduate study leading to the Master of Applied Geography degree, with a specific focus on the use of geographic perspectives and tools to examine an array of applied research questions related to water resources, biogeography, land use change, desertification, landscape conservation, and urban and transportation planning. A minor in Geographic Information Science and Technology (GIS & T) is also available for all graduate students, regardless of major; details are provided below. Admission to the program is in accord with the general regulations of the Graduate School. Foreign students must receive a minimum score of 570 on the paper-based or 230 on the computer-based Test of English as a Foreign Language (TOEFL) examination. Any applicant who does not have an adequate undergraduate background in geography will be required to make up the deficiencies. Applicants must submit three letters of recommendation and a formal statement of intent to the Department as part of the application process.

The department is a sponsoring department in the interdisciplinary graduate degree program that offers both an M.S. and Ph.D. degree in water science and management. Program details, application procedures, and funding resources are listed under the program description that is part of the College of Agricultural Consumer and Environmental Sciences, the lead College for the program. Interested students are encouraged to contact the Department Head of Geography, Christopher Brown, at 575.646.1892 or brownchr@nmsu.edu, for more information.

The Department is also a participant in the Western Regional Graduate Program (WRGP) supported by the Western Interstate Commission of Higher Education (WICHE). The WRGP is a tuition-reciprocity arrangement that enables students that are legal residents in WICHE states (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington and Wyo-ming) to attend NMSU and pay the resident tuition rate, instead of the nonresident rate that an out-of-state student would normally pay.

The Department has a contract research laboratory (Spatial Applications Research Center-SpARC) and a state-of-the-art computer teaching laboratory, both of which support the full suite of ESRI, ERDAS, and ENVI geo-spatial analytical software. The SpARC laboratory employs graduate students who work with local and state governments and research agencies, as well as with businesses on applied geography projects. Our teaching laboratory supports graduate students engaged in course work and research projects. The Department has good working relationships with the Water Resources Research Institute, the Jornada Experimental Range, the Physical Sciences Laboratory, and other units on campus. The Department has its own field equipment and field vehicle, which graduate students can use to support their thesis research. The potential for financial support exists for graduate students in geography through teaching assistantships and research assistantships. Inquiries regarding the program and assistantships should be directed to the Dr. Daniel Dugas, Geography Graduate Director (ddugas@nmsu.edu). Financial aid questions should be addressed to the Office of Financial Aid at NMSU.

**DEGREE: MASTER OF APPLIED GEOGRAPHY**  
**MAJOR: GEOGRAPHY**

The basic requirement for the Master of Applied Geography is a minimum of 30 graduate credits, including 6 thesis credits and a successful thesis defense. A non-thesis option requires 36 graduate credits with a minimum of 3 credits of professional residency and an approved final research report. All candidates must maintain an overall GPA of 3.00 or higher. All candidates must also receive a grade of B- or better in the following required courses: GEOG 501, Research Design; GEOG 585, Advanced Spatial Analysis; and one graduate-level GIS&T course, either prior to entering the program or before graduation. A total of at least 15 credits must be earned in courses numbered 500 and above, and no more than 9 credits of the 30 (thesis option) or 36 (non-thesis option) can be earned outside of geography.

**MINOR: GEOGRAPHIC INFORMATION SCIENCE AND TECHNOLOGY**

The Department of Geography offers a minor in Geographic Information Science and Technology (GIS&T), and this minor is available for all graduate students. To earn a minor in GIS&T, the following courses are required, combining for a total of 14 credits. Students may not take any of these courses S/U, and students must earn a grade of at least B- in all of these classes.

The following two classes are mandatory requirements for the minor:

GEOG 573	Introduction to Remote Sensing	4
GEOG 578	Fundamentals of Geographic Information Science and Technology (GIS & T)	4

**TWO of the following four optional classes are also required:**

GEOG 521	GIS & T Applications and Modeling	3
GEOG 572	Geodatabase Design	3
GEOG 581	System Design for Geographic Information Science and Technology (GIS & T)	3
GEOG 582	Advanced Remote Sensing	4

## GEOLOGICAL SCIENCES

Department website: <http://www.nmsu.edu/~geology/>  
 (575) 646-2708  
 nmcmillan@nmsu.edu

*N. J. McMillan, department head, Ph.D. (Southern Methodist)– igneous petrology, geochemistry, J. M. Amato, Ph.D. (Stanford)– structural geology, tectonics, F. C. Ramos, Ph.D. (California- Los Angeles)– isotope geochemistry, petrology, T. R. J. Burgette, Ph.D. (Oregon)- Neotectonics, B.A. Hampton, Ph.D. (Purdue)- sedimentology, tectonics; E.R. Johnson, Ph.D. (Oregon)- igneous petrology, volcanology, T.F. Lawton, Ph.D. (Emeritus) (Arizona)- stratigraphy, basin analysis; G.H. Mack, Ph.D. (Emeritus) (Indiana-Bloomington)- sedimentary petrology, sedimentology,*

**DEGREE: MASTER OF SCIENCE**  
**MAJOR: GEOLOGY**

The Department of Geological Sciences offers graduate study leading to the Master of Science degree in geology. Admission to the program is in accord with the general regulations of the Graduate School. Admission to this program without deficiency is based on an undergraduate program essentially equivalent to that pursued by a geology major at this university. The Graduate Record Examination (verbal and quantitative only) is required. A candidate for a master's degree must complete a minimum of 30 graduate credits, including a minimum of 6 credits for thesis (GEOG 599). No more than 5 thesis credits may be taken in any one semester. Early selection of a research advisor is encouraged. A thesis proposal must be approved by the advisor and the candidate's committee before registering for thesis credits. At least 15 credits must be earned in courses numbered 500 or above, and at least 15 credits must be earned in geology. Students are expected to register for and participate in the department's colloquium each semester. Supportive graduate work is available in geological engineering and geophysics. The department offers excellent laboratory facilities for research in mineralogy, igneous petrology, geochemistry, stratigraphy, paleontology, and sedimentology. Available are a large, fully equipped rock preparation laboratory, mineral separation laboratory, plus computer, geochemical and petrographic labs. Major equipment includes a Gemini heavy mineral separation table, X-Ray Fluorescence Spectrometry (XRF), Laser-Induced Breakdown Spectroscopy (LIBS), a class 1000 clean lab, Thermal Ionization Mass Spectrometry (TIMS) and Laser-Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS). The department maintains its own fleet of field vehicles. Also available are computing facilities that include an HP color plotter and GIS system. Financial support is available to graduate students in geology through teaching and research assistantships and scholarships. Inquiries regarding financial aid should be directed to the graduate advisor.

## GOVERNMENT

Department site: <http://www.nmsu.edu/~govdept/>  
 Masters in Public Administration site: <http://deptofgov.nmsu.edu/academic-programs/mpa/>  
 (575) 646-4935  
 govdept@nmsu.edu

*N. Harvey, Ph.D., department head (Essex)– Mexican politics, comparative politics, Latin America; N. Baker, (emerita) Ph.D. (Tulane)– public law, American politics, presidency, G. Butler, Ph.D. (Catholic)– political theory, American politics, D. Chand, Ph.D., (Arkansas) - interest groups and non-profit advocacy, immigration policy, public/non-profit management; T. Conner, Ph.D., (Oklahoma) - public administration, Native American politics, public budgeting; J. Garcia, Ph.D. (New Mexico) – New Mexico politics, border politics, Latin America, comparative politics; Y. Lapid, Ph.D. (Columbia)– international relations theory, comparative foreign policy, international organizations; C. Medina (Univ. Colorado Denver) Ph.D. – public administration, public policy, education policy, qualitative methods; N. Rosendorf, Ph.D., (Harvard) international relations, cultural diplomacy, US foreign*

*policy, W. Taggart, (emeritus) Ph.D. (Florida State)—public administration, public policy, American politics; R. G. Winn, (emeritus), Ph.D., (Arizona State)—public administration, policy analysis, environmental policy*

**DEGREE: Master of Arts****MAJOR: Government****DEGREE: Master of Public Administration****MINORS: Government****Public Administration****Security and Intelligence Studies**

The Department of Government offers two degrees: the Master of Arts (M.A.) in government and the Master of Public Administration (M.P.A.) and a graduate minor in Security and Intelligence Studies. The programs are designed to prepare students both for diverse careers in the public sector and for further training at the doctoral level. The M.P.A. program is accredited by the Network of Schools of Public Policy, Affairs and Administration (NASPAA), a distinction held by fewer than one-quarter of M.P.A. programs nationwide. The M.P.A. program offers joint degrees with the Department of Criminal Justice (M.P.A./M.C.J.) and with the Department of History (M.P.A./M.A. in Public History). Students in a joint degree program can earn two master's degrees with fewer credits than would be required to earn those degrees independently.

**Admission**

Prospective graduate students in either the M. A. or M. P. A. should demonstrate a 3.0 grade point average for the second half of their undergraduate course work. For students with a GPA of less than 3.0, GRE scores are required, though this requirement may be waived if the undergraduate degree was awarded more than five years before applying. Applicants to either program are required to submit an application online. See instructions at: <http://prospective.nmsu.edu/graduate/apply/index.html>. Applications include three letters of recommendation, a writing sample, and a personal statement concerning their interest in pursuing a graduate degree. Additional information concerning program requirements and the admission process can be obtained from either the department's M.A. chair or M.P.A. director. Under exceptional circumstances the department may exempt students from the minimal requirements. Application for admission to the Graduate School should clearly indicate the program in which the student wishes to enroll. Applications for admission to the M.P.A. program are reviewed twice a year, once in the Fall semester and once in the Spring semester.

Students interested in a joint degree option must apply and be accepted in to the two departments separately, and indicate their interest on their applications in one of the joint degree programs.

**General Requirements**

Students in both the M.A. and M.P.A. programs select either a thesis or non-thesis option. Students planning on continuing their studies in a doctoral program or wishing to establish expertise related to a specific career objective are strongly encouraged to select the thesis option. The non-thesis option is suggested for students desiring immediate employment or seeking to enhance their current employment situations. Course work outside the department must have prior advisor approval to ensure a well-integrated program of study. Complete information on the requirements for either program should be obtained directly from the department. Most M.A. and M.P.A. courses are offered in the evening.

**DEGREE: MASTER OF ARTS****MAJOR: GOVERNMENT**

The M.A. program provides general course work in each of the major fields of political science. Students may choose either the thesis option, under which they complete 30 credits of course work plus 6 thesis credits (GOVT 599), or the nonthesis option, with 30 credits of course work plus 6 hours of special research credit (GOVT 598) or 6 hours of approved internship credit (GOVT 510). Both the thesis and nonthesis options require a final oral examination; the non thesis option requires a written examination as well. The program provides a broad-based foundation in political science while allowing students to pursue specific areas of interest.

**All students are required to complete a research methods class, either**

GOVT 502	Research Methods in Government	3
	or	
GOVT 503	Qualitative Research Methods	3

**In addition, students must take 3 of the following 6 courses (9 credits):**

GOVT 530	Seminar in Public Policy	3
GOVT 550	Seminar in American Politics	3

GOVT 560	Seminar in International Relations Theory	3
GOVT 570	Seminar in Comparative Politics	3
GOVT 580	Seminar in Political Theory	3
GOVT 590	Seminar Public Law and Legal Systems	3

The remaining credits required for the degree are selected subject to advisor approval to satisfy particular academic interests or career goals. Flexibility in planning a program of study is permitted to meet the educational needs of a diverse student population. Structured areas of emphasis are available in several topical areas including security studies, Latin American affairs, and international affairs. The study program for each certification area must be approved by the M.A. Program Committee. Information on these areas may be obtained from the Department of Government. No more than 9 credits taken outside the department will be counted toward the degree.

**MINOR: SECURITY AND INTELLIGENCE STUDIES****Nine semester hours of graduate course credit from the following courses:**

GOVT 468	Rebels, Guerrillas, and Terrorists in Modern Latin America	3
GOVT 549	Ethics in Government	3
GOVT 560	Seminar in International Relations Theory	3
GOVT 562	Advanced Issues in Security and Intelligence Studies	3
GOVT 564	Advanced National Security Policy	3
GOVT 566	Advanced Issues in American Foreign Policy	3
GOVT 567	Terrorism and Political Violence	3
GOVT 568	Advanced Intelligence Studies	3
GOVT 569	Advanced Issues in Globalization	3
GOVT 574	Contemporary Comparative Studies	3
GOVT 596	International Law	3

**Additional Courses:**

Other graduate courses may become available during the year which may be substituted for the above listed courses. Consideration may be made on a case-by-case basis.

**DEGREE MASTER OF PUBLIC ADMINISTRATION**

The M.P.A. program is accredited by NASPAA. The M.P.A. is designed to provide students with the managerial and analytical skills, in addition to ethical and professional values, necessary to meet the increased demand for skilled public administrators. Candidates who follow this professional program must complete a minimum of 42 credits, consisting of core courses, electives and either an internship or a thesis.

**All students are required to complete a core curriculum of 18 credits, including:**

GOVT 502	Research Methods in Government	3
GOVT 541	Public Budgeting	3
GOVT 542	Public Sector Human Resources Management	3
GOVT 544	Public Policy Analysis	3
GOVT 547	Government Organizations	3
GOVT 549	Ethics in Government	3

The remaining 24 credits required for the degree are selected with the approval of an advisor to meet the needs and interests of the individual candidate. Because students have divergent career goals, a thesis or internship option is offered. The thesis option requires an additional 18 credits of course work, 6 credits of thesis (GOVT 599), and an oral examination covering the thesis and course work. The internship option requires an additional 21 credits of course work, 3 credits of internship (GOVT 510), and an oral examination covering the internship and course work. As part of the course work, students selecting the internship option must take GOVT 519 (Proseminar/Capstone in Public Administration) during the latter part of their studies, and are required to earn a B-grade or higher in that course.

With approval, students may include up to 12 credits of relevant course work from other departments to be counted toward the total credits required for the M.P.A. These credits may be selected to form a graduate minor in another academic discipline.

Candidates with inadequate preparation for graduate study in public administration may be required to take appropriate undergraduate and graduate courses as part of, or in addition to, a regular program of study. Applicants to the M.P.A. program will be advised of any such requirements at the time of admission.

## JOINT M.P.A.-M.C.J. PROGRAM

The M.P.A.-M.C.J. joint degree option requires completion of a minimum of 57 credits of approved course work from the Departments of Government and Criminal Justice. Students interested in this option should meet with the M.P.A. director or criminal justice graduate advisor for additional information.

## JOINT M.P.A.- M.A. PUBLIC HISTORY PROGRAM

The M. P. A.- M. A. Public History Option Program requires completion of a minimum of 57 credits of approved course work from the Departments of Government and History, including completing internship credits in both programs. Interested applicants should consult with the M. P. A. director or the director of the Public History Program for additional information.

# HISTORY

Department website: <http://www.nmsu.edu/~histdept/>  
 Program in Public History site: <http://web.nmsu.edu/~publhist/>  
 (575) 646-4601  
[khammond@nmsu.edu](mailto:khammond@nmsu.edu)

*K.J. Hammond, Ph.D.(Harvard), department head,— China, East Asia; J. L. Bronstein, Ph.D.(Stanford)— nineteenth century U.S., Britain; N. M. Brooks, Ph.D.(Columbia)— Russia/Soviet Union, modern Europe, modern science; J.P. Brown, Ph.D.(Illinois-Urbana)— early United States, public history; W. C. Eamon, Ph.D.(Kansas)— history of science, early modern Europe; I. Garcia-Bryce, Ph.D.(Stanford)— Latin America, Peru; K. J. Hammond, Ph.D.(Harvard)— China, East Asia; E. Horodowich, Ph.D.(Michigan-Ann Arbor)— early modern Europe, Mediterranean; J. Hunner, Ph.D.(New Mexico) public history, New Mexico; P. Kopp, Ph.D.(Nevada-Reno)— US, environmental, public history; M. Malamud, Ph.D.(California-Berkeley)— ancient, medieval, Islam; A. Orzoff, Ph.D.(Stanford)— twentieth-century Europe, Eastern Europe, intellectual history; D. T. Pitcaithley, Ph.D.(Texas Tech)— historical memory, public history, Civil War; I. Seong-Leong Quintana, Ph.D.(Michigan-Ann Arbor)— US, Latino/a, Asian-American*

**DEGREE: Master of Arts**

**MAJOR: History**

**CONCENTRATION: Public History**

**MINOR: History**

The Department of History offers graduate work leading to the Master of Arts degree. In addition to fulfilling the basic requirements for admission to the Graduate School, applicants must present undergraduate passage of at least 12 credits in history with grades of B or higher, including 6 upper division history credits. Those lacking this preparation must normally make up deficiencies before beginning graduate course work. Candidates who choose a course of study requiring a foreign language will be responsible for their own language preparation.

Students applying for admission to the graduate program in history are required to submit an application form and a transcript to the Graduate School and a strong writing sample, three letters of recommendation ideally from History faculty members at NMSU or other institutions, and a two-to-three page statement of purpose to the Department of History, approximately four months in advance of the desired enrollment date. Applicants for graduate assistantships and fellowships must submit a letter of application, a transcript, and three letters of recommendation to the department by February 15 for the fall semester, and by October 15 for the spring semester. Students who are not applying for graduate assistantships and fellowships may apply at any time for acceptance into the graduate program.

Thirty-six credits (27 of which must be at the 500 level) are required for the thesis program, including at least 3 public history credits above the 500 level; four history graduate seminars that include the Craft of History seminar, two readings seminars from among HIST 590, HIST 591, HIST 592, and HIST 593, and a research seminar; and a thesis (6 credits). With permission of the graduate advisor, a maximum of 6 credits may be taken in related fields outside the Department of History. A student choosing the thesis program must receive permission for his/her thesis by passing a thesis proposal defense after earning 12 graduate credits in History. The department will provide guidelines for the thesis defense. A student choosing the thesis program must pass a final oral examination over graduate course work and the thesis. All graduate students will be required to present a research paper in a public forum approved by the department's Graduate Director.

Thirty-six credits (27 of which must be at the 500 level) are required for the Public History specialization. These include four history seminars: the public history seminar, Craft of History, one research seminar, and one readings seminar from among HIST 590, HIST 591, HIST 592, and HIST 593. Students complete a

public history internship (3 credits) and preparation of an article of scholarly quality (3 credits).

Students in the Public History specialization must collectively pass 18 credits of nonpublic history courses, including the nonpublic history seminars noted above. They must collectively pass 18 credits in public history, which must include the public history seminar, the internship, and the article. The scholarly article is developed through work in the internship and will be of peer reviewed journal quality. The public history credits may include a maximum of 9 graduate level (450 -and-above) credits outside the Department of History with permission of the Director of the Public History Program. A student choosing the Public History specialization must pass an article proposal defense about the proposed scholarly article during the first semester after completion of the internship. The department will provide guidelines for the article defense. A student choosing the Public History specialization must give a public presentation of a portfolio that includes his/her work and the scholarly article, and must pass an oral examination over graduate course work, the internship, and the article. Students who receive a Master's degree in this track will have a specialization in Public History added to their transcripts.

Students choosing to pursue both the thesis track and Public History specialization must complete the course hours required for the public history specialization, perform an internship, and defend the proposed thesis before undertaking it using guidelines provided by the department, present the public history portfolio at a public presentation, complete the thesis, and defend their course work, thesis and public history portfolio at a final oral examination. In order to satisfactorily complete both programs, such students would complete 39 credits, including three hours of internship credit and six hours of thesis work.

The Department of History and the Department of Government offer a joint degree in which students who are accepted into both of these programs may simultaneously earn both a Master of Arts in History degree with the Public History specialization, and a Master of Public Administration degree. The joint degree requires 57 total credits, while students who pursued both degrees as separate degrees would need to pass at least 72 credits. Students earning the joint degrees must pass a joint oral examination after passing required courses and completing internship credits in both programs. Students interested in the joint degree program should consult with the Director of the Public History Program and the Director of the Master of Public Administration Program.

Students may earn a graduate minor in History by passing the following courses: Craft of History, one readings seminar from among HIST 590, HIST 591, HIST 592, and HIST 593, and two additional 3-credit 500-and-above courses, for a total of 12 graduate credits.

Graduate students in History must maintain a 3.0 grade point average in their History courses. A graduate student earning a C or lower grade in one History course will receive a letter of warning. A graduate student earning two or more C or lower grades in History courses or whose History grade point average falls below 3.0 will be removed from the History graduate program. Students must earn at least one B or higher grade in a seminar during their first year in the graduate program, and must take at least one seminar during each year in which they are enrolled in the program. If a graduate student receives one U (Unsatisfactory) grade on his/her thesis or internship, the student will receive a written warning, and if a student received two or more U grades on his/her thesis or internship, the student will be removed from the program.

# MATHEMATICAL SCIENCES

Department website: <http://www.math.nmsu.edu>  
 (575) 646-3901  
[gradcomm@nmsu.edu](mailto:gradcomm@nmsu.edu)

*J. Lakey, department head, Ph.D.(Maryland)— applied harmonic analysis; P. Baggett, Ph.D.(Colorado)— mathematics education; M. Ballyk, Ph.D.(McMaster)— mathematical biology and ecology; E. Barany, Ph.D.(Ohio State)— mathematical physics; G. Bezhaniashvili, Ph.D.(Tokyo Institute of Technology)— logic; M. S. Cohen, Ph.D.(Chicago)— mathematical biology, mathematical physics; S. Dai, Ph.D.(Maryland)— partial differential equations, applied math; R. DeBlasse, Ph.D.(MIT)— Probability; L. Fouli, Ph.D.(Purdue)— commutative algebra; T. Giorgi, Ph.D.(Purdue)— applied mathematics; J. Harding, Ph.D.(McMaster)— logic and foundations; G. Lodder, Ph.D.(Stanford)— algebraic topology; N. Michalowski, Ph.D.(Chicago)— partial differential equations, harmonic analysis, probability; P. Morandi, Ph.D.(California-San Diego)— algebra; B. Olberding, Ph.D.(Wesleyan)— commutative algebra, valuation theory and module theory; S. Salamanca-Riba, Ph.D.(M.I.T.)— Lie groups and representation theory; R. Smits, Ph.D.(Purdue)— probability, harmonic analysis; R. Staffeldt, Ph.D.(California-Berkeley)— algebraic topology; T. Stanford, Ph.D.(Columbia)— low dimensional topology; T. Wang, Ph.D.(Windsor)— mathematical statistics. Associated Faculty: Annie Selden, Ph.D.(Clarkson)— mathematics education, John Selden, Ph.D.(Georgia)— mathematics education.*



**DEGREE: Master of Science  
MAJOR: Mathematics****DEGREE: Doctor of Philosophy  
MAJOR: Mathematics****MINOR: Mathematics**

The Department of Mathematical Sciences offers graduate instruction leading to the Master of Science degree, and Doctor of Philosophy degree. Possible areas of study are various topics in pure mathematics and applied mathematics, statistics, and mathematics education. Students may also pursue an interdisciplinary program of study. Our program has 50 to 60 graduate students, most of them supported by a combination of teaching assistantships, research assistantships, fellowships, and job opportunities at nearby teaching or research units.

For more information on our programs and on our working environment, and to learn more about the research interests of the faculty, please see our web site at [www.math.nmsu.edu](http://www.math.nmsu.edu), phone us at (575) 646-3901, or write to Graduate Secretary, Department of Mathematical Sciences, NMSU, Las Cruces, NM 88003-8001, email: [gradcomm@nmsu.edu](mailto:gradcomm@nmsu.edu).

Students applying for regular admission to graduate study in mathematics are expected to have 24 credits of upper-division courses in mathematics and statistics, including a three-credit course in modern analysis and a three-credit course in modern algebra. Students who do not meet these requirements may be admitted with deficiencies and allowed to complete the requirements at New Mexico State University.

Applications must be submitted online, see <http://prospective.nmsu.edu/graduate/apply/>. The minimum application to be admitted as a regular graduate student in mathematics includes:

1. a completed Graduate School admission application,
2. complete transcripts of all undergraduate and graduate work,
3. application fee,
4. three letters of recommendation from professors, employers, or others who are qualified to judge potential for graduate work in mathematics,
5. a one-page statement of educational objectives.

Although GRE subject test scores are not required for admission, applicants are encouraged to submit them, if available. The test scores may be used to help allocate available teaching assistantships among entering students.

To ensure full consideration for admission, candidates should submit their applications by the following deadlines:

**Application Deadlines-Domestic Applicants:**

Semester	Admission only	Admission /Financial Aid
Fall	July 1	February 1
Spring/Summer	October 1	October 1

**Application Deadlines-International Applicants:**

Semester	Admission only	Admission /Financial Aid
Fall	February 1	February 1
Spring/Summer	October 1	October 1

**DEGREE: MASTER OF SCIENCE  
MAJOR: MATHEMATICS**

The Master's degree is designed to increase one's knowledge and understanding of mathematics beyond the Bachelor's degree level. It also prepares a student for future graduate work.

A candidate for a master's degree may select up to two minors in addition to the major. A minimum of 8 credits of graduate work is necessary for a minor.

**Minimum Requirements for the Master's Degree**

1. In fulfillment of the Graduate School requirement of a minimum of 30 semester credits of course work, the student must take at least 24 credits of mathematics or statistics, numbered above 500.
2. The student must complete, transfer, or challenge MATH 525, MATH 527, MATH 528, and MATH 581.

3. In addition, 6 of the 24 Math credits must be from the following list of courses: Algebra (MATH 582), Complex Analysis (MATH 591, MATH 592), Differential Equations (MATH 531, MATH 532), Logic and Foundations (MATH 557, MATH 585), Probability and Statistics (STAT 562, STAT 571), Real Analysis (MATH 593, MATH 594) and Topology (MATH 541, MATH 542).
4. At most 6 credits of individual study courses such as MATH 540 may be used to fulfill the course requirement.
5. MATH 511 through MATH 516, and MATH 563 through MATH 569 may not be used to fulfill any of these requirements.
6. The student's program of study must be approved by the departmental Graduate Studies Committee.
7. The student must successfully complete a final master's examination.

**The Master's Final Examination**

The Master's final examination is an oral examination administered by the student's committee and covers the student's coursework. The student's committee consists of at least three departmental members and a Graduate faculty member from another department who serves as the Dean's representative. If the student has a minor area of study, then a member must come from the minor department. The examination is restricted to course work presented in the student's program of studies. When a master's thesis has been written, the master's final exam will be in part an oral defense of the thesis and in part a general examination of the candidate's course work. The oral exam must be completed at least 10 days prior to the end of the semester in which the candidate wishes to receive the degree.

**DEGREE: DOCTOR OF PHILOSOPHY  
MAJOR: MATHEMATICS**

Candidates for the Ph.D. degree in the Department of Mathematical Sciences must pass a qualifying examination, three comprehensive written examinations, a basic mathematical reading knowledge test in a language other than English, a comprehensive oral examination, a series of courses, and a final oral doctoral thesis examination. These are briefly described below. For more information, see the Graduate School requirements in this catalog, and the Mathematics Graduate Student handbook at [www.math.nmsu.edu](http://www.math.nmsu.edu).

**Qualifying examination:** Every student admitted to the Ph.D. program must complete the Ph.D. oral qualifying examination. Its purpose is to determine the areas in which the student shows strength or weakness, as well as the ability to assimilate subject matter presented at the graduate level. Students who complete their mathematics master's degree at NMSU may request, at the time of applying for their master's oral final examination, that the Master's examination also fulfill the Ph.D. qualifying examination requirement. In all other cases, towards the end of the student's first semester in the Ph.D. program, the student and his or her advisor will convene an oral examination with three examiners, the examiners being the advisor and some of the student's current or past instructors. As a result of the Qualifying examination, the department will take one of the following actions: (1) admit the student to further work toward the Ph.D.; (2) recommend that the student's program be limited to a Master's degree; (3) recommend a reevaluation of the student's progress after the lapse of one semester; or (4) recommend a discontinuation of the student's graduate program in mathematics.

**Written comprehensive examinations:** Candidates for the Ph.D. degree must pass written comprehensive examinations in three of the seven areas of algebra, complex analysis, differential equations, logic and foundations, real analysis, statistics, and topology. To ensure adequate breadth, a combination of three comprehensive examinations must include real analysis, and at least one of algebra and topology.

The seven examinations are based on the following comprehensive examination sequence courses: Algebra (MATH 525, MATH 581, MATH 582), Complex Analysis (MATH 517, MATH 591, MATH 592), Differential Equations (MATH 518, MATH 531, MATH 532), Logic and Foundations (MATH 504, MATH 557, MATH 585), Real Analysis (MATH 527, MATH 528, MATH 593, MATH 594), Probability and Statistics (STAT 562, STAT 571), and Topology (MATH 541, MATH 542).

Full time students should complete the comprehensive written exams in the first two years. Those who have not made substantial progress towards completion of their written exams at the start of the fifth semester may be removed from the program. Students who have not completed the written exams by the start of the sixth semester will normally have any departmental funding revoked.

Exams are offered every August and January. A student must register to take exams in the semester prior to taking the exams. A student has three consecutive examination periods to complete the written comprehensive exam requirements (Example: if s/he starts in August, s/he has the August, January and August examination periods to complete the exams). This does not extend the time limit mentioned above. Students will normally not be given more than two attempts at any one exam.

**Course requirements:** Before graduation, a student must pass a total of four comprehensive exam sequences, but needs to take the comprehensive examinations in only three of them. In addition, a student must pass four more (one-semester) MATH/STAT courses from the seven comprehensive exam sequences listed above.

A student may pass any of the four comprehensive examination sequences before enrolling as a Ph.D. student, but the four additional courses have to be passed after enrolling as a Ph.D. student.

The following courses will not count towards the course requirements: Any course below MATH 501, MATH 511 through MATH 516, and MATH 563 through MATH 569, MATH 540/STAT 540, MATH 598/STAT 598, MATH 599, MATH 600, MATH 700.

Students and advisors are encouraged to consider further courses beyond this minimum.

**Foreign language examination:** The department requires that each Ph.D. student pass a basic mathematical reading knowledge exam in a language, other than English, relevant to the student's research interests. This exam is coordinated by the student's advisor and consists of the open-dictionary written translation into English of a mathematical text of interest to the student. The language requirement must be fulfilled prior to the oral part of the Ph.D. comprehensive examination.

**Oral Comprehensive Exam:** The student must take this exam at the end of the semester after completing the written comprehensive exams. The student should present a proposed direction for thesis work.

**Final Oral Exam:** This should be an exam over the student's thesis and administered by the same committee of the oral comprehensive exam.

## MOLECULAR BIOLOGY

**Department Website:** <http://molb.research.nmsu.edu/>  
(575) 646-3437  
nancyt@nmsu.edu

A. Ashley, Ph.D. (Colorado State University)— Center for Animal Health and Safety, DNA replication and repair; R. Ashley, Ph.D. (Colorado State University)— Department of Animal and Range Sciences; P. Cooke, Ph.D. (New Hampshire-Durham)— Director of Electron Microscopy Lab; R. Creamer, Ph.D. (California-Davis)— Department of Entomology, Plant Pathology, and Weed Science-plant virology, fungal endophytes; D. Cowley, Ph.D. (University of Wisconsin-Madison)— Department of Fish, Wildlife and Conservation Ecology -ecological and conservation genetics; J. Curtiss, Ph.D. (University of Colorado-Boulder)— Department of Biology-molecular genetics of eye development; A. Dawe, Ph.D. (Tennessee)— Department of Biology-molecular biology of plant-fungal and virus-host interactions; K. A. Hanley, Ph.D. (University of California San Diego)— Department of Biology-emerging vector-borne viruses; I. Hansen, Ph.D. (University of Wurzburg, Germany)— Department of Biology-molecular vector biology; S. Hanson (Wisconsin)— Department of Entomology, Plant Pathology, and Weed Science-viral plant pathogens; J. Houston, Ph.D. (Texas A&M)— Department of Chemical Engineering-flow cytometry and molecular imaging; K. Houston, Ph.D. (University of Texas)— Department of Chemistry and Biochemistry; J. Jun, Ph.D. (New Mexico State University)— molecular biology-DNA sequencing; J. He, Ph.D. (Baylor)— Department of Computer Science-protein structure prediction; S. Lusetti, Ph.D.— Department of Chemistry and Biochemistry-DNA replication, recombination and repair; B. A. Lyons, Ph.D. (Cornell University)— Department of Chemistry and Biochemistry-elating structure to function, specifically the Grb7 protein family; B.G. Milligan, Ph.D. (California-Davis)— Department of Biology-plant evolutionary biology; M. K. Nishiguchi, Ph.D. (California-Santa Cruz)— Department of Biology-molecular and ecological basis of speciation, coevolution of symbiotic relationships; J. Randall, Ph.D. (New Mexico State University)— Department of Entomology, Plant Pathology, and Weed Science-molecular plant physiology and plant/microbe interactions; I. Ray, Ph.D. (Wisconsin-Madison)— Department of Plant and Environmental Sciences-plant genetic engineering, primary and secondary metabolism, stress, legumes; A. Rowland, Ph.D. (University of Utah)— Department of Chemistry and Biochemistry-gene regulation of extrahepatic of metabolic enzymes (cytochrome P450s); C. Sengupta-Gopalan, Ph.D., Program Director (Ohio State)— Department of Plant and Environmental Sciences-nitrogen-fixation, plant-bacterial interactions; E. E. Serrano, Ph.D. (Stanford)— Department of Biology-membrane biophysics and molecular neurobiology; C. B. Shuster, Ph.D., Program Director (Tufts University)— Biology-regulation of mitosis and cytokinesis, role of the cytoskeleton during early development; G. Smith, Ph.D. (North Carolina State)— Department of Biology-environmental gene probes, microbial biodegradation; W. Van Voochries, Ph.D. (Arizona)— lifespan regulation in nematodes and insects; H. Vilchis-Licon, M.D., M.P.H. (UNAM)— Director, Border Epidemiology and Environmental Health Center-epidemiology; J. Xu, Ph.D. (Second Military Medical University, China)— Department of Biology-functional genomics and population genetics of mosquito-malaria interactions; E. Yukl (Oregon HSU) - Department of Chemistry and Biochemistry - Bioinorganic chemistry and

structural biology; J. Zhang, Ph.D. (University of Arkansas)— Department of Plant and Environmental Sciences-cotton genetics, genomics and molecular biology

**DEGREE: Master of Science**  
**MAJOR: Molecular Biology**

**DEGREE: Doctor of Philosophy**  
**MAJOR: Molecular Biology**

**MINOR: Bioinformatics (with Computer Science)**

### THE MOLECULAR BIOLOGY PROGRAM

Students of the molecular life sciences seek to reduce complex biological processes to a set of understandable molecular or chemical structure and function relationships. Integration of this knowledge into the context of complex living tissues interacting with the environment is the ultimate goal. This requires that the expertise from many diverse traditional disciplines be directed along converging experimental lines. The Ph.D. program in molecular biology is designed to facilitate an interdisciplinary approach to graduate research, utilizing both traditional techniques and the latest advances in biotechnology, including the extraordinary power of recombinant DNA methodology. Participants in this program will take core courses in biochemistry, molecular biology and cell biology. Subsequent course work will be tailored for the individual student, depending upon his or her research emphasis. Participation in regular seminar programs will be expected to provide students with the widest possible scientific background. Financial aid, in the form of a limited number of MB teaching and research assistantships, is available on a competitive basis. Research Assistantships may also be available from individual faculty within the Molecular Biology (MB) program. Only the most competitive students are admitted with assistantship support.

The MB program offers curricula leading to the M.S. and Ph.D. degrees in the areas of biochemistry, molecular genetics, molecular biology, cell biology, bioinformatics, and microbiology. Admission to the MB Program without deficiency is based on an undergraduate program essentially equivalent to that pursued by an undergraduate major in chemistry, biology, agronomy, horticulture, biochemistry, or microbiology at this university. An entering student is required to complete the Graduate Record Examination (General Aptitude). Undergraduate deficiency courses must be passed with a minimum grade of B.

Applicants are strongly encouraged to contact at least three individual program faculty before applying to identify a prospective advisor and laboratory in which to pursue graduate research. Previous course records and GPA standings (typically minimum of 3.3/4.0), GRE scores (typically minimum of 300 combined verbal and quantitative), TOEFL scores of foreign applicants (typically minimum of 550 on the paper-based or 213 on the computer-based), a letter of interest from the applicant that identified faculty laboratories of interest, and three letters of reference regarding research performance or potential are weighted heavily during the selection process.

Students with a B.S. degree in one of the disciplines listed above can expect to earn the M.S. degree in about 30 credits, including at least 6 credits of thesis research. The Ph.D. degree can be earned in about 30 to 40 credits of formal course work, plus additional thesis research credits, for a minimum total of 75 credits beyond the B.S. Because research is central in both the M.S. and Ph.D. curricula, early selection of a research advisor is required. Ph.D. degree candidates will successfully complete a written and oral qualifying examination based on their proposed research and the subject matter in the core courses (below) at the end of the first year of study. Also at this time, the master's or doctoral committee is organized to assist in planning a program appropriate to the background and goals of the student. Ph.D. candidates will subsequently complete a comprehensive written examination and oral examination approximately at the end of the second year of study. A final, formal presentation and oral defense of the original research documented in the M.S. or Ph.D. thesis completes the degree requirements.

The Molecular Biology program also offers formal minors in molecular biology or bioinformatics. The molecular biology minor consists of 10 credit hours including MOLB 545; either MOLB 520 or MOLB 542; any of the tier II courses; and one MOLB 590 seminar. The bioinformatics minor is jointly offered with the Department of Computer Science and consists of 9 credit hours for Master's students and 12 credit hours for Ph.D. students, including MOLB 452/GENE 452, and additional courses selected from those listed at <http://research.nmsu.edu/molbio/>. The courses selected will depend on whether the student is majoring in a biological or non-biological science and include courses from the graduate Computer Science and Molecular Biology curricula. Please inquire with the Molecular Biology Program office for the most recent requirements for the bioinformatics minor.

#### Phase I Core Courses:

MOLB 520	Molecular Cell Biology	3
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MOLB 542	Biochemistry I	3
MOLB 545	Molecular and Biochemical Genetics	3

**Molecular Biology Tier II Courses (at least 9 credits):**

AGRO 506	Plant Genetics	3
AGRO 516	Molecular Analysis of Complex Traits	3
AGRO 685	Plant Genetic Engineering	3
ANSC 602	Advanced Reproductive Physiology (fo)	3
ANSC 602 L	Molecular Techniques in Reproductive Physiology (fo)	2
ANSC 621	Metabolic Functions and Dysfunctions (fe)	3
BCHE 494	Techniques in Genetic Engineering	3
BCHE 546	Biochemistry II	3
BCHE 645	Nucleic Acid Metabolism	3
BCHE 647	Physical Biochemistry	3
BCHE 648	Proteins and Enzymes	3
BIOL 451	Physiology of Microorganisms	3
BIOL 470	Developmental Biology	3
BIOL 474	Immunology	3
BIOL 475	Virology	3
BIOL 477	Applied and Environmental Microbiology	4
BIOL 478	Molecular Biology of Microorganisms	3
BIOL 482	Microbial Systematics	2
BIOL 490	Neurobiology	3
BIOL 523	Mechanisms of Microbial Pathogenicity	3
BIOL 541	Professional Development Seminar	1-3
BIOL 541	Professional Development Seminar	1-3
BIOL 550	Special Topics	1-3
BIOL 550	Special Topics	1-3
BIOL 550	Special Topics	1-3
BIOL 577	Advanced Topics in Environmental Microbiology	3
BIOL 590	Advanced Neurobiology	1-3
BIOL 698	Selected Topics	1-3
CHEM 516	Physical Organic Chemistry	3
CHEM 517	Synthetic Organic Chemistry	3
EPWS 486	Plant Virology	3
MOLB 546	Biochemistry II	3
MOLB 550	Topics in Molecular Biology	1-3
MOLB 650	Advanced Topics in Molecular Biology	1-3
TOX 461	Toxicology I	3
WLSC 488	Conservation Genetics	

**Other Course Requirements**

A ST 505	Statistical Inference I	4
	or	
	equivalent course	
MOLB 590	Discussions in Molecular Biology	1
MOLB 597	Laboratory Rotations/Research Discussions	1-3
MOLB 599	Master's Thesis	0-15
PHIL 540	Science and Ethics	1-3
	or	
	equivalent course	

MOLB 599: 6 Thesis Research Credits  
MS candidates must enroll for 6 credits MOLB 599, Master's Thesis. May register for additional credits to maintain full-time status

## MUSIC

Department website: <http://music.nmsu.edu>  
(575) 646-2421  
[music@nmsu.edu](mailto:music@nmsu.edu)

*L. Chaffin, department head, Ph.D. (Texas Tech)—theory, composition; L. Borchert, D.M.A. (Florida State)—clarinet, history; F. Bugbee, D.M.A. (Eastman School of Music)—percussion, history; C. Hughes, D.M.A. (Univ. of Colorado)—Director of Instrumental Studies, conducting; A. Kaplan, Ph.D. (NYU Manhattan School of Music)—low brass; J. Martinez-Rios, M.M. (Western Michigan)—viola; F. Romero, D.M.A. (University of Oklahoma) J. Shearer, D.M.A. (Eastman School of Music)—graduate coordinator, history; L. Spitzer, D.M.A. (USC)—piano, history; R. Taylor, D.M.A. (Arizona)—saxophone, theory; L. Van Winkle, D.M.A. (Arizona) flute, history*

**DEGREE: Master of Music**  
**AREA OF STUDY: Conducting**  
**Music Education**  
**Performance**

**DEGREE: MASTER OF MUSIC**

The Master of Music degree is offered in the following areas of study: Conducting, Music Education and Performance. Applicants are expected to have an undergraduate degree in music or music education equivalent to that represented by the B.M. or B.M.E. degree from New Mexico State University. The music department does not require the Graduate Record Exam, but does expect each applicant to possess graduate-level language and writing skills. For admission into the Master of Music degree program, all applicants must have an undergraduate GPA of at least 3.0 and submit at least three letters of recommendation from music professionals. An audition, either in person or by recording, is required for entrance into the Performance or Conducting programs. Auditions will be based upon, but not limited to, prescribed repertory.

For acceptance into the Music Education program, the applicant must have completed a Bachelor of Music Education degree comparable to the one offered by NMSU or take the requisite undergraduate courses at NMSU leading to state licensure before enrolling in graduate courses. (Contact the Music Department for details.)

Note: The degree offered is a Master of Music. The student's official transcript and diploma will only indicate that degree. The area of study (Conducting, Music Education, Performance) will not be included as part of the official degree title.

**Recital Requirements for Performance and Conducting**

A graduate recital plus an analytical paper are required of all candidates in Performance and Conducting. Students must be enrolled in their applied area during the semester the recital is given. A minimum of 60 minutes of music is required for all Performance recitals. A minimum of three major works for the appropriate ensemble is required for all Conducting recitals. The recital may only be given after at least 6 hours of graduate applied or conducting courses have been successfully completed.

**Program of Study and Committee Selection**

After admission, each student must successfully complete MUS 471 before subsequent enrollment in other music theory courses. He or she must also successfully complete MUS 477 before subsequent enrollment in other music history courses.

During the first semester of study, a tentative Program of Study is planned, documented and filed by the student in consultation with the advisor in his or her major field. The Program of Study is subject to approval by the Music Department Head and the Graduate Music Committee. The student will also select, in consultation with his or her advisor, an advisory committee consisting of the advisor, and two additional faculty members.

**Candidacy**

In order to qualify for candidacy the student (except those in the online Music Education program) must meet the Graduate School requirement of 12 credits of graduate work in residence and must show evidence of a satisfactory quality of work in the required courses, demonstrate the desired progress in his or her performance area and, where required, submit a recital program, thesis topic, or project proposal for approval.

**Thesis**

A thesis is optional in Music Education and is encouraged for students considering completion of a terminal degree. Music Education candidates not writing a thesis must develop and complete an approved project before the oral examination.

## Final Examination

All Master of Music candidates must take a final comprehensive oral examination. The final oral examination may not be scheduled until the graduate recital (with analytical paper) is completed or a final draft of the Music Education project or thesis has been approved by the candidate's advisor.

## Fees

Fees, in addition to tuition, will be assessed for all applied hours and recitals. (Consult the Music Department for details.)

## Area of Study: Conducting (33 credits)

### Required Courses

MUS 471	Graduate Theory Review	3
MUS 477	Graduate Music History Review	3
MUS 527	History and Analysis of the Symphony	3
	Music Theory	3
	Music History and Literature	3
	Conducting	9
MUS 450	Research Methods	3
MUS 580	Ensemble Performance	1
MUS 540	Graduate Recital/Analytical Paper	4

MUS 471: Students must make a B or better in MUS 471 before taking additional music theory courses.

MUS 477: Students must make a B or better in MUS 477 before taking additional music history courses.

## Area of Study: Music Education (31 credits)

### Required Courses

MUS 471	Graduate Theory Review	3
MUS 477	Graduate Music History Review	3
	Music Theory	3
	Music History and Literature	3
	Music Education	9
	Approved Elective	3
MUS 450	Research Methods	3
MUS 598	Special Research Programs	1-4
	or	
MUS 599	Master's Thesis	0-15

Students must make the grade of B or better in a course for it to count toward degree completion.

MUS 471: Students must make a B or better in MUS 471 before taking additional music theory courses.

MUS 477: Students must make a B or better in MUS 477 before taking additional music history courses.

## Area of Study: Performance (33 credits)

### Required Courses

MUS 471	Graduate Theory Review	3
MUS 477	Graduate Music History Review	3
	Music Theory	3
	Music History and Literature	3
	Applied	8
	Pedagogy and Literature	4
MUS 450	Research Methods	3
MUS 580	Ensemble Performance	1
MUS 540	Graduate Recital/Analytical Paper	4

MUS 471: Students must make a B or better in MUS 471 before taking additional music theory courses.

MUS 477: Students must make a B or better in MUS 477 before taking additional music history courses.

# PHYSICS

Department website: <http://physics.nmsu.edu/>  
(575) 646-3831

[physics@nmsu.edu](mailto:physics@nmsu.edu)

*S. Zollner, department head, Ph.D.(Stuttgart)– experimental condensed matter and applied physics; V. Papavassiliou, graduate program director, Ph.D.(Yale)– nuclear and particle physics; R. L. Armstrong, Ph.D.(Johns Hopkins)– optics and laser physics; C. W. Bruce, Ph.D.(New Mexico State)– applied optics; M. Burkardt, Ph.D.(Erlangen)– theoretical nuclear and particle physics; M. DeAntonio, Ph.D.(New Mexico State)– applied optics; M. Engelhardt, Ph.D.(Erlangen)– computational nuclear and particle physics; E. Fohntung, Ph.D.(Freiburg)– materials science, neutron and X-ray scattering; W. R. Gibbs, Ph.D.(Rice)– theoretical nuclear physics; G. H. Goedecke, Ph.D.(Rensselaer)– theoretical physics, optics; T. M. Hearn, Ph.D.(Cal Tech)– seismic tomography, seismology; Stephen Kanim, Ph.D.(University of Washington)– Physics Education; B. Kiefer, Ph.D.(Michigan)– computational condensed matter physics, mineral physics; H. Nakotte, Ph.D.(Amsterdam)– materials science, neutron scattering; J. Ni, Ph.D.(Cornell)– geophysics, seismology; S. F. Pate, Ph.D.(Pennsylvania)– nuclear and particle physics; J. Urquidí, Ph.D.(Texas Tech)– materials science, neutron and X-ray scattering; I. Vasiliev, Ph.D.(Minnesota)– computational materials science; Xiaorong Wang, Ph.D.(Hua-zhong Normal)– nuclear and particle physics*

**DEGREE: Master of Science**

**MAJOR: Physics**

**CONCENTRATION: Space Physics**

**DEGREE: Doctor of Philosophy**

**MAJOR: Physics**

**MINOR: Physics**

The Department of Physics offers programs in many areas of emphasis leading to the M.S. and Ph.D. degrees. Admission to these programs is competitive and selection of applicants is based on undergraduate and/or previous graduate grade-point averages, performance on the general and subject Graduate Record Examination, other evidence of prior academic and research accomplishments submitted by the applicant, and references, as well as matching of the applicant's research interests to the Department's research activities, as described by the student's statement of purpose, in the case of applicants for the doctoral program.

The M.S. in Physics with a concentration in Space Physics program provides students with a strong foundation in physics with an intensive focus on space physics. Graduate study in space physics at the master's level prepares graduates for continued and specialized study toward the doctorate program in space-related fields as well as for challenges they will confront in space industrial and government settings.

All degree-seeking graduate students must satisfy the relevant Graduate School requirements, pass a qualifying examination based on undergraduate physics courses at the 400 level, successfully complete a 3-credit, 500-level laboratory, and demonstrate or develop knowledge of computer programming. Additional course requirements are described below; courses taken S/U may not be used to satisfy any of the degree requirements, including the lab requirement for Master's and Ph.D. students.

The qualifying and comprehensive examination outcomes are decided by vote of the entire faculty, based on the recommendations of the corresponding examination committees. For the qualifying examination, the faculty may decide that a student pass at the doctoral level; pass at the master's level; be requested to retake the exam at the next available opportunity; or terminate graduate study. For the written part of the comprehensive examination, the faculty may decide that a student be given an unconditional pass; be given a conditional pass, with the requirement that the student produce additional evidence of research accomplishments during the oral part of the exam before being granted admission to candidacy; repeat the written part the next time it is offered; or terminate graduate study. In addition, the faculty may decide to discontinue financial support to a student based on the student's performance on the qualifying or comprehensive examination. Students will receive written notification of the exam's outcome from the Graduate Physics Program Head within 30 days of the exam. Appeals must be addressed to the Physics Department Head within 30 days of receiving written notification of the exam's outcome and will be decided by the physics faculty.

A student granted an unconditional or conditional pass on the written part of the comprehensive examination must take the oral part in the same semester that the written part was taken; the student's Ph.D. committee makes the final decision, following the oral part of the comprehensive examination, on admission of the student to the candidacy to the doctoral degree.

Students may choose areas of emphasis from a variety of experimental, theoretical, and computational re-search programs in the department. The current major research areas of the department include atmospheric physics, condensed matter physics/materials science, geophysics, optics, particle and nuclear physics, physics education, and others. These research projects are supported by multimillion-dollar funding by various federal agencies and two national laboratories within the state of New Mexico: Los Alamos National Laboratory and Sandia National Laboratories. In addition to the in-house research, the department conducts collaborative research programs with the Brookhaven National Laboratory, the Center for Integrated NanoTechnologies, Los Alamos National Laboratory, Sandia National Laboratories, the Thomas Jefferson Laboratory, Fermilab, Air Force Research Laboratory and other national and international laboratories.

The department is housed in a newly- renovated building which contains research laboratories, classrooms, offices, and a computational laboratory.

### DEGREE: MASTER OF SCIENCE MAJOR: PHYSICS

For the master's degree, students must also successfully complete or transfer at least 30 course credits and pass a final oral examination or the doctoral comprehensive examination. Of these 30 credits, at least 21 must be in physics/geophysics, at most 3 may be for individual study or other informal courses, at most 6 may be for a thesis, and at most 9 may be numbered between 450 and 499. A master's thesis is optional.

**For the master's degree with a concentration in Space Physics, students must successfully complete the following physics core and specialized courses:**

PHYS 551	Classical Mechanics	3
PHYS 593	Advanced Experimental Nuclear Physics	3
PHYS 511	Mathematical Methods of Physics I	3
	or	
PHYS 495	Mathematical Methods of Physics I	3
PHYS 497	Introduction to Space Plasma Physics	3
	or	
PHYS 597	Space Plasma Physics	3
PHYS 554	Quantum Mechanics I	3
	or	
PHYS 454	Intermediate Modern Physics I	3
PHYS 561	Electromagnetic Theory I	3
	or	
PHYS 461	Intermediate Electricity and Magnetism I	3
PHYS 584	Statistical Mechanics	3
	or	
PHYS 480	Thermodynamics	3

### CONCENTRATION: Space Physics

**In addition, all physics M.S. students with a concentration in Space Physics must take a minimum of three elective courses in their specialization from the following list.**

ASTR 535	Observational Techniques I (f)	3
ASTR 575	Computational Astrophysics	3
ASTR 620	Planetary Science I	3
ASTR 698	Special Topics.	1-9
E E 460	Space System Mission Design and Analysis	3
GPHY 540	Physics of the Earth and Planetary Interiors	3
M E 533	Computational and Theoretical Fluid Mechanics	3
PHYS 576	Advanced Computational Physics I	3
	or	
PHYS 476	Computational Physics	3

PHYS 591	Advanced High-Energy Physics I	3
	or	
PHYS 491	High Energy Physics I	3

### DEGREE: DOCTOR OF PHILOSOPHY

For the Ph.D. degree, students must also pass the doctoral comprehensive examination, carry out original research, complete a dissertation, and pass a final oral examination. They must also pass or transfer at least 36 credits in formal courses numbered above 500 in physics/geophysics, including 24 credits of core graduate courses, and complete at least 6 credits of formal courses numbered above 600. The total number of credits, including formal and informal course credits and a minimum of 18 dissertation credits, must be at least 72. Financial support is available to graduate students in physics through teaching and research assistantships and fellowships. Inquiries about these opportunities should be directed to the graduate program director

### MAJOR: PHYSICS

**Core courses for the Ph.D. program are:**

PHYS 511	Mathematical Methods of Physics I	3
PHYS 551	Classical Mechanics	3
PHYS 554	Quantum Mechanics I	3
PHYS 555	Quantum Mechanics II	3
PHYS 561	Electromagnetic Theory I	3
PHYS 562	Electromagnetic Theory II	3
PHYS 576	Advanced Computational Physics I	3
PHYS 584	Statistical Mechanics	3

## PSYCHOLOGY

**Department website:** <http://psych.nmsu.edu/>  
(575) 646-2502  
[domsimon@nmsu.edu](mailto:domsimon@nmsu.edu)

*D.A. Simon, department head, Ph.D.(California- Los Angeles)– cognition, learning and performance; I. Dolgov, Ph.D.(Arizona State University)– perception and action, natural user interfaces, embodied cognition, human factors; M. J. Guynn, Ph.D.(New Mexico)– human memory; M.C. Hout, Ph.D.(Arizona State University) - visual cognition; T. Ketelaar, Ph.D.(Michigan)– social psychology, emotion; J. K. Kroger, Ph.D.(California-Los Angeles)– biopsychology, cognitive neuropsychology; J. MacDonald(Purdue)– engineering psychology, auditory perception; L.J. Madson, Ph.D.(Iowa State)– scholarship of teaching & learning, gender, sexuality; M.J. Marks, Ph.D.(Illinois, Urbana- Champaign)– social psychology, sexual behaviors, relationships; L.A. Thompson, Ph.D.(California-Santa Cruz)– developmental psychology, cognitive psychology; D.Trafimow, Ph.D.(Illinois, Urbana-Champaign)– social cognition.  
Support Faculty: J.R. Cowie, Ph.D.(Strathclyde University, Glasgow, Scotland) - automatic language processing, psycholinguistics; P. Foltz, Ph.D.(Colorado)– cognition, human-computer interaction; D. Gillan(Texas)– human-computer interaction, perception; D. Hunt(Emeritus) Ph. D.(Ohio State)– human factors; V. S. Johnston(Emeritus), Ph.D.(Edinburgh)– biopsychology, comparative, psychopharmacology, neuropsychology; A. Y. Lee, Ph.D.(Colorado)– cognition, learning, human-computer interaction; J. E. McDonald,(emeritus), Ph.D.(New Mexico State University)– cognitive psychology, engineering psychology; W. C. Ogden, Ph.D.(New Mexico State)– human computer interaction, natural language processing; K. Paap(Emeritus) Ph.D.(Wisconsin)– psycholinguistics; R. Schvaneveldt(Emeritus) Ph.D.(Wisconsin)– engineering psychology, aviation; W. Stephan(Emeritus) Ph.D.(Minnesota)– stereotyping and prejudice, cross-cultural psychology*

**DEGREE: Master of Arts  
MAJOR: Psychology**

**DEGREE: Doctor of Philosophy  
MAJOR: Psychology**

**MINOR: Psychology**

### Admission

The Department of Psychology offers graduate work leading to the Master of Arts and Doctor of Philosophy degrees. To maximize consideration for

admittance, candidates should submit applications by January 15. Note that the Psychology Department does not offer training in counseling or clinical psychology.

Students will be admitted to graduate study on the basis of their potential for achievement in research, scholarship, and teaching. The most promising applicants will be accepted. Because the number of students that the department can successfully accommodate is limited, it will not always be possible to admit all qualified applicants. The admissions committee will consider any material that a candidate for admission wishes to present. Application forms and instructions are available here: <http://prospective.nmsu.edu/graduate/apply/index.html>. The minimum application consists of the following:

1. A completed Graduate School admission application.
2. Complete transcripts of all college work.
3. Scores on the General Graduate Record Examination (minimum acceptable values are available at [psych.nmsu.edu](http://psych.nmsu.edu)). Scores on the GRE Psychology test are not required.
4. Three letters of recommendation from professors, employers, or others qualified to evaluate your potential for graduate work.
5. A curriculum vitae or resume.
6. A personal statement explaining how graduate work at NMSU fits your educational and career goals, and, an indication of the faculty members whose work is of particular interest to you.

Students with bachelor degrees should apply for admittance to the master's program even if their eventual goal is a Ph.D.

Students with a master's degree in psychology-related disciplines or from other institutions may apply directly to the Ph.D. program. Admission to the doctoral program is frequently made conditional upon one or more of the following: completion of a research thesis, completion of either course work or qualifying exams in three of the core course areas; and completion of either course work or qualifying exams in masters-level quantitative methods.

A number of potential minors are available to interested students, including a minor in statistics. Additional information about a minor may be found in the listing of the home department in this catalog.

#### **DEGREE: MASTER OF ARTS MAJOR: PSYCHOLOGY**

The department offers an M.A. degree in general experimental psychology. The program provides students with sufficient electives to emphasize a particular sub-area of experimental psychology. The program is designed to provide graduates with the tools and knowledge necessary for further training at the doctoral level or for employment in industry or government. Students are required to: (1) complete a first-year research project; (2) complete three of the nine core courses (perception, learning, behavioral neuroscience, cognitive neuroscience, cognitive, developmental, engineering, history & systems, or social); (3) take three required courses in quantitative skills; and (4) complete a research thesis. Students should also register for one credit of Research Seminar (PSY 590) each semester.

#### **DEGREE: DOCTOR OF PHILOSOPHY MAJOR: PSYCHOLOGY**

The Ph.D. in psychology is offered in the major areas of cognitive, engineering, and social psychology. Ph.D. candidates are required to: (1) complete four of the nine core courses (sensation & perception, learning, behavioral neuroscience, cognitive neuroscience, cognitive, developmental, engineering, history and systems, or social), at least one which must be the basic course from one of our three programs, viz. cognitive, engineering, or social psychology; (2) complete three required courses in quantitative skills, plus a minimum of 6 additional credits in methods/ statistics; (3) pass comprehensive written and oral exams in their area (cognitive, engineering, or social); (4) pass a final oral examination that consists primarily of an evaluation of the dissertation and the candidate's defense of it, but may extend over the entire field of the candidate's study, and (5) complete a work-related training requirement (i.e. complete an internship of at least 3 months duration OR teach at least one 3-credit undergraduate course independently; pre-teaching requirements listed on [psych.nmsu.edu](http://psych.nmsu.edu)). Students should also register for one credit of Research Seminar (PSY 590) each semester.

#### **MINOR: PSYCHOLOGY**

Students may earn a minor in psychology at the M.A. or Ph.D. level by completing three of the nine core courses (perception, learning, behavioral neuroscience, cognitive neuroscience, cognitive, development, engineering or human performance, history & systems, or social), at least one of which must be the basic course from one of our three programs, viz. cognitive, engineering, or social psychology.

## **SOCIOLOGY**

**Department website:** <http://sociology.nmsu.edu>  
(575) 646-3448

**Program Director: Dr. Sandra Way**  
[sway@nmsu.edu](mailto:sway@nmsu.edu)

*D. LoConto, Ph.D. (Oklahoma State University) classical American social thought, leisure studies, race and ethnic studies; P. Hoffman, Ph.D. (University of Nebraska)— sociology of the family, environment and child well-being; K. Hovey, Ph.D. (University of New Mexico)— rural and urban communities, social control, criminological theory; C. A. Newby, Ph.D. (University of Texas at Austin)— race/ethnic/minority, relations; C. Pelak, Ph.D. (Ohio State University)— social inequalities, race and ethnicity, sociology of sport; J. Steinkopf-Rice, Ph.D. (Washington State University)— gender, globalization, communities; J.C. Rice, Ph.D. (Washington State University)— environment, society and technology, political sociology; S. Way, Ph.D. (University of Arizona)— sociology of education, gender, juvenile delinquency; K. Wosick, Ph.D. (University of California, Irvine)— sexuality, gender, family social psychology, qualitative research methods.*

**DEGREE: Master of Arts  
MAJOR: Sociology**

**DEGREE: MASTER OF ARTS  
MAJOR: SOCIOLOGY**

#### **The Southwest and Border Region**

Our unique location attracts faculty who are interested in peoples of the southwest, particularly Hispanics/Latinos and American Indians. In addition, our proximity to the U.S.-Mexico border provides an ideal laboratory for the examination of such issues as globalization, transnational migration and the consequences of border development.

#### **Social Inequality**

Our faculty members examine the intersection of race, class and gender oppression in their teaching and research, with special attention to educational, rural/urban, ecological and global disparities. One goal of this examination is to address social problems such as poverty and racial/ethnic inequality.

The program is designed to prepare students for doctoral study in sociology and for employment in research and applied areas of the field. In addition to the on-campus program, we offer an online MA for students who are geographically distant from the NMSU main campus or who have full time jobs. Through small seminars, on campus graduate students engage in discussions of subjects that often result in thesis and internship topics. Regardless of course format, faculty members and students work toward the mutual goal of developing each student's full potential.

Students seeking a master's degree in sociology should have taken one undergraduate course each in methods and statistics or their equivalent. Students who have not taken these courses should complete them before beginning their graduate study, or as soon as possible, in consultation with an academic advisor.

#### **Program Options and Requirements**

Graduate students in sociology have two program options, thesis or non-thesis. Faculty consider the students special interests and career plans in advising regarding their choice of program options. The thesis option is typically selected by students who intend to pursue a Ph.D. degree, while the non-thesis option is commonly pursued by those desiring immediate employment in research and applied areas in government, education, social welfare and health. The non-thesis, coursework only option is currently the only option available for on-line MA students. All students must pass a final master's examination.

#### **Thesis Program Requirements**

In addition to the successful completion of an acceptable master's thesis, students who choose this option will take a minimum of 36 credit hours of graduate work distributed as follows:

- SOC 501, SOC 551, SOC 552, SOC 553 (12 credits total), to be taken within the first 27 hours of graduate credit. A grade of B- or better is required to receive credit for each of these core courses.
- SOC 599 (6 credits) Thesis
- 18 credits of additional 500 level Sociology course work to be taken in consultation with the sociology graduate student's advisor.
- Final master's oral examination covering all general coursework and the thesis.

**Non-Thesis Program Requirements: Coursework Only**

Students who choose this option will take a minimum of 36 credit hours of graduate work distributed as follows:

- SOC 501, SOC 551, SOC 552, SOC 553 (12 credits total), to be taken within the first 27 hours of graduate credit. A grade of B- or better is required to receive credit for each of these core courses.
- 24 credits of additional 500 level course work to be taken in consultation with the sociology graduate student's advisor.
- Final master's written examination covering all general coursework. In some cases, with the permission of the director of graduate studies, on-campus students may complete a special research project that will include a final master's oral examination covering all general coursework and the research project.

**Admission Requirements**

To apply for admission to the Sociology MA Program, and the Graduate School, submit the following through <http://prospective.nmsu.edu/graduate/apply/index.html>

- Application form and fees
- Official undergraduate and graduate transcripts from all colleges and universities attended
- A personal statement from the candidate addressing graduate school objectives and interests
- Letters of recommendation from three persons familiar with the candidate's academic record

An undergraduate grade-point average of 3.0 or higher is strongly recommended. On-campus applicants wishing to apply for a graduate assistantship and applicants wishing to apply for the online program should apply by February 15.

## SPANISH

Department website: <http://www.nmsu.edu/~langling/>  
(575) 646-3408

[jelongwe@nmsu.edu](mailto:jelongwe@nmsu.edu)

*J. Longwell, Graduate Director, M.A. (New Mexico State University); J. Barquet, Ph.D. (Tulane); J. M. Garcia, Ph.D. (Kansas); S. Herrera, Ph.D. (New Mexico); P. MacGregor-Mendoza, Ph.D. (Illinois-Champaign-Urbana); G. Moreno, Ph.D. (Arizona); B. Pollack, Ph.D. (California-Santa Barbara); D. Villa, Ph.D. (New Mexico); M. Waltermire, Ph.D. (New Mexico)*

**DEGREE: Master of Arts****MAJOR: Spanish****MINOR: Spanish**

The Department of Languages and Linguistics offers a Master of Arts in Spanish, which may be completed through our program on the main campus or completely online. Students are asked to specialize in either linguistics or literature. For non-thesis students, a specialization consists of a minimum of 27 credit hours, for thesis students, a specialization consists of a minimum of 24.

**Admission Requirements**

Admission requirements include a BA in Spanish. An undergraduate Grade Point Average (GPA) of 3.0 or above, which includes at least 12 semester hours of upper-division undergraduate courses in Spanish with a GPA of at least 3.0. Students must also satisfy general requirements of the Graduate School and submit the proper electronic online application and transcripts at the Graduate School website. Students must also complete a secondary admission packet (also submitted online through the Graduate School electronic application portal), which should include:

- A current resume (C.V.) in Spanish
- Three (3) letters of recommendation from qualified professionals (written within the last six months), preferably from past professors, that address the applicant's academic record.
- A writing sample in Spanish (critical or creative writing texts). If you do not have a six-page paper, you may submit multiple shorter works totaling six pages.
- A Language Evaluation Form (available for download at the departmental website) completed and signed by a qualified language evaluator. If you have an official ACTFL OPI rating certificate, this may be submitted in lieu of the Language Evaluation Form.
- An introductory letter in Spanish to include:

- A brief biography of one or two paragraphs along with your goals and objectives for obtaining a Master's degree in Spanish
- A statement of interest in either the residential (on-campus) program or the online program
- A statement of your prospective area of interest (Linguistics or Literature), and
- Your declaration of interest in being considered for a Graduate Teaching Assistantship (this option is only available for the residential [on-campus] program).

Only completed applications will be reviewed. Again, all materials should be submitted via the Graduate School electronic application portal. No materials should be sent directly to the department. Applying to the program does not guarantee admission to the program. It is the applicant's responsibility to ensure that all materials have been submitted correctly.

**Application deadlines: September 15** for admission for the following Spring semester (which begins in January), and **January 15** for admission for the following Fall semester (which begins in August). Students will be advised upon their formal acceptance into the program.

**MAJOR: SPANISH****The Degree Plan**

The degree plan requires a minimum of 36 credits in Spanish, of which at least 30 must be earned at the 500 level, and the remainder above the 450 level. The courses should be concentrated in the student's chosen area of study (linguistics or literature) as each student will be tested on a reading list that corresponds to each area study. A thesis is optional. Students authorized to complete a thesis may count a maximum of 6 credits of thesis work toward the degree. At the present time, the thesis option is not available for online-only students. There are no required core courses at this time and a student should work closely with his/her advisor and the Graduate Director to establish an appropriate individual degree plan.

All students in either the on-campus or online program may complete a minor at the master's level by taking 9 credits (3 courses) at the 500 level or above, in another area (department) of study, or within the department itself. For instance, a student studying linguistics may wish to obtain a minor in literature or a student studying literature may wish to obtain a minor in linguistics. In either case, the minor credits count as part of the 36 total credits required for the degree. In all cases, the student should work closely with the Graduate Director to ensure his/her particular plan of study is acceptable to the program.

**Linguistics area of study courses include:**

SPAN 507	Technology Enhanced Language Learning	3
SPAN 508	Teaching Literature with Technology	3
SPAN 509	Teaching Culture with Technology	3
SPAN 510	Assessing the National Standards	3
SPAN 540	Introduccion a la Linguistica	3
SPAN 545	Advanced Dialectos del Espanol	3
SPAN 558	Bilinguismo	3
SPAN 560	Advanced Spanish Language Acquisition	3
SPAN 561	Advanced Spanish Phonetics	3
SPAN 562	Advanced Spanish Phonology	3
SPAN 570	Advanced Study in Technical Translation	3
SPAN 580	Research Methodology in Spanish Linguistics	3
SPAN 584	Spanish Morphosyntax	3
SPAN 585	Language Assessment	3
SPAN 589	Spanish Sociolinguistics	3
SPAN 591	Advanced Study in History of the Spanish Language	3
SPAN 592	Advanced Structure of Spanish	3
SPAN 593	Advanced Studies in U.S. Spanish	3
SPAN 594	Theory and Methodology of Spanish Pedagogy	3
SPAN 595	Advanced Topics in Applied Spanish Linguistics	3
SPAN 597	Advanced Strategies for Teaching Spanish for Heritage/Native Speakers	3

SPAN 595: may vary by course subtitle

**Literature area of study courses include:**

SPAN 500	Methods of Research and Literary Criticism	3
SPAN 512	Contemporary Spanish-American Poetry	3
SPAN 520	Hispanic Micro Fiction	3
SPAN 521	Advanced Cuban Literature	3
SPAN 528	Advanced Hispanic Literature of the U.S.	3
SPAN 546	Advanced Poesia Modernista	3
SPAN 547	Advanced Hispanic Film	3
SPAN 548	Advanced U.S.-Hispanic Film	3
SPAN 552	Advanced Literature of the Mexican Revolution	3
SPAN 555	Advanced Spanish-American Literature Through the 18th Century	3
SPAN 556	Advanced 19-Century Spanish-American Literature	3
SPAN 563	Advanced Study in Mexican Literature	3
SPAN 564	Advanced Caribbean Literature in Spanish	3
SPAN 566	Contemporary Spanish-American Novel	3
SPAN 567	Advanced Study in Chicano Literature	3
SPAN 573	Advanced Study in Creative Writing	3
SPAN 581	Advanced Prosa Modernista	3
SPAN 583	Advanced Study in Spanish-American Women Writers	3
SPAN 586	Contemporary Spanish-American Essay	3
SPAN 587	Contemporary Spanish-American Short Story	3
SPAN 588	Contemporary Spanish-American Drama	3

Courses that may apply to either area include SPAN 590 (see subtitles in schedule of courses to confirm subject of the course) SPAN 598, SPAN 599 (both courses require a course proposal and prior approval).

**Additional Language Requirement**

For both the on-campus and online degrees, the department requires that students fulfill a second language requirement (in addition to English and Spanish) by following an approved course of study. Typically, this is completed by taking a four-semester course of study, but may vary according to the languages available.

Options for completing this requirement include taking classes at a local Community College or University, or online. Some students have met this requirement by studying abroad through NMSU. Students should consult the Graduate Director to establish a plan and discuss how this requirement will be met. NOTE: evidence of fulfilling the second language requirement must be provided to the Graduate Director BEFORE taking final examinations.

**English Language Requirement**

International students are required to demonstrate proficiency in English and meet all international admissions requirements prior to beginning their program of study. Please see the section of the Graduate Catalog on international admissions requirements and scores required for either the TOEFL or IELTS exam. NOTE: evidence of fulfilling the English Language Requirement must be provided to the Graduate Director AND the Graduate School BEFORE taking final examinations.

**Final Examinations**

Students must successfully complete a final department examination (generally during the final semester of coursework) that is partially written and partially oral. Please consult the Graduate Director for specific information on dates and format for these exams. Final examinations are only available during the Fall and Spring semesters.

**Areas of Interest/Reading List**

As stated previously, each student needs to select an area of interest - Linguistics or Literature. At the end of the student's degree, the final examinations (written and oral) will be based on the readings from the readings list in the student's selected area of study. For example, a student that has opted to specialize in literature is responsible for reading all the materials on the Literature Reading List. Likewise, a student that has opted to specialize in linguistics is responsible for reading all the materials on the Linguistics Reading List. The student is responsible for the reading list that was in place the year s/he started the program.

Each student is responsible for covering the reading materials listed. Please contact the Graduate Director for a detailed reading. Note that the list is dated, so

make sure to refer to the correct list that covers the year/semester the student started the program. The student is responsible for covering ALL the readings even if the student did not cover them as part of work done in class.

**Graduate Assistantships**

For the on-campus program only, the department awards graduate assistantships to qualified students. For this financial assistance, the student works up to 20 hours a week in departmental programs, chiefly in the teaching of elementary and intermediate Spanish courses in either the Heritage Language sequence or Spanish as a second Language sequence. Students interested in being considered for an assistantship should clearly state this interest in their introduction letter during the application process. The department offers a limited number of assistantships, and students should remember that not everyone that applies for this award receives one. Maintaining the award depends on the student's successful performance both academically and in the classes he/she teaches and is evaluated on a semester-by-semester basis. Students who receive an assistantship are required to take SPAN 594 (see course description) as part of their degree plan in order to help them prepare for teaching classes at NMSU.



# COLLEGE OF BUSINESS

Dean • *James Hoffman*

Associate Dean (Academic Programs) • *Kathleen Brook*

Interim Associate Dean (Research) • *Steven Elias*

Assistant Dean (Development) • *Anthony Casaus*

MBA Academic Advisor • *John Shonk*

## ACCOUNTING AND INFORMATION SYSTEMS

Department website: <http://business.nmsu.edu/accounting-is>  
(575) 646-4901  
kdm@nmsu.edu

*K. Melendrez, department head, Ph.D. (University of Arizona)— financial accounting; M. J. Billiot, D.B.A. (Mississippi State)— C.P.A.-managerial and financial accounting; T. Joo, Ph.D. (University of Arkansas) financial accounting and taxation; S. K. Mills, Ph.D. (Texas Tech)— C.P.A.-managerial accounting and fraud examination; E.A. Scribner (emeritus), Ph. D. (Oklahoma State)- C.P.A. financial accounting and accounting systems; C. Seipel, Ph.D. (Oklahoma State)— C.P.A., C.F.E.-financial accounting and auditing; T. Shonhiwa, Ph.D. (University of Nebraska)— financial accounting and cost; P. L. Tunnell, Ph.D. (Oklahoma State)— C.P.A.- taxation; Y. Zhang, Ph.D. (Texas Tech) - financial accounting.*

### DEGREE: Master of Accountancy

#### MINOR: Information Systems

#### MASTER OF ACCOUNTANCY (MACC)

The last two decades have witnessed a tremendous expansion in the knowledge base required for accounting professionals. The business environment has become increasingly complex, as evidenced by the growth in the body of national and international accounting and auditing standards, taxation, SEC, and other regulatory requirements. The accountant must also be well versed in communications and analytical skills, computer-based information systems, professional ethics, and global issues.

Neither the traditional four-year accounting program nor the MBA provides the educational breadth and depth necessary to fully prepare students for the demands now imposed by many accounting careers. The major objective of the Master of Accountancy (MAcc) program is to provide for these increased educational needs and to prepare students more adequately for careers as professional accountants in financial institutions, government, not-for-profit organizations, and public practice. The program is designed to provide a technical and theoretical foundation in accountancy at the advanced level and yet allow the student to take courses to accommodate individual needs.

The MAcc program is recommended for those students wishing to fulfill the 150-hour education requirement which most states, including New Mexico, have legislated as a requirement for taking the Uniform CPA Examination.

Graduate assistantships are available for a limited number of qualified students. Interested persons are urged to apply well within the deadlines set by the Graduate School. Inquiries should be addressed to the Master of Accountancy Director.

Admission requirements of the Graduate School must be met before the applicant may be admitted to the Master of Accountancy program. Consideration for admissions to the Master of Accountancy program is dependent on an applicant's undergraduate record and score on the Graduate Management Admissions Test (GMAT). Specifically, an applicant's undergraduate GPA is multiplied by a factor of 200 and the result is added to his/her GMAT score. The required total is 1100. Applicants scoring between 1000 and 1100 will be admitted to the program only with approval of the MAcc Admissions Committee. The minimum acceptable GMAT score is 400. An acceptable score on the GMAT must be submitted at least one month prior to the student's first enrollment unless the student meets one of the GMAT waivers listed below.

In addition to the aforementioned entrance requirements, an applicant's GPA in 7 upper division accounting prerequisites must be at least 3.0. For those students not receiving their undergraduate accounting degree at NMSU, it is expected that substantially all of the accounting prerequisite classes be from an

AACSB accredited business school or the application will need to be approved by the MAcc Admissions Committee. In this case the Admissions Committee may require that some of these prerequisite courses be retaken at an AACSB institution such as NMSU.

All grades, including those from the first attempt at repeated classes, will be used to compute upper division accounting prerequisite grade point averages to determine admission to the graduate program. At the suggestion of any faculty member, the MAcc Admissions Committee will review the application of a student whose potential might not be accurately reflected by this calculation.

#### GMAT Waivers:

The GMAT requirement is waived for those who:

1. Are graduates of an undergraduate program in accounting from a US AACSB accredited business school with at least a 3.25 GPA overall and a 3.25 GPA in their eight upper division accounting courses; or
2. Hold a recognized professional accounting credential (such as CPA, CMA, CIA, CFE); or
3. Hold a post baccalaureate degree (such as MBA, MS, MA, JD) from an approved, AACSB-accredited US university with a minimum 3.0 GPA in graduate course work.

Candidates for the Master of Accountancy degree who have an undergraduate degree in accounting must successfully complete a minimum of 30 graduate credits. Qualifying NMSU undergraduate accounting students can apply to have two graduate courses count for their undergraduate program as well as their graduate program. Candidates with an undergraduate degree in a field other than accounting must complete additional prerequisite work dependent upon previous courses taken. In any case, all candidates must present or fulfill the following requirements:

#### Foundation Courses

These courses are required of every student unless they can be waived. As a general policy, the courses upon which waivers are claimed must have been taken within seven years of enrollment in the program with a grade of B or better. A final decision regarding a waiver is based on an evaluation of each student's total educational and professional background.

#### The following is a list of these courses

(for a description of these courses, see the New Mexico State University Undergraduate Catalog):

ACCT 221	Financial Accounting	3
ACCT 222	Management Accounting	3
BCIS 338	Business Information Systems I	3
BLAW 316	Legal Environment of Business	3
ECON 251G	Principles of Macroeconomics	3
ECON 252G	Principles of Microeconomics	3
FIN 341	Financial Analysis and Markets	3
MGT 309	Human Behavior in Organizations	3
MKTG 303	Principles of Marketing	3

#### One of the following:

BCIS 485	Enterprise Resource Planning	3
MGT 344	Production and Operations Management	3
MGT 470	Project Management in Organizations	3

## MAcc CORE AND ELECTIVE COURSES (30 CREDITS)

### Core Courses:

Each student must complete 21 credits in accounting courses numbered above 520 or higher. These courses must include a research class (either ACCT 555 or ACCT 564) and ethics (ACCT 559) unless a student has already taken an equivalent course. In addition, three of the credits may be in upper division undergraduate elective accounting courses numbered 450 or higher. Other specific courses to be completed by each candidate will be determined in the advisement process.

### Other Courses:

All students must complete a total of 9 additional credits in other courses. Three of the credits must be ACCT 510, Technical and Professional Communication for Accountants, the rest must be from the approved list of electives or a waiver must be received to take a course not on the list. Neither ACCT 503 or any course fulfilling the foundation requirement may be included. Any student wishing to be waived from any of the above requirements may submit a petition in writing to the MAcc Director. Each request will be considered individually by the MAcc Committee.

## ACCOUNTING AND RELATED PREREQUISITES (21 CREDITS)

In addition to the foundation requirements, each student must present or complete the equivalent of an undergraduate major in accounting. This requires, at a minimum, 21 credits of accounting above the elementary level.

No coursework applied toward the MAcc degree, including the foundation requirements and the undergraduate accounting prerequisites, may be taken on an S/U basis.

The Graduate School requires that students maintain a grade-point average of at least 3.0 in all courses taken as a graduate student, as well as a 3.0 grade-point average in all graduate courses taken as a graduate student at NMSU. The Department of Accounting and Information Systems requires, in addition, that every candidate for the MAcc degree maintain at least a 3.0 grade-point average in all accounting courses used to satisfy the core and elective course requirement. MAcc students may not retake 500-level accounting courses for which they have previously received a grade without approval of the MAcc Admissions Committee.

### Comprehensive Examination

Satisfactory performance on a comprehensive examination is required for the degree.

**Thesis:** No thesis is required; however, under special approval, a candidate may elect to write a thesis under ACCT 599. Up to 6 credits may be earned for the thesis.

### Admission to Master of Accountancy

Class registration in any Accounting course numbered above ACCT 503 requires

1. prior full admission to the MAcc program, or
2. prior consent of the Director of the MAcc program.

## MINOR: INFORMATION SYSTEMS

This minor is for master's-level students who are not in the Masters of Business Administration (MBA) program. Students in the MBA program may choose a specialization in Information Systems (see the Business Administration section below).

To obtain a graduate minor in Information Systems (IS) students must satisfy the requirements as stated in the Graduate Catalog for a minor at the master's level. For it to appear on the transcript, the student must list the minor on the "Program of Study and Committee for Master's Student" (Application for Admission to Candidacy) and have it signed by the head of the department offering the minor.

The minor requires a minimum of 9 credits of graduate work.

### Two courses are required:

BCIS 540	Information Systems Analysis and Design	3
BCIS 595	Database Management Systems	3

### The third course is chosen from:

BCIS 558	Knowledge Management and Decision Support	3
BCIS 560	Enterprise Resource Planning & Business Processes	3
BCIS 565	Enterprise Information Portals	3
BCIS 575	Management of Information Security	3
BCIS 584	Object-Oriented Systems Development Techniques	3
BCIS 590	E-commerce Security	3

## APPLIED STATISTICS

Department website: <http://business.nmsu.edu/academics/economics-ib/economics-programs/master-of-science-estat/>  
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R. Adkisson, Department Head, Ph.D. (Nebraska); D. Clason, Ph.D. (Emeritus); D. Daniel, Ph.D. (Southern Methodist)—nonparametrics, general consulting; C. Gard, Ph.D. (University of Washington)—biostatistics; W. Gould, Ph.D. (North Carolina State)—biological sampling, wildlife and fisheries estimation; S. Knapp (Purdue University)—fish & wildlife, biometrics; R. Steiner, Ph.D. (Oklahoma State)—likelihood methods, discrete distributions, simulation; D.M. VanLeeuwen, Ph.D. (Oregon State)—statistics

### DEGREE: Master of Science

### MAJOR: Applied Statistics

### DEGREE: MASTER OF SCIENCE

### MAJOR: APPLIED STATISTICS

Offered by the Department of Economics, Applied Statistics and International Business, the Master of Science (M.S.) degree in applied statistics is designed to produce graduates proficient in current practices in statistics and able to enter directly into positions in industry, government, or private business. A person completing this degree will have the requisite skills to help researchers outside of statistics execute data analyses, design experiments, and/or plan and analyze biological surveys or surveys obtained by mail, phone, or personal interview. In addition, a person completing this degree will be familiar with the major statistical packages for computers. Students in the program will receive instruction in both theory and application of statistics, oriented strongly towards linear models and sampling, as well as extensive training and experience in statistical consulting.

The MS degree serves two basic groups of students: (1) students with degrees in areas other than mathematics who wish to strengthen their quantitative skills and (2) students with a degree in mathematics or statistics or those with a strong minor in mathematics who wish to apply statistics in one or more subject matter areas.

### ADMISSION

Requirements for regular admission to the MS in Applied Statistics include the following:

- A minimum 3.0 grade-point average overall or in the last two years of study. Complete graduate and undergraduate transcripts must be supplied.
- Three semesters of engineering calculus, equivalent to MATH 191G, MATH 192G, and MATH 291 at NMSU, completed with B or better grades.
- A one-semester course in introductory statistics. Students entering with only one undergraduate course in statistics will generally take A ST 505. NOTE: A ST 505 does not carry credit toward the M.S. in applied statistics.
- Three letters of reference from former professors or others able to evaluate the student's academic potential.
- A one- to two-page typewritten letter of application, discussing academic objectives, and professional plans, plus giving specific reasons for selecting statistics as a field for advanced studies.

In addition to the formal requirements above, some expertise in computer use or programming experience is strongly recommended.

Applicants whose native language is not English must take the Test of English as a Foreign Language (TOEFL). Fluency in written and spoken English is essential to successful completion of the program. Further information regarding the TOEFL can be obtained from Test of English as a Foreign Language, CN 6151, Princeton, NJ 08541-6151, USA.

### Theory (14 credits)

A ST 565	Statistical Analysis I	4
A ST 566	Statistical Analysis II	4
A ST 567	Applied Linear Models I	3
A ST 568	Applied Linear Models II	3

**Methods (6 credits)**

A ST 503	SAS Basics	2
A ST 504	Statistical Software Applications	1
A ST 506	Statistical Inference II	3

**Research (Research option) (4-6 credits)**

A ST 598	Special Research Problems	1-6
	or	
A ST 599	Master's Thesis	1-6

**Electives - (Research Option) (6-8 credits)****Electives - (Course-Only Option) (12 credits)****Consulting (3 credits)**

A ST 551	Introduction to Statistical Consulting	1
A ST 552	Advanced Statistical Consulting	1
A ST 553	Practicum in Statistical Consulting	1

**MINOR: APPLIED STATISTICS**

Master's-level students wishing to minor in applied statistics at the master's level must have at least 10 credits of 500-level applied statistics courses. The recommended courses for a general master's-level minor are A ST 503, A ST 504, A ST 505 and A ST 506. Depending on a particular student's background, it may be desirable to substitute other A ST courses for the minor. In accordance with Graduate School requirements, doctoral students must have at least 12 credits of 500-level applied statistics courses for a minor at the doctoral level.

Students wishing to obtain the minor in applied statistics should contact an applied statistics faculty member to recommend appropriate applied statistics course work to be included in the plan of study and to serve as the graduate committee representative from the minor area.

**BUSINESS ADMINISTRATION**

MBA Program website: <http://business.nmsu.edu/mba>

Ph.D. Program in Management website: <http://managementphd.nmsu.edu/>

Ph.D. Program in Marketing website: <http://marketingphd.nmsu.edu/>

Department Website: <http://business.nmsu.edu/>  
(575) 646-2821

R. Adkisson, Ph.D. (Nebraska)— international economics, public finance, institutional economics; T. R. Adler, Ph.D. (Cincinnati)— policy and strategy, collaborative networks, information systems; P. G. Benson, Ph.D. (Colorado State)— international human resource management, wage and salary administration; M. J. Billiot, D.B.A. (Mississippi State, C.P.A.)— managerial accounting; J. W. Bishop, Ph.D. (Virginia Tech)— human resource management and organizational behavior; L. Blank, Ph.D. (Tennessee)— micro economics, economics of regulated utilities; K. B. Boberg, Ph.D. (Penn State)— transportation, marketing; D. M. Boje, Ph.D. (Illinois)— organizational behavior, storytelling, organizational change; K. Brook, Ph.D. (Texas)— money and banking, macroeconomic theory; C. I. Chavez, Ph.D. (SUNY-Albany)— organizational behavior, leadership, power/influence; G. Clarkson, J.D., D.B.A. (Harvard) - American Indian law, tribal economic development, intellectual property strategy, business law; D. L.M. Clark, Ph.D. (University of Texas-Dallas)— entrepreneurship; N. H. Compton, J.D. (Emeritus); B.F. Daily, Ph.D. (Missouri-Rolla)— operations management; D. L. Daniel, Ph.D. (Southern Methodist)— non parametrics; M.E. de Boyrie, Ph.D. (Florida International)— international finance and trade issues; V. Diaz Avilez, Ph.D. (UTPA)— financial institutions and banking; P. W. Dorfman, Ph.D. (Emeritus); C. M. Downes, Ph.D. (New Mexico)— environmental/resource economics, development, international business; S. Elias, Ph.D. (Colorado State)— influence in the workplace, occupational self-efficacy, organizational commitment and social power; M. G. Ellis, Ph.D. (Emeritus); C. E. Enomoto, Ph.D. (Texas A&M)— microeconomic theory; C. A. Erickson, Ph.D. (Arizona State)— monetary theory, macroeconomics; C. Flinchbaugh, Ph.D. (University of Kansas)— Human resource management, employee well-being, organizational behavior, positive organizational scholarship; R. D. Fortin, Ph.D. (Kansas)— corporate finance and investments; C. Gard, Ph.D. (University of Washington)— biostatistics; D. A. Gegax, Ph.D. (Wyoming)— managerial economics, microeconomic theory; W. R. Gould, Ph.D. (North Carolina State)— biological sampling, wildlife and fisheries estimation; S. R. Gray, Ph.D. (Texas A&M)— entrepreneurship, small business management; G.M. Hampton, Ph.D. (Washington)— global marketing; M. Holt, J.D. (University of New Mexico) - business law, employment law; B. Huhmann, Ph.D. (Alabama)— advertising, consumer behavior; M. Hyman, Ph.D. (Purdue)— marketing theory and research; I.M. Jasso, Ph.D. (Houston)— advertising, strategy; M. Jun, Ph.D.

(Georgia State)— production and operations management; S.M. Knapp, Ph.D. (Purdue)— wildlife biometrics; Y.J. Kreie, Ph.D. (Arkansas)— information systems; Y. L. Lee, Ph.D. (Southern Illinois-Carbondale)— international finance, international trade, international monetary system, economic development; J. Leonhardt, Ph.D. (University of California Irvine) - Consumer Behavior and Marketing Research; J. Loveland, Ph.D. (Emeritus); K. J. Martin, Ph.D. (Purdue)— financial management, corporate control; R. McFerrin, Ph.D. (Texas A&M)— microeconomics, macroeconomics, economic history; J. T. McGuckin, Ph.D. (emeritus); K. D. Melendrez, Ph.D. (Arizona)— financial accounting; S. K. Mills, Ph.D. (Texas Tech)— C.P.A.-managerial accounting; C. Mora-Monge, Ph.D. (Toledo)— supply chain management, information systems; J. J. A. Nelson, Ph.D. (Missouri)— information systems; M. Niculescu, Ph.D. (University of Cincinnati)— modeling consumer behavior; R. Oliver, Ph.D. (New Mexico State)— information systems; N. A. Oretskin, J.D. (Case Western School of Law)— contract law/negotiation; Collin R. Payne, Ph.D. (Brigham Young)— marketing and consumer behavior; M. Pan, Ph.D. (Nebraska)— economic development, international economics, applied econometrics, general regional economics; J. T. Peach, Ph.D. (Texas)— quantitative economics, economic development; R. T. Peterson, Ph.D. (Washington)— marketing management; A. V. Popp, Ph.D. (Emeritus); J. Tim Query, Ph.D. (Georgia)— insurance, finance, risk management; C. Ricketts, Ph.D. (Mississippi State)— labor, health, development; S. Rogers, Ph.D. (Rutgers University)— human resource management, labor and employment relations, workplace diversity; G. A. Rosile, Ph.D. (Pittsburgh)— narrative research, organizational studies; H. Sankaran, Ph.D. (Houston)— corporate finance, investments; E. T. Sautter, Ph.D. (Emeritus) E. A. Scribner, Ph.D. (Emeritus); C. Seipel, Ph.D. (Oklahoma State)— C.P.A.-financial accounting, auditing; T. Shonhiwa, Ph.D. (University of Nebraska) financial accounting and cost; D.B. Smith, Ph.D. (Emeritus); W.L. Smith, Ph.D. (New Mexico State)— C.P.A.- taxation; R. L. Steiner, Ph.D. (Oklahoma State)— likelihood methods, discrete distributions; J. E. Teich, Ph.D. (SUNY-Buffalo)— quantitative management; P. L. Tunnell, Ph.D. (Oklahoma State)— C.P.A.-taxation; D. M. VanLeeuwen, Ph.D. (Oregon State)— statistics; B. Widner, Ph.D. (Colorado State)— urban/regional, public finance, development; E. S. Willman, Ph.D. (Emeritus); Y. Zhang, Ph.D. (Texas Tech) financial accounting

**DEGREE: Master of Business Administration****SPECIALIZATION: Agribusiness****SPECIALIZATION: Finance****SPECIALIZATION: Information Systems****DEGREE: Doctor of Philosophy****MAJOR: Business Administration****SPECIALIZATION: Management****SPECIALIZATION: Marketing****MINORS: Finance****Management****DEGREE: MASTER OF BUSINESS ADMINISTRATION****M.B.A. PROGRAM****(575) 646-8003****[mba@nmsu.edu](mailto:mba@nmsu.edu)**

The Master of Business Administration (MBA) program is a professional program designed to provide students with a solid background in business practices and the problem-solving and people skills needed to become successful leaders in the global business environment. Program graduates are prepared for administrative or managerial positions in a wide variety of organizations, both private and governmental. The M.B.A. program is accredited by AACSB International-The Association to Advance Collegiate Schools of Business.

**Admissions**

Applicants must meet the basic admission requirements of the Graduate School before they are considered for admission to the M.B.A. program. To be considered for admission to the MBA program, applicants must have:

1. completed an undergraduate degree with a GPA of at least 3.5 from an institution with business accreditation by AACSB International or ACBSP, or
2. completed the Graduate Management Admission Test (GMAT) with a minimum score of 400 and a combined GMAT score and undergraduate GPA such that (GPA x 200) + GMAT greater than or equal to 1050, or
3. received a graduate degree from a regionally accredited U.S. college or university, or
4. completed at least four years of relevant, full-time, post-degree, professional work experience with an undergraduate GPA of at

least 3.25 from an institution with business accreditation by AACSB International or ACBSP.

If required, official GMAT scores must be submitted to the MBA Program Office at least one month prior to initial enrollment in the program. A maximum of 9 credit hours of the required MBA courses may be completed prior to the student's acceptance into the MBA degree program.

### Registration in Master of Business Administration Classes

Registration in any of the eleven required MBA courses listed below requires:

1. admission to the Graduate School
2. acceptance into the "Senior Petitioner" program or,
3. consent of the Academic Associate Dean

### Background Knowledge

Although the MBA program is designed to encourage participation by students with a variety of educational backgrounds, the curriculum is fast paced. As a consequence, a minimum level of background knowledge is expected of all entering students, and those who are lacking the necessary background in any of the knowledge areas indicated below will be required to make up their deficiencies early in the program. Students may complete no more than 9 credits of required MBA courses prior to completion of the background knowledge courses.

Background knowledge may be demonstrated by successful completion (with a grade of A or B) of undergraduate courses in managerial accounting, financial accounting, macroeconomics, finance, marketing, statistics, and calculus. At NMSU, the relevant courses are ACCT 221 and ACCT 222 (or ACCT 500 and 501), ECON 251G, FIN 341 (or FIN 500), MKTG 303 (or MKTG 500), A ST or STAT 251, and MATH 142G. Knowledge of each of these subjects may also be demonstrated by completing examinations as designed by the College of Business. For more information on examinations, contact the MBA Office.

### Program Requirements (36 credits)

The MBA program consists of twelve courses beyond the background knowledge requirements. Eleven are required courses: ACCT 503, BCIS 502, BLAW 502, ECON 503, FIN 503, MGT 502, MGT 503, MGT 512, MGT 590, MKTG 503, and B A 590. One elective course is required in addition to the listed MBA courses. This elective must be selected from the approved course list on the MBA web page.

The Graduate School requires that students maintain a grade-point average of at least 3.0 in all courses taken as a graduate student, at NMSU. The MBA program requires, in addition, that every candidate for the MBA degree must graduate with at least a 3.0 grade point average in all courses required for the basic MBA degree.

The following course sequencing requirements must be satisfied:

1. B A 590 must be completed during the final term of the student's program and is only open to students who have been accepted into the MBA degree program. Effective with students entering in summer 2011, ACCT 503, BLAW 502, FIN 503, and MKTG 503 must be completed prior to enrollment in B A 590.
2. MGT 590 must be completed at the end of the student's program of study and is only open to students who have been accepted into the MBA degree program. All MBA coursework other than B A 590 must be completed prior to or during the same terms as MGT 590.

Students requesting transfer credit for any graduate courses taken before admission to the MBA must submit appropriate, written justification, including course descriptions, syllabi, etc. Transfers are generally limited to courses taken at AACSB accredited schools. Transfer credits for courses taken after admission to the program are generally not permitted, but advance approval should be requested and may be granted in exceptional situations.

Oral defense of the paper written in fulfillment of the requirements of B A 590 will constitute the final examination as required by the Graduate School and will be scheduled and completed in accordance with timetables prescribed by, and other requirements of, the Graduate School. A thesis is not required. With special approval, however, a degree candidate may elect to write a thesis with a least 6 credit hours earned under B A 599 in lieu of B A 590.

MBA students may elect to pursue one of several MBA specializations as described below.

### SPECIALIZATION: Agribusiness

Students who want to specialize in Agribusiness must take the following set of five AEEC courses in substitution of five courses included in the above "Required Course Work" list.

The five AEEC courses included in the specialization in Agribusiness are:

AEEC 511	Advanced Futures and Options Markets	3
AEEC 520	International Agricultural Trade Theory and	3

	Policy	
AEEC 526	Global Food Supply Chain Management	3
AEEC 551	Advanced Agribusiness Marketing	3
AEEC 556	Advanced Agribusiness Management	3

The five "Required Course Work" courses, for which the above courses are substituted collectively, are:

ECON 503	Managerial Economics	3
MGT 502	Operations Management	3
MGT 512	Quantitative Analysis for Business Decisions	3
MKTG 503	Marketing Management	3
	Elective course (from the approved list)	

Students in the specialization in Agribusiness who have not previously taken a course in Agricultural Policy will be required to take AEEC 545 prior to taking the five specialization courses. They will also need to complete ECON 371 as a program prerequisite.

### SPECIALIZATION: Information Systems

Students who want to specialize in Information Systems must take additional coursework beyond that required to complete the M.B.A. degree program.

Four courses, from the list below, constitute the specialization in Information Systems.

Any of these courses may also be used to fulfill the MBA elective requirement:

BCIS 540	Information Systems Analysis and Design	3
BCIS 560	Enterprise Resource Planning & Business Processes	3
BCIS 565	Enterprise Information Portals	3
BCIS 575	Management of Information Security	3
BCIS 580	Systems Design, Development, and Implementation	3
BCIS 584	Object-Oriented Systems Development Techniques	3
BCIS 585	Design of On-Line Business Systems	3
BCIS 590	E-commerce Security	3
BCIS 595	Database Management Systems	3

Students may choose certain combinations of the above BCIS courses to form recommended tracks and are encouraged to seek advising from the MBA Office or the Information Systems faculty in making course selections.

### SPECIALIZATION: Finance

MBA students who want to specialize in Finance must complete 3 of the following 4 courses plus 1 elective course in Finance numbered 500 or higher. (Finance 503 is a required MBA course and a prerequisite for each of the courses listed below). Students who took FIN 435 as undergraduates must substitute another 500 level finance course for FIN 535 and thus are required to take only 2 of the remaining 3 listed courses (FIN 545, FIN 555, and FIN 566). Any of the specialization courses may also be used to fulfill the MBA elective requirement.

#### Course Listing

FIN 535	Investment Concepts	3
FIN 545	Money and Capital Markets	3
FIN 555	Derivative Markets and Securities	3
FIN 566	Advanced Financial Management	3

### DUAL DEGREE—ENGINEERING/MBA PROGRAM

Highly motivated undergraduate engineering students who would like to apply their quantitative skills and technical expertise to the business environment should consider the dual degree program offered through the College of Engineering and the College of Business. Undergraduate students who are accepted into this program can, with full time enrollment and careful scheduling of their coursework, complete the MBA degree requirements in as little as one year beyond completion of the BS degree. Information regarding the dual degree program may be obtained from the College of Engineering or the MBA Program Office (GU 114).

**DEGREE: DOCTOR OF PHILOSOPHY**  
**MAJOR: BUSINESS ADMINISTRATION**

**Doctor of Philosophy in Business Administration**

The College offers a program leading to a Ph.D. degree. The faculty of the PhD Program in Business Administration is committed to training researchers and educators who will shape business scholarship, practice, and pedagogy. The program emphasizes preparing candidates to understand the complexities of modern business while they develop a specialized area of expertise in marketing or management. The PhD in Business Administration provides graduates with the opportunity to pursue a variety of career paths within academia and within industry. Currently concentrations are offered in management and marketing, and each of specializations admits students independently.

**Program Requirements**

- demonstrate competency in statistics and research methods;
- complete studies in a major field of concentration chosen from the departments of management or marketing in the College of Business;
- complete studies in a minor field of concentration or interest area that supports the student's research, teaching, and/or career goals;
- pass qualifying and comprehensive exams; and
- complete and successfully defend a doctoral dissertation.

## ECONOMICS AND ECONOMIC DEVELOPMENT

Department website: <http://business.nmsu.edu/economics-ib>  
 (575) 646-5682  
 (575) 646-2113  
[impat@nmsu.edu](mailto:impat@nmsu.edu)

**Department of Economics, Applied Statistics and International Business:**

R. Adkisson, department head, Ph.D. (Nebraska)—international economics, public finance, institutional economics; Larry Blank, Ph.D. (University of Tennessee, Knoxville)—microeconomic theory, managerial economics and regulatory economics; K. Brook, Ph.D. (Texas-Austin)—macroeconomic theory, monetary policy; D. L. Clason, Ph.D. (Kansas State)—linear models, government statistics; D. L. Daniel, Ph.D. (Southern Methodist)—nonparametrics; C. M. Downes, Ph.D. (University of New Mexico)—environmental/resource economics, development, international business; M. Ellis (Emeritus), Ph.D. (California-Riverside)—comparative economic systems, medical economics; C. Enomoto, Ph.D. (Texas A&M)—econometrics, economic theory; C. A. Erickson, Ph.D. (Arizona State)—monetary theory, macroeconomics; C. Gard, Ph.D. (University of Washington)—biostatics; D. A. Gegax, Ph.D. (Wyoming)—public utility economics, industrial organization; W. R. Gould, Ph.D. (North Carolina State)—biological sampling, wildlife and fisheries estimation; S.M. Knapp, Ph.D. (Purdue) wildlife biometrics; Y. L. Lee, Ph.D. (Southern Illinois-Carbondale)—international finance, international trade, international system, economic developments; B. N. Matta, (Emeritus) Ph.D. (Texas at Austin)—Economics; Randy McFerrin, Ph.D. (Texas A & M University)—micro theory, principles and American economic history; J. T. McGuckin (emeritus), Ph.D. (Wisconsin-Madison)—production economics, resource economics and policy; M. Pan, Ph.D. (Nebraska)—economic development, international economics, applied econometrics, general regional economics; J. T. Peach, Ph.D. (Texas-Austin)—quantitative economics, border studies, economic development; A.V. Popp, (Emeritus), Ph.D., (Northern Illinois)—public finance; C. Ricketts, Ph.D. (Mississippi State)—labor, health, development; D.B. Smith, (Emeritus), Ph.D. (Nebraska)—public utility economics, industrial organization; R. L. Steiner, Ph.D. (Oklahoma State)—likelihood methods, discrete distributions; D. VanLeeuwen, Ph.D. (Oregon State)—statistics; B. Widner, Ph.D. (Colorado State)—urban/regional, public finance, development; E. S. Willman, (Emeritus) Ph.D. (Indiana)—monetary policy, macroeconomic theory

**Department of Agricultural Economics and Agricultural Business:**

Terry L. Crawford, interim department head, Ph.D. (Cornell University)—marketing, policy and pricing, quantitative methods, trade; R. N. Acharya, Ph.D. (Auburn University)—food safety, logistics management, technology adoption, and marketing; S. Archambault, Ph.D. (University of New Mexico) Economics; L.B. Catlett, Ph.D. (Iowa State)—marketing, futures, economics; C. Clary, Ph.D. (North Carolina State)—marketing, commodity advertising; J. A. Diemer, Ph.D. (Colorado State)—natural resources, regional economics; J. M. Fowler, Ph.D. (Iowa State)—forestry and range economics; W. D. Gorman (Emeritus, Adjunct), Ph.D. (Oregon State)—agricultural business management, international marketing; J. Hawkes,

Ph.D. (New Mexico State)—range management; B. H. Hurd, Ph.D. (California-Davis)—water and natural resource economics; J. D. Libbin, Ph.D. (Iowa State)—farm management, production economics; J. Lillywhite, Ph.D. (Purdue)—agribusiness marketing; M. Patrick, Ph.D. (Michigan State)—Economic Development; R. Skaggs, Ph.D. (Utah State)—agriculture and natural resource policy; L. A. Torell, Ph.D. (Utah State)—range, ranch economics, production economics; F. A. Ward, Ph.D. (Colorado State)—resource economics, welfare economics

**DEGREE: Master of Arts**

**MAJOR: Economics**

**SPECIALIZATION: Public Utility Policy and Regulation**

**DEGREE: Doctor of Economic Development**

**GRADUATE STUDY IN ECONOMICS**

The Department of Economics, Applied Statistics and International Business cooperates with the Department of Agricultural Economics and Agricultural Business in offering graduate programs in economics, agricultural economics, and economic development. The programs are jointly administered by faculty from the two departments. The objective of the master's programs is to prepare students for professional positions in business, government, or research institutions and/or for further graduate studies leading to the Ph.D. degree. The Department of Economics, Applied Statistics and International Business offers a Master of Arts in economics and, as subcategories of the degree, options in regulatory economics, policy analysis and econometrics. For more information on the Master of Science degree in agricultural economics, refer to the Agricultural Economics section in this catalog. The objective of the Doctor of Economic Development is to provide advanced training in applied economic development.

**DEGREE: MASTER OF ARTS**

**MAJOR: ECONOMICS**

Candidates for the Master of Arts in economics must successfully complete a minimum of 30 graduate credits, (options may require more than 30 graduate credits). Twenty- one of the credits must have one of the four following prefixes: AECC, ECON, ECDV, or AG E. Twenty- four of the credits must be associated with courses numbered 500 or above. ECON 503 cannot be counted toward the major in Economics. All students must meet the requirements specified in the general regulations and requirements for admission to the Graduate School and to candidacy. Students preparing to enter the program are encouraged to complete the following: (a) one course in intermediate microeconomic theory and one course in macroeconomic theory with minimum grades of B; (b) one course in college-level calculus; and (c) one course in statistics, including simple regression. Those students not having completed these courses may be admitted with the requirement that the deficiencies be completed at the beginning of the graduate program. Those students interested in the option in regulatory economics are advised to complete two courses in college-level statistics.

**For the option in Public Utility Policy and Regulation, students must also complete:**

ECON 571	Regulatory Policy and Industry Analysis: Electricity I	3
ECON 572	Regulatory Policy and Industrial Analysis: Water and Natural Gas	3
ECON 573	Regulatory Policy and Industry Analysis: Electricity II	3
ECON 574	Advanced Seminar Regulatory Policy and Industry Analysis	3

**For the option in policy analysis, students must also complete the following courses:**

AECC 522	Public Sector Economics I	3
AECC 523	Public Sector Economics II	3
GOVT 530	Seminar in Public Policy	3
	6 additional credits agreed upon with the advisor	
	three-credit internship	
	or	
AECC 599	Master's Thesis	0-15

**For the option in Econometrics, students must also complete the following courses:**

ECON 545	Econometrics II	3
	6 graduate credits of A ST (Applied Statistics) at	

	the 500 level (excluding A ST 505)	
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**All students in the program must successfully complete a minimum of 30 credits including the following core courses:**

AEEC 501	Microeconomic Theory	3
AEEC 502	Macroeconomic Theory	3
AEEC 540	Econometrics I	3

Teaching and research assistantships are available to qualified applicants. It is not necessary to have a degree in economics to enter the graduate program or to receive financial assistance. An application and three letters of reference are required to be considered for any available assistantships. These forms can be obtained from the department.

### MINOR: ECONOMICS

Graduate students wishing to earn a minor in economics must complete 12 semester credit hours, including at least two courses from AEEC 501, AEEC 502, and AEEC 540. The remaining credit hours must come from ECON or AEEC courses numbered 500 or higher, excluding ECON 503, which cannot be counted toward the minor. Students pursuing the economics minor must fulfill the course prerequisites before enrolling in the graduate courses.

### CERTIFICATE: Graduate Certificate in Public Utility Regulation and Economics (PURE)

The certificate in Public Utility Regulation and Economics (PURE) is a professional educational program designed for post-baccalaureate students pursuing a career in the utility sector, with an electric utility company, natural gas utility, water distribution utility, or with a government agency regulating these types of companies. PURE students must meet the general regulations and minimum requirements for admission to the graduate school and complete 12 credit hours including ECON 571, ECON 572, ECON 573, and ECON 574. See departmental webpage for details.

### DEGREE: DOCTOR OF ECONOMIC DEVELOPMENT DED PROGRAM

The Doctor of Economic Development (DED) is a professional doctorate designed to provide advanced training for economic development professionals. It is not designed to prepare graduates for academic careers.

Candidates for the DED enter the program with the equivalent of a master's degree. DED students must successfully complete 60 graduate credits beyond the hours required for entry. All students must meet the requirements specified in the general regulations and requirements for admission to the Graduate School and to candidacy. DED minimum admission requirements include: (a) related master's degree or equivalent coursework; (b) one course in intermediate microeconomic theory and one course in intermediate macroeconomic theory with minimum grades of B; (c) one course in college-level calculus with a minimum grade of B; and (d) one course in statistics, including simple regression with a minimum grade of B. Additionally, students who have not completed graduate level courses in microeconomic theory, macroeconomic theory, and econometrics (AEEC 501, AEEC 502, AEEC 540) with grades of B or better will be required to successfully complete these courses early in the DED program.

**All students in the DED program must successfully complete the following core courses:**

ECDV 550	Introduction to Local and Regional Development	3
ECDV 651	Economic Development Theory	3
ECDV 661	Regional Economic Modeling I	3
ECDV 662	Regional Economic Modeling II	3
ECDV 664	Population Economics	3
ECDV 668	Economic Development Finance	3
ECDV 671	Sustainable Economic Development	3
ECDV 692	Seminar in Economic Development	3

ECDV 692: twice

**In addition, students will complete:**

ECDV 681	Urban Economic Development	3
ECDV 682	Rural Development	3
ECDV 683	Seminar in National Economic Development	3
	plus a specialty area (six semester hours)	
	12-15 semester hours of internship and final project, and sufficient elective credits to fulfill the 60 hour requirement.	

Comprehensive and oral exams will be given and will determine eligibility to continue in the program and/or to graduate.

Detailed and updated information is available on the departmental website.

### Graduate Study in Business Administration

The Department of Economics, Applied Statistics and International Business also cooperates with the other departments of the College of Business in offering programs leading to a Master of Business Administration degree and a PhD in Business Administration. Within the PhD program, the department offers a minor area of study. More information about these programs is available in this catalog under College of Business.

# COLLEGE OF EDUCATION

Dean • Michael Morehead

Associate Dean • James O'Donnell

Associate Dean for Research • Jonathan Schwartz

Assistant Dean for Budget and Planning • Gladys De Necochea

Director of Education Research and Budget • Juanita Hannan

## COUNSELING AND EDUCATIONAL PSYCHOLOGY

Department website: <http://cep.education.nmsu.edu>  
(575) 646-2121

*E. Arroyos, Ph.D., interim co-department head, (University of Iowa)- school psychology, traumatic brain injury, mentoring, multicultural competence; E. Adams, Ph.D., (Ohio State University)- multiculturalism & diversity, mindfulness, supervision; H. Cheng, Ph.D. (University of Missouri-Columbia)- attachment theory, help-seeking and mental health disparities, racial and ethnic minority psychology; H. Chun, Ph.D. (Missouri-Columbia)- school psychology, prevention of adolescent mental health and behavior problems, risk and protective factors; I. Torres Fernandez, Ph.D. (University of Iowa)- school psychology, prevention, classroom guidance; G. Dickson, Ph.D. (University of Iowa)- counselor education, multicultural training; L. L. Grayshield, Ph.D. (Nevada-Reno)- indigenous culture based methods in counseling & educational psychology; D. Harper, Ph.D. (New Mexico State University)-counseling psychology, integrated primary care, sustainability for behavioral health care, inter-professional training and utilization of integrated care teams; T. Hitter, Ph.D., (New Mexico State University)-counseling psychology, identity and self-concept, sexuality and sexual satisfaction; A. L. Lopez, Ph.D. (The University of Texas at San Antonio)- multicultural counseling, social justice, immigration, bilingual counseling/supervision, eating disorders and body image; J. P. Schwartz, Ph.D., (New Mexico State University) counseling psychology, gender roles, prevention, intimate violence; E. Vazquez, Ph.D. (University of Iowa)- school psychology, assessment, psychoeducational interventions, acculturation, ethnic and linguistic diversity; L. Vazquez, Ph.D. (University of Iowa)- counseling psychology, multicultural curriculum development and counseling, bilingual therapy, acculturation, identity development, and phenotype research; M. Waldo, Ph.D. (University of Utah)- counseling psychology, mental health counseling, relationship enhancement, group work, prevention*

**DEGREE: Master of Arts**

**MAJOR: Counseling and Guidance**

**CONCENTRATION: Counseling**

**CONCENTRATION: Educational Diagnostics**

**DEGREE: Specialist in Education**

**MAJOR: School Psychology**

**DEGREE: Doctor of Philosophy**

**MAJOR: Counseling Psychology**

The major thrust of the Counseling and Educational Psychology (CEP) Department is the preparation of personnel for work in counseling, educational diagnostics, school psychology, counseling psychology and related areas. Three graduate degrees are available: (1) Master of Arts, (2) Specialist in Education and (3) Doctor of Philosophy.

The CEP Dept. offers a Counseling Program which leads to a Master of Arts in Counseling and Guidance. The program is accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). It prepares professional counselors to perform mental health counseling in agencies, hospitals, private practice and schools. Successful completion of the Counseling Program qualifies students to pursue licensure as clinical mental health counselors with the New Mexico Counseling and Therapy Practice Board and licensure as school counselors with the New Mexico Department of Education. The 60-credit counseling curriculum requires two years full time or three years part time study on campus, and covers the following areas: human development; appraisal; diagnosis; treatment planning; individual, family and group counseling; consultation; career/life planning; addictions; research; and professional issues. Specialized training and supervised experience is offered in mental health agencies, hospitals and in schools.

The CEP Dept. offers a School Psychology Program that leads to an Educational Specialists (Ed. S.) degree in School Psychology. The program has national approval through the National Association of School Psychologists. The program provides additional education beyond the M.A. to prepare professionals for licensure as school psychologists in New Mexico and throughout the United States. The School Psychology Program prepares its candidates to work with preschoolers, children, adolescents, and families. The various settings where School Psychologists are employed include public schools and other organizations that require advanced assessment, counseling, consultation and other interventions. The program trains its candidates to serve students with diverse educational, psychological and emotional needs from various backgrounds. Such training also includes working with all school personnel to help make education a positive and rewarding experience for their students. Students admitted to the School Psychology Program also have the opportunity to achieve a Masters degree in Counseling & Guidance with a specialization in Educational Diagnostics on the way to obtaining the specialist degree. Students would need to complete additional curricular and field experiences and degree requirements.

The CEP Dept. offers a doctoral Counseling Psychology Program that leads to a Ph.D. in Counseling Psychology. The program is accredited by the American Psychological Association (for more information on this accreditation contact the Office of Program Consultation and Accreditation, APA, 750 1st Street, NE, Washington, DC 20002, 202.336.5979). The program is based on the scientist-practitioner model through which both research and service delivery skills are acquired. Graduates of the program are prepared to conduct research, provide service, teach and supervise. The program prepares students for licensure as psychologists. The three goals of the program are to:

1. Produce well-trained generalists in applied psychology capable of competently utilizing a wide variety of assessments, modalities and types of interventions, and in disseminating psychological information.
2. Nurture active learners and critical/scientific thinkers capable of integrative thinking, application of theory, hypothesis generation, and self-reflection.
3. To develop in students a contextual understanding of psychology and the environments in which they work and live so as to produce culturally-responsive, developmentally-aware, and strengths-based psychology professionals.

CEP faculty conducts periodic reviews of students' progress in the programs, including their academic performance, counseling and psychoeducational skills, professionalism, and ethics. An interview is required as part of the review. Deficits identified through faculty reviews may result in recommendations that students engage in remedial work or that they pursue alternative career goals.

For information on admission procedures and requirements of degree programs in Counseling and Educational Psychology, contact the department office. Test scores on the Graduate Record Examination (aptitude) are required of all applicants. Other requirements include but are not limited to the following: application and fee, official transcripts, three letters of recommendation, curriculum vita or resume, letter of intent and/or statement of purpose and list of completed upper-division and/or graduate course work related to counseling, school psychology, or counseling psychology. Interviews are required as a part of the selection process. For more information about the CEP Department and programs visit our website: <http://cep.education.nmsu.edu>.

## CURRICULUM AND INSTRUCTION

Department website: <http://education.nmsu.edu/ci/>  
(575) 646-4820

[gmartine@nmsu.edu](mailto:gmartine@nmsu.edu)

*J. L. Haynes Writer, Interim Department Head, Ph.D. (New Mexico)- critical multicultural & social justice education, Indigeneity, Native American education teacher preparation; B. Araujo, Ph.D. (New Mexico State) - critical pedagogy,*

bilingual education; H. P. Baptiste, Ed.D. (Indiana)—science elementary, E. Cahill, Ph.D. (Kent State)—early childhood education; J.F. Carmona, Ph.D. (Utah)—culture and society, sociology of education; R. C. Chavez, Ed.D. (New Mexico State)—curriculum and multicultural education; L. Cibils, Ph.D. (New Mexico State University)—tesol, bilingual education, language teaching; E. Egginton, Ph.D. (Syracuse New York)—critical pedagogy, bilingual education, research design, international and border education, education for peace and social justice, transformative international higher education partnerships; J. Freire Ph.D. (University of Utah)—bilingual education; M. L. Fahrenbruck, Ph.D. (Arizona)—language, reading & culture; H. S. Garcia, Ed.D. (New Mexico State)—bilingual education, educación bilingüe crítica/ESL, critical pedagogy, critical literacy, transnational pedagogy, critical curriculum development, and the education of Latino/as; K. Glazewski, Ph.D. (Arizona State)—Learning technologies, problem-based learning, technology-enhanced learning environments; J. Franzak, Ph.D. (New Mexico)—english language arts, secondary education, literacy policy, teaching literature, teaching of writing and critical literacy; O. D. Hadfield, Ed.D. (Northern Arizona)—mathematics, computer education; A. Hernandez (Stanford University)—elementary literacy, sociolinguistics, biliteracy-multiliteracy, and teacher professional development; C.M. Hernandez, Ph.D. (Kansas State)—science education; L. Huerta-Charles, Ph.D. (New Mexico State)—early childhood/bilingual education; K. Kim, Ph.D. (Arizona)—language, reading and culture, miscue analysis, EMMA (eye movement and miscue analysis); C. Kinzer, Ph.D. (New Mexico State)—mathematics education, mathematics professional development, learning systems preK-20; J. O'Donnell, Ed.D. (Massachusetts-Amherst)—critical pedagogy and democratic education and teacher education; M. Morehead, Ed.D. (Missouri-Columbia)—teacher education, classroom management/motivation; H. Oesterreich, Ph.D. (Teachers College Columbia University New York)—secondary education, feminist critical curriculum; P. Orelus, Ed.D. (Massachusetts at Amherst)—bilingual/TESOL education program; J. Parra, Ph.D. (Pepperdine)—teacher/faculty professional development, innovative & transformative education; L. V. Reyes, Ph.D. (New Mexico State)—early childhood education and critical pedagogy; M. Ruiz, Ph.D. (New Mexico)—Teaching English to Speakers of Other Languages (TESOL); D. Rutledge, Ph.D. (Colorado-Boulder)—learning technologies, international education; M. N. Torres, Ph.D. (New Mexico)—sociocultural and psychological foundation; J. Trespacios, Ph.D. (Virginia Tech)—game based learning, technology-enhanced learning environments, teacher education and math education; L. Uribe, Ph.D. (Virginia Tech)—mathematics education; K. Wiburg, Ed.D. (U.S. International)—instructional technology; X. Woodley, Ph.D. (New Mexico State University)—educational learning technology, critical pedagogy

**DEGREE: Master of Arts****MAJOR: Education**

**CONCENTRATION: Bilingual Education**  
**CONCENTRATION: Curriculum & Instruction**  
**CONCENTRATION: Early Childhood Education**  
**CONCENTRATION: Early Childhood Special Education**  
**CONCENTRATION: Educational Learning Technologies**  
**CONCENTRATION: Language, Literacy & Culture**  
**CONCENTRATION: Teaching English to Speakers of Other Languages**

**DEGREE: Master of Arts in Teaching**

**CONCENTRATION: Dance**  
**CONCENTRATION: Math**  
**CONCENTRATION: Science**  
**CONCENTRATION: Spanish**

**DEGREE: Specialist in Education**

**MAJOR: Curriculum and Instruction**  
**CONCENTRATION: Educational Diagnostics**

**DEGREE: Doctor of Education**

**MAJOR: Curriculum and Instruction**

**DEGREE: Doctor of Philosophy**

**MAJOR: Curriculum and Instruction**

**MINORS: Bilingual Education**

**Curriculum and Instruction**  
**Early Childhood Special Education**  
**Education**  
**Educational Learning Technologies**  
**Reading**

The Department of Curriculum and Instruction is devoted to the preparation of master educators for public, private, and governmental institutions. Graduates are prepared to serve as directors of instruction and curriculum, subject matter specialists, supervisors of student teaching and college professors of curriculum and instruction.

Five degree programs are available: Master of Arts (in education), Master of Arts in Teaching, Specialist in Education, Doctor of Education in curriculum and instruction, and Doctor of Philosophy in curriculum and instruction. The Master of Arts requires a concentration in curriculum and instruction. Six areas of concentration are offered: (1) curriculum and instruction, (2) bilingual education, (3) early childhood education, (4) educational learning technologies, (5) language, literacy & culture, reading, and (6) TESOL. Course work may be taken in elementary education, secondary education, TESOL, curriculum development, instructional techniques, instructional technology, advanced methodology, multicultural education, and teaching fields or endorsement areas.

At the master's degree level, nonthesis option, the department requires a final examination. This written examination is administered once each semester (fall, spring, and summer II). Detailed information about the written exam is available in the Master's Handbook ([http://education.nmsu.edu/ci/documents/candi\\_ma\\_handbook.pdf](http://education.nmsu.edu/ci/documents/candi_ma_handbook.pdf)) and on the departmental webpage (<http://education.nmsu.edu/ci/index.html>).

The Ph.D. and Ed. D have a theoretical-research orientation. Every doctoral student (Ph.D. and Ed.D.) is required to take a 12-credit research block that includes EDUC 613 and EDUC 576. Furthermore, students enrolled in the Ph.D. program must complete 6 credits in either computer tools courses or the foreign language sequence.

A master's degree, a cumulative GPA of 3.0 or better in graduate work, and three years of teaching experience or the equivalent are required for admission to doctoral programs in curriculum and instruction. Applicants should be aware that admission to the doctoral program is competitive and based on available departmental resources and available faculty resources and interest. Applicants for the Ed.S. degree must meet all departmental qualifications and have at least one year of successful teaching experience.

Doctoral-level qualifying exams are held during the spring semester.

Particulars with regard to procedural requirements relating to the degree are available by visiting the departmental website: <http://education.nmsu.edu/ci/index.html>.

Students seeking teacher licensure must meet all Teacher Education Program requirements. Those requirements include an undergraduate GPA of 2.5, passing scores on basic and general portions of the NMTA, and satisfying the requirements for the academic teaching field. Each student must possess the academic ability, character, and attitude suitable for teaching. Students who, in the professional judgment of the faculty and staff, do not possess these qualifications may be examined by a Selective Review Committee. The committee may recommend a variety of actions, ranging from remedial procedures to withdrawal from the Teacher Education Program.

**Competitive Admission Process for Teacher Licensure**

Applicants who successfully meet the minimum requirements for admission will be reviewed by the Teacher Education Program admission committee. The admission committee will base admission decisions on applicants' academic qualifications, basic skills test scores, written communication, faculty recommendations for the student and the student's portfolio.

Applicants should be aware that admission to the Teacher Education Program is competitive and is based upon available faculty resources. Posted GPA and basic skills test scores are the minimum necessary to be considered for admission to the Teacher Education Program and do not ensure admittance into programs. Applicants are encouraged to develop a strong student portfolio, achieve the highest GPA possible and present a professional portfolio.

**General Admission to Graduate Programs**

The Department of Curriculum and Instruction requires graduate students who have completed 9 credits under the "undeclared" category in the Graduate School and/or nondegree status in the College of Health and Social Services to be admitted into a graduate degree program either in Curriculum and Instruction or any other graduate department in the College of Education. The department will disenroll any student who has not been admitted into a graduate degree program (after completing 9 credits) and additionally, will not allow them to enroll or attend in other Curriculum and Instruction coursework.



# EDUCATIONAL LEADERSHIP AND ADMINISTRATION

Department website: <http://education.nmsu.edu/emd/>  
(575) 646-3825  
edmandev@nmsu.edu

*M. Prentice, Department Head, Ph.D. (University of Texas at Austin)- community college administration, service learning issues, best practices in teaching higher education; D. Christman, Ed.D. (Oklahoma State University)- educational administration, higher education, educational change processes, gender and American Indian issues, multicultural leadership; J.M. Hannan, Ph.D. (New Mexico State University)- distance education administration, best practices in teaching distance education, student services for distance education students; A. Humada-Ludeke, Ed.D. (Arizona State University)- school administration, organizational change, educational accountability, leadership development, Pk-20 collaborations and partnerships; G.M. Ivory, Ed.D. (Texas Tech University)- research design and evaluation, management technology; K. Kew, Ph.D. (Boston College)- educational change and reform, educational leadership, school culture, micro-politics; A.F. Osanloo, Ph.D. (Arizona State University)- educational equality, educational leadership and policy, philosophical foundation of education, issues of race, class, and gender in civic education; C. Rodríguez, Ph.D. (University of Texas at Austin)- education policy and leadership, Pk-20 access policy, Latino and borderland studies; H. Williams Pichon, Ph.D. (University of New Orleans) higher education administration, access and persistence of historically underrepresented groups in higher education, college student development, research Emeriti*

*A. L. Armendáriz, Ph.D. (University of New Mexico)- school administration, leadership development, organizational theory; R. Dominguez, Ph.D. (New Mexico State University) educational administration, higher education, community college administration, leadership development; M.L. González, Ph.D. (New Mexico State)- leadership in public school administration, multicultural organizations; C. T. Townley, Ph.D. (University of Michigan)- knowledge management, higher education*

**DEGREE: Master of Arts**  
**MAJOR: Educational Administration**

**DEGREE: Doctor of Education**  
**MAJOR: Educational Administration**

**DEGREE: Doctor of Philosophy**  
**MAJOR: Educational Administration**

## MINOR: Educational Administration

The mission of the Department of Educational Leadership and Administration at New Mexico State University is to prepare and graduate capable, skillful and dynamic educational leaders for a diverse society. Through the use of theory and practice we aim to develop change agents and role models for socially-just educational systems.

Students studying in these programs are generally interested in the following categories:

- Those seeking preparation for careers as educational leaders and administrators in Pk-12 school sectors. Positions most commonly sought are principals, superintendents, supervisors, program directors, central office staff, and state education agency leaders.
- Those seeking preparation for administrative and leadership careers in postsecondary education at the community college and university level, as well as in technical-vocational education. This particular focus can include preparation for the professoriate.
- Those seeking preparation for careers in educational research, agency and program evaluation, and educational management technology. Positions cover placement in a broad range of employment situations within school districts, community colleges, universities, government, and industry.

## Admission

The department requires full admission to any ELA program before starting course work. The department will disenroll any student who has not been admitted into a graduate degree program and, additionally, will not allow them to enroll in other ELA course work.

Detailed information on programs may be obtained by writing the department or on the website at <http://education.nmsu.edu/emd/>. For additional information on degree requirements, consult the Graduate School and College of Education policies listed in the "General Information" chapter of this catalog.

Specific criteria for each program are available from the Department of Educational Leadership and Administration.

## Admission to ELA Classes

Admission to ELA course work is generally done by cohort. Registration in any ELA 500-level course requires

1. full admission to the ELA department, or
2. admission to another COE graduate degree department, and
3. consent of the ELA Programs Coordinator and/or ELA Department Head.

## Master of Arts

The Master of Arts (M.A.) in educational administration focuses on two areas: Pk-12 school administration and Postsecondary education. The program of study for Pk-12 school administration includes all course work and internships required by the New Mexico State Public Education Department for Administrative Licensure.

## Admission

Grade point average requirements for the master's program are consistent with those of the Graduate School. However, in addition to these requirements, all master's degree applicants must provide a one-page letter of application indicating career interests and reasons for wanting to pursue a master's degree in the department; a professional résumé; a two-page professional or academic writing sample; official document showing three years of Pk-12 teaching experience (for those pursuing the Pk-12 administration focus); copy of current teaching license (for those pursuing the Pk-12 administration focus; international applicants may submit a certified letter from their school director in lieu of teaching license); and three letters of recommendation. The letters of support must be mailed directly to the department from the writer. The ELA admissions committee bases admissions decisions on this portfolio and will not consider incomplete applications.

## Prerequisites

Students interested in the Pk-12 school administration must have a current teaching license and three years of full-time teaching experience in the Pk-12 sector.

## Application Deadlines for Pk-12 School Administration

This program begins in the fall semester only. All materials for this program must be received by the deadline of July 15. Admission requirements are available from the Department of Educational Management and Development, or on the website at <http://education.nmsu.edu/emd/mainal.html>.

## Application Deadline for Postsecondary Education

This program begins in the spring semester only. All materials for this program must be received by the deadline of December 1. Admission requirements are available from the Department of Educational Leadership and Administration, or on the website at <http://education.nmsu.edu/emd/mainal.html>.

## Doctorate Degrees

The Department of Educational Management and Development offers both the Doctor of Education (Ed.D.) and the Doctor of Philosophy (Ph.D.). The Doctor of Education is geared toward those students wishing to pursue a degree which will help them in their profession. Course work, internships, and research are constructed to develop individuals for administrative positions in Pk-12 schools and in postsecondary institutions.

The Doctor of Philosophy is a research-oriented degree. Course work and internships will be directed toward developing research proficiencies in educational leadership. The Ph.D. also requires additional hours of course work in an approved cognate area.

## Admission

The department requires applicants to complete a Doctoral Admissions Portfolio. Specific details and criteria are available from the Department of Educational Leadership and Administration or on the website at <http://education.nmsu.edu/emd/docpage.html>.

## Graduate Assistantships

Some graduate assistantships are available in the department. Interested persons should inquire at an early date. (Due date for application for the following academic year is March 15.) Graduate Assistantship applications are available at <http://education.nmsu.edu/emd/student-resources.html>.

# SPECIAL EDUCATION/ COMMUNICATION DISORDERS

Department website: <http://education.nmsu.edu/sped/>  
(575) 646-2402  
spedcd@nmsu.edu

*M.B. Salas-Provence, Ph.D., department head (University of Illinois-Urbana)- speech and hearing science, multicultural, cleft lip and palate; Z. Chai, Ph.D. (University of Georgia) early childhood special education; K. Chinn, Ed.D. (Lamar University)- deaf education/deaf studies; S. Estalla, M.A. (New Mexico State University) bilingual services; H. Lehnert-Lehouiller, Ph.D. (State University of NY at Buffalo) speech science, phonetics, speech sound disorder; L. Mason, Ed.D. (University of Northern Colorado) special education, visual impairment, orientation and mobility; A. Medina, MS (University of Minnesota) bilingual services; S. Mishra, Ph.D. (University of Southampton, U.K.) audiology, hearing science and pediatric audiology; D. Rhein, Ph.D. (University of Arizona)- bilingual language assessment, literacy; S. Ramdoss, Ph.D. (University of Texas at Austin) special education, autism and assistive technology; L. Salas, Ph.D. (New Mexico State University)- bilingual special education; L. Spencer, Ph.D. (University of Iowa) speech and hearing science, language and literacy acquisition in children with hearing loss; T. Trammel-Yeboah MA (New Mexico State University) childhood language and articulation; A. Valdez, Ph.D. (University of New Mexico)- educational psychology; Emeriti: E. Poel, Ph.D. (New Mexico State University); A. Gallegos, Ed.D. (New Mexico State University) low-high incidence disabilities*

**DEGREE: Master of Arts**  
**MAJOR: Communication Disorders**

**DEGREE: Master of Arts**  
**MAJOR: Education**

**CONCENTRATION: Autism Spectrum Disorders**  
**CONCENTRATION: Special Education**  
**CONCENTRATION: Special Education/Deaf-Hard of Hearing**  
**CONCENTRATION: Speech-Language Pathology**

**DEGREE: Specialist in Education**  
**MAJOR: Curriculum and Instruction**  
**CONCENTRATION: Special Education/Deaf-Hard of Hearing**  
**CONCENTRATION: Special Education**

**DEGREE: Doctor of Education**  
**MAJOR: Special Education**  
**CONCENTRATION: Bilingual/Multicultural Special Education**

**DEGREE: Doctor of Philosophy**  
**MAJOR: Special Education**  
**CONCENTRATION: Bilingual/Multicultural Special Education**

**MINORS: Communication Disorders**  
**Deaf Education**  
**Special Education**

The Department of Special Education/Communication Disorders offers programs designed for students with career goals as master special education teachers, special education consultants and directors, school psychologists, and speech-language pathologists in school, community, and medical settings, or as higher education faculty in the fields of special education (SPED) and communication disorders (CD). The program in conjunction with general education is NCATE approved.

The department offers programs leading to the Master's degree. The M.A. in education with emphasis in special education can be earned with the following emphasis: general special education (i.e., noncategorical), mild-to-moderate disabilities (behavior disorders, learning disabilities, and mental retardation), early-childhood special education, bilingual special education, deaf/hard-of-hearing education, and visual impairment. Students who have earned a bachelor's degree and who are seeking special education licensure must enroll in a graduate degree program. Depending on the individual student's needs and experiences, programs can be designed to lead toward special education licensure, visual impairment licensure and specialization in categorical areas.

The M.A. in Communication Disorders offers a specialization in speech-language pathology. The program is designed primarily for students who are interested in becoming speech-language pathologists in schools, hospitals, community-based clinical facilities, or private practice. The programs for students

entering without a communication disorders background are generally one year longer. The programs are designed to provide the academic background and clinical-practicum experience for meeting state and national certification and licensure requirements.

The master's degree program in speech-language pathology is accredited by the Council on Academic Accreditation of the American Speech-Language-Hearing Association. Enrollment in graduate courses in communication disorders is limited to individuals in good standing in the Graduate School. In addition, the licensure courses in the communication disorders curriculum are restricted to CD majors. To complete a course of study, each student must meet the program's academic and clinical competency criteria, as well as the recommendation of state and national certifying bodies for educational licensure and clinical certification. Only those courses in which a grade of B or higher has been earned will apply toward the program of study. If a student earns lower than a B grade in any course, he or she will meet with the Communication Disorders Graduate Faculty Selective Review Committee to determine a consequential course of action before proceeding with the next module of the program.

Admission to the department's M.A. programs is based on the evaluation of a portfolio of materials that includes:

- Undergraduate GPA
- Graduate GPA (if applicable)
- Psychometric score on the Graduate Record Exam (aptitude portion) for CD program applicants
- An academic vita
- A one-page letter of interest in which the candidate cites relevant background experiences and personal motives for applying to the program
- Three letters of reference
- Other optional materials (as available) such as samples of writing, evidence of scholarship, indication of membership in a group traditionally underrepresented in graduate programs, or extenuating factors highlighted by applicants in their letters of interest.

The department offers three advanced degrees in curriculum and instruction with emphasis in special education: the Specialist in Education (Ed.S.), Doctor of Education (Ed.D.), and Doctor of Philosophy (Ph.D.).

The Ed.S. provides additional study beyond the M.A. to prepare the student for leadership roles within his or her field. An Ed.S. degree can be earned in School Psychology. An Ed.S. project is required.

The Ed.D. program is designed to provide advanced professional training and to develop further ability in the scholarly study of professional problems. This program is intended primarily for students pursuing careers that emphasize teaching, administration, and service delivery.

The Ph.D. program has a theoretical and research orientation requiring the student to demonstrate competency with two of the following research tools: (a) advanced statistics, (b) computer language, and (c) foreign language.

The residency requirements for the Ed.D. and Ph.D. are described in the section "Requirements for Higher Degrees." "Three years' teaching experience, or the equivalent, is required for admission to doctoral programs. Applicants for the Ed.S. degree must have at least one year of successful teaching experience prior to receiving the degree.

The following psychometric scores are required for admission to the Ed.D. and Ph.D. programs: Miller Analogies Test and Graduate Record Examination (aptitude).

For detailed information on admission requirements, stipends, and program requirements, write to the Department of Special Education/Communication Disorders, MSC 3SPE, NMSU, P.O. Box 30001, Las Cruces, New Mexico 88003-8001.

# COLLEGE OF ENGINEERING

Dean • Ricardo Jacquez, P.E.

Associate Dean (Academic Programs) • Sonya L. Cooper, P.E.

Associate Dean/Director of Engineering Research Center • Martha C. Mitchell, P.E.

Assistant Dean (Development) • Patricia Sullivan

Scholarship and Career Development Coordinator • Monica Lopez

Communications and Special Events Coordinator • Linda Fresques

Student Programs Coordinator • Elizabeth H. Franzoy

## CHEMICAL & MATERIALS ENGINEERING

Department Website: <http://chme.nmsu.edu/>

(575) 646-1214

[drockstr@nmsu.edu](mailto:drockstr@nmsu.edu)

*D.A. Rockstraw\*, Department Head, Ph.D. (Oklahoma)- activated carbon, chemical process design, analysis & simulation, catalysis and reaction kinetics, trade secret and intellectual property litigation; P.K. Anderson, Ph.D. (California-Berkeley)- chemical process simulation, engineering education, electrochemical systems; C.E. Brewer, Ph.D. (Iowa State)- biomass thermochemical processing, sustainable agriculture, biorenewable resources; S. Deng, Ph.D. (Cincinnati)- absorption, nanoporous materials, hydrogen fuel cells, water treatment; R. Foudazi, Ph.D. (Cape Peninsula University of Technology, South Africa)- porous polymers, rheology of complex fluids, physicochemical properties of soft matter, colloid and interface science; A. Ghassemi, Ph.D. (NMSU)- environmental management, advanced water treatment, renewable energy, pollution prevention and process control; J. Houston, Ph.D. (Texas A&M)- biomedical engineering, biophotonics, flow cytometry; H. Luo, Ph.D. (Tulane)- nanostructured materials, thin films, magnetism, electrochemistry, photovoltaics; T.A. Manz, Ph.D. (Purdue)- quantum chemistry simulations, advanced materials; J.A. Martinez, Ph.D. (California-Davis)- novel energetic nanostructured materials, quantum transport phenomena, thermoelectronics; M.C. Mitchell\*, Ph.D. (Minnesota)- statistical mechanics, computer modeling and simulation, thermodynamic characterization of aerospace fuels*

\*Registered Professional Engineer

### DEGREE: Master of Science in Chemical Engineering

#### DEGREE: Doctor of Philosophy

#### MAJOR: Engineering

#### CONCENTRATION: Chemical Engineering

The Department of Chemical and Materials Engineering offers graduate study leading to the Master of Science degree and the Ph.D. with an emphasis in chemical engineering. Admission to the program is in accord with the general regulations of the Graduate School. The Graduate Record Examination (GRE) General Test is required for all applicants. All graduate students are required to pass all graduate engineering courses with a minimum grade of B.

All graduate students must select a thesis or dissertation advisor by the end of their first semester in the chemical engineering graduate program. Graduate teaching and research assistantships, fellowships, and traineeships are available. For consideration for financial assistance, completed applicants must be received by March 1. All support is contingent upon availability, eligibility and satisfactory progress toward the degree.

### DEGREE: MASTER OF SCIENCE IN CHEMICAL ENGINEERING CHEMICAL & MATERIALS ENGINEERING PROGRAM

The program of study leading to the M.S. consists of 32 credits which includes; required CH E core graduate courses (14 credits); tools elective courses (6-9 credits, list found on the departmental website); chemical engineering elective courses numbered 455-589 (3-6 credits); and thesis as CH E 599 (6 credits).

#### Required Core Courses:

CH E 501	Graduate Thermodynamics for Chemical Engineers	3
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CH E 506	Graduate Transport Phenomena(s)	3
CH E 516	Numerical Methods in Chemical Engineering	3
CH E 542	Graduate Reactor Analysis and Design (s)	3
CH E 594	Professional Communication in Chemical Engineering	2
CH E 599	Master's Thesis	0-15
	CH E electives	3-6
	Tool electives	6-9

CH E 599 - minimum 6 credit hours before the thesis defense

#### Graduate Tool Elective Courses

The graduate tool elective courses must be selected from the list available on the department website. Chemical engineering electives must be selected from courses numbered 455-589. The thesis may be pursued in absentia at various industrial sites by special arrangement.

Each student admitted to the CHME grad program who has an undergraduate degree in a discipline other than chemical engineering must schedule a meeting with the CHME Department Head to define the undergraduate course deficiencies the student must take to obtain a graduate degree in chemical engineering.

#### DEGREE: DOCTOR OF PHILOSOPHY MAJOR: ENGINEERING

The program of study leading to the Ph.D. is available to students who have either a B.S. or M.S. in chemical engineering. Students with a B.S. must complete 36 course credits and 18 dissertation credits, for a total of 54 credits, including: required core CH E courses (14 credits); three elective tool courses (9 credits); two chemical engineering elective courses (6 credits); two open electives\* (6 credits); independent research as CH E 698 prior to completion of the comprehensive exam (9 credits); dissertation as CH E 700 after completion of the comprehensive exam (9 credits); and graduate seminar as CH E 690 (1 credit).

For students with an M.S. in chemical engineering who have completed all of the required CH E core graduate courses, the program of study leading to the Ph.D. consists of a chemical engineering elective (3 credits); two open electives\* (6 credits); graduate seminar (1 credit); independent research (9 credits); and dissertation (9 credits). All Ph.D. students must pass: (1) a qualifying examination within 18 months of starting their Ph.D. studies; (2) a comprehensive examination completed a minimum of nine months prior to the dissertation defense; and (3) an oral defense of the written dissertation before the dissertation committee.

\*open electives must be letter-graded and numbered 500 or greater, selected from engineering or the natural sciences, and exclude seminar and independent study courses.

#### Required Courses:

CH E 501	Graduate Thermodynamics for Chemical Engineers	3
CH E 506	Graduate Transport Phenomena(s)	3
CH E 516	Numerical Methods in Chemical Engineering	3
CH E 542	Graduate Reactor Analysis and Design (s)	3
CH E 594	Professional Communication in Chemical Engineering	2
CH E 690	Graduate Seminar	1
	CH E electives	6
	Open electives	6
	Tool electives	9

CH E 698	Special Research programs	1-9
CH E 700	Doctoral Dissertation	0-15

CH E 698: minimum 9 credits before completion of the comprehensive exam

CH E 700: minimum 9 credits after completion of the comprehensive exam

The chemical engineering electives must be selected from courses numbered 455-589 or 600-689. The two elective courses must be letter-graded course work numbered 500 or greater (excluding seminar courses and individual study courses) from any engineering or natural science (e.g. Biology, Chemistry, Mathematics, Physics, Statistics) graduate program.

For further information on the Department of Chemical Engineering, please consult the web page <http://chemeng.nmsu.edu>.

### MINOR: MATERIALS ENGINEERING

Students may complete a minor in Materials Engineering by completing 15 credits beyond the required introductory course (CH E 361) as provided in the approved list of materials courses maintained on the departmental website.

## CIVIL ENGINEERING

Department website: <http://cagesun.nmsu.edu/>  
(575) 646-3801

[wales@nmsu.edu](mailto:wales@nmsu.edu)

*K. R. White, \* Ph.D. (Texas Tech-emeritus)– structural design; P. Bandini, Ph.D. (Purdue)– geotechnical engineering; A. S. Bawazir, Ph.D. (New Mexico State)– agricultural/water resources engineering; D. Cortes, Ph.D. (Georgia Tech)– geotechnical engineering; R. L. Idriss, Ph.D. (New Mexico State)– structural engineering; R. B. Jacques, \* Ph.D. (Virginia Polytechnic)– environmental engineering; D. Jáuregui, Ph.D. (Texas-Austin)– structural engineering; N. N. Khandan, \* Ph.D. (Drexel)– environmental engineering; J. P. King, \* Ph.D. (Colorado State)– agricultural/water resources engineering; P. T. Martin, Ph.D. (Nottingham, UK)– transportation engineering; C. Newton, Ph.D. (Washington)– structural engineering; L. Papelis, Ph.D. (Stanford); Z. Samani, \* Ph.D. (Utah State)– agricultural engineering, water resources; B. Weldon, Ph.D. (Notre Dame)– structural engineering; P. Xu, Ph.D. (ENGREF, Paris, France).*

*\*Registered Professional Engineer*

*# Board Certified Environmental Engineer (BCEE)*

### DEGREE: Master of Science in Civil Engineering

### DEGREE: Master of Science in Environmental Engineering

### DEGREE: Doctor of Philosophy

### MAJOR: Engineering

#### CONCENTRATION: Civil Engineering

The Civil Engineering Department offers excellent opportunities for advanced study and professional training in several fields leading to the M.S.C.E., M.S. ENVE, and the Ph.D. degrees. Among the currently active areas are environmental (water and wastewater treatment, hazardous waste, and site remediation); geotechnical (experimental soil mechanics, foundations, and other geosystems, and pavement geotechnics); water resources (surface and ground water, irrigation and drainage, erosion and sediment transport); hydraulics (open channel and structures); structural mechanics (emphasis on bridge design and inspection); structural design, and structural health monitoring/NDE.

The department has excellent facilities including some 15 teaching and/or research laboratories with facilities for mechanical, chemical, and biological research. The outstanding feature of the program is the energetic, highly motivated faculty and the low student-faculty ratio. The department currently has several ongoing research projects of various size and scope employing graduate students. Office space is normally provided for those students pursuing an advanced degree. Teaching and research assistantships are available to qualified students.

Students enrolling for graduate work in civil engineering must have received a bachelor's degree in engineering or one of the allied fields. A candidate for the master's degree may choose either a thesis or a nonthesis option. When a student enrolls for the Ph.D., a doctoral committee is formed to assist the student in planning a program appropriate to the student's background and goals and to administer the required examinations. All Ph.D. candidates in civil engineering must have a demonstrated proficiency in English and two research tools. Mutual understanding between the Ph.D. candidate and his or her doctoral committee on the final nature of these two research tools will be on an individual basis.

### MAJOR: ENGINEERING

Exceptions to these requirements must be approved by the head of the department.

### Structural Engineering

#### Thesis Option

#### Prerequisite Courses:

C E 365	Intermediate Structural Analysis	1
C E 444	Elements of Steel Design	3
C E 445	Reinforced Concrete Design	3

C E 444: based on AISC

C E 445: based on ACI

#### Required Courses:

C E 501	Advanced Mechanics of Materials	3
C E 515	Finite Element Methods	3
C E 544	Advanced Design of Steel Structures	3
C E 545	Advanced Concrete Design	3
C E 571	Structural Dynamics	3

#### Option Courses:

At least 9 credits from the following list (1):

C E 502	Advanced Mechanics of Steel Structures	3
C E 504	Advanced Engineering Design	3
C E 509	Deep Foundations	3
C E 543	Advances in Concrete Technology	3
C E 547	Bridge Engineering	3
C E 554	Wood Design	3
C E 555	Masonry Design	3
C E 572	Earthquake Engineering	3
C E 577	Advanced Pavement Analysis	3
C E 615	Advanced Finite Element Methods	3
C E 645	Prestressed Concrete	3

#### Research Credits:

C E 599	Master's Thesis	0-15
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(A maximum of 6 credits are counted toward the Master's Degree program)

**Total credits: 24 credits of coursework and 6 credits of Master's Thesis research.**

### Geotechnical Engineering

#### Thesis Option

#### Prerequisite Courses:

C E 357	Soil Mechanics	3
C E 457	Foundation Design	3

#### One course in Geological Sciences:

GEOL 111G	Survey of Geology	4
	or	
	higher-level courses	

#### One course in Reinforced Concrete (based on ACI):

C E 445	Reinforced Concrete Design	3
	or	
	higher-level courses	

#### Required Courses:

C E 506	Advanced Soil Mechanics	3
C E 509	Deep Foundations	3
C E 585	Slope Stability Analysis and Design	3

#### Optional Courses:

(Can be taken as C E 503. A maximum of 6 credits of C E 503 are counted toward the Masters Degree program)

At least 6 credits from the following list:

C E 485	Design of Earth Dams	3
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C E 577	Advanced Pavement Analysis	3
G EN 452	Geohydrology	
	or	
C E 581	Ground Water Hydrology	3

**At least 6 credits from the following list:**

C E 515	Finite Element Methods	3
	or	
	similar course	
C E 575	Plasticity Theory	3
C E 577	Advanced Pavement Analysis	3
C E 479	Pavement Analysis and Design	3
C E 586	Geotechnical Earthquake Engineering	3

**At least 3 credits from courses outside the area or department (1):**

	Geological Sciences or Geophysics course (For example: GEOL 470, GPHY 451)	3
A ST 505	Statistical Inference I	4
	or	
	similar statistics course	
C E 543	Advances in Concrete Technology	3
C E 545	Advanced Concrete Design	3
C E 596	Special Topics	1-3
C E 503	Special Design and Analysis Program	3-6
ENVE 455	Solid and Hazardous Waste Systems Design	3
	Course in mathematics, numerical methods, or programming (450 or higher)	3

**Research Credits:**

C E 599	Master's Thesis	0-15
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(A maximum of 6 credits are counted toward the Masters Degree program)

1. The optional courses outside the area or department should be previously approved by the academic advisor or student's Graduate Committee.
2. International students must be registered at least 9 credits per semester.
3. International students may be required to take English language courses to show proficiency in English.

**Total credits: 24 credits of coursework and 6 credits of Master's Thesis research (2) (3)****Notes:**

1. The optional courses outside the area or department should be previously approved by the academic advisor or student's Graduate Committee.
2. International students must be registered at least 9 credits per semester.
3. International students may be required to take English language courses to show proficiency in English.

**Water Resources Engineering Thesis Option**

Prerequisite Courses: (Total of 30 credits required)

	Core courses	12
	Statistics	3
	Area of Interest Courses	9
	Thesis (C E 599, Master's Thesis)	6

**Non-Thesis Option (Total of 30 credits required):**

	Core courses	12
	Statistics	3
	Area of Interest Courses	15

**Foundation Requirements**

1. ABET- Accredited B.S. in Civil, Agricultural, Geological Engineering, or closely related field or equivalent (as per existing CAGE Department regulations)
2. One course in surface water hydrology
3. One course in hydrogeology or geohydrology
4. At least three semesters of hydraulic and hydraulic design

**Core Courses (15 credits from following courses):**

A ST 505	Statistical Inference I	4
C E 531	Open Channel Hydraulics	3
C E 557	Water Resources Development	3
C E 581	Ground Water Hydrology	3
C E 582	Statistical Hydrology	3

A ST 505: or advanced statistics class if student is qualified

**Area of Interest Courses (Flexible):****Agricultural/ Civil/ Environmental Engineering**

A EN 459	Design of Water Wells/Pumping Systems	3
A EN 475	Soil and Water Conservation	3
A EN 478	Irrigation and Drainage Engineering	3
C E 482	Hydraulic Structures	3
C E 483	Surface Water Hydrology	3
C E 503	Special Design and Analysis Program	3-6
C E 485	Design of Earth Dams	3
C E 504	Advanced Engineering Design	3
C E 682	Topics in Hydrodynamics II	3
ENVE 557	Surface Water Quality Modeling	3
ENVE 630	Fate and Transport of Environmental Contaminants	3
G EN 452	Geohydrology	
C E 503	Special Design and Analysis Program	3-6
GEOG 487	Geographic Information Science and Technology	3
GEOG 581	System Design for Geographic Information Science and Technology (GIS &T)	3
SOIL 651	Advanced Soil Chemistry	3
SOIL 652	Advanced Soil Physics	3

**Modeling/Fluid Mechanics**

M E 530	Intermediate Fluid Mechanics	3
M E 533	Computational and Theoretical Fluid Mechanics	3
M E 580	Engineering Analysis II	3

**Management/ Optimization**

I E 533	Linear Programming	3
I E 534	Nonlinear Programming	3
I E 535	Discrete Optimization	3

**Institutional Aspects:**

BLAW 527	Negotiation and Business Dispute Resolution	3
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Approved Electives in College of Engineering: A ST, AECC, GEOG, GEOL, MATH, STAT, and SOIL (Must be approved by the Advisor and Committee Members).

**DEGREE: MASTER OF SCIENCE IN ENVIRONMENTAL ENGINEERING**

Environmental engineering at New Mexico State University provides unique educational and research opportunities at the graduate level in the fields of water quality, water treatment, water pollution control, wastewater treatment reclamation and reuse, industrial, hazardous and solid waste management, groundwater treatment, air pollution control; waste minimization and pollution prevention. Therefore, course offerings have been developed to emphasize basic engineering and scientific principles, as well as design and application of environmental engineering unit operations and processes. Special problem and thesis research are closely matched with faculty expertise and the programs and professional goals of the graduate students. Study and research programs are specifically designed for individual students, taking advantage of not only the

program capabilities, but complementing activities of the university as a whole, the student's professional experience and work environment.

Graduate students satisfy degree requirements in environmental engineering by completing specific core course work. Course work in the graduate program includes: water and wastewater treatment, solid and hazardous waste systems design, environmental chemistry, environmental microbiology, environmental contaminant analysis, industrial pollution control, fate and transport of pollutants in engineered and natural systems and water quality in surface water and groundwater systems. Additional topics of interest to the students are covered through special topics classes and by courses taught outside of the College of Engineering.

### ENVIRONMENTAL ENGINEERING M.S. PROGRAM

The M.S. program requires either a thesis or a non-thesis practice oriented experience. The non-thesis option is designed for students that are working full time in engineering practice, but is also available to other students interested in pursuing a non-thesis option. The thesis option consists of a minimum of 30 semester credit hours, including 6 credit hours of thesis. Students who are working full time in engineering practice may apply for the non-thesis option. This option consists of 30 semester credit hours of which up to 3 credit hours can be awarded for a professional engineering design experience (ENVE 590) and up to 6 credit hours can be awarded for an engineering practicum (ENVE 598). Transfer credit for courses taken elsewhere is evaluated on an individual basis. Up to six semester hours of graduate level courses taken may be used to satisfy M.S. degree requirements provided that the credits were not used toward another degree.

#### Required Curriculum

The graduate environmental engineering program of the CAGE department expects all M.S. and Ph.D. students to meet certain requirements in pursuit of an advanced degree. Some of these requirements are related to the quantity, level, and quality of coursework. This Graduate Catalog details what is expected as a minimum for graduation, but it is up to the student and his/her advisor and graduate committee to determine the plan of study for the student. The student and his/her advisor will create this program of study in the first semester of graduate work.

Students desiring to work toward an advanced degree in environmental engineering must have completed undergraduate preparation similar to that required for a Bachelor of Science degree in an ABET accredited engineering program or must have adequate background, as determined by the graduate faculty of the program. The program administrator will approve exceptions to these requirements.

The environmental engineering faculty will form a committee for every entering student. The faculty will evaluate the student's record and determine which deficiencies and/or core courses, if any, are needed by the student. For all professional non-thesis programs, the department head will review the committee's decision. In order to provide consistency among plans of study for graduate students and to set a minimum set of core or pertinent courses, it is the policy of the graduate environmental engineering program that each graduate student will fulfill the following course requirements (or equivalent).

#### Required Background Courses

The following courses may be required if the student did not take a similar course at the undergraduate level, as negotiated with the general faculty committee.

C E 356	Fundamentals of Environmental Engineering	3
C E 382	Hydraulic Systems Design	3
ENVE 455	Solid and Hazardous Waste Systems Design	3
ENVE 456	Environmental Engineering Design	3

#### Core Courses- All of the following core courses are required (12 cr.):

ENVE 551	Unit Processes/Operation of Water Treatment	3
ENVE 552	Unit Processes/Operation of Wastewater Treatment	3
ENVE 553	Chemical Theories of Environmental Engineering	3
ENVE 557	Surface Water Quality Modeling	3

#### Thesis or Professional Experience for MS students

ENVE 598	Special Research Programs	1-3
	or	
ENVE 599	Master's Thesis	0-15

ENVE 590: may replace ENVE 455 or ENVE 456

ENVE 598: Practicum 6

ENVE 599: for students pursuing the thesis option

#### Dissertation, Research Tools for Ph.D. Students

	A minimum of two research tools (3 cr. each.)	
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#### Professional Development Electives for the Non-thesis option (outside the college of engineering):

**M.S. program:** A minimum of six credits hours in graduate-level communications, management, economics and/or other relevant disciplines. These courses will be selected by the student and must be approved by the environmental engineering faculty (6 cr.).

#### Elective Courses (3 cr.)

A EN 459	Design of Water Wells/Pumping Systems	3
C E 557	Water Resources Development	3
E S 462	Sampling and Analysis of Environmental Contaminants	3
ENVE 630	Fate and Transport of Environmental Contaminants	3
G EN 452	Geohydrology	

## ELECTRICAL AND COMPUTER ENGINEERING

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*V. G. Oklobdzija, department head, Ph.D. (California-Los Angeles)– low-power VLSI design; D. K. Borah, Ph.D. (Australian National)– digital communication systems; L. E. Boucheron, Ph.D. (California- Santa Barbara)– digital image and signal processing; S. M. Brahma, Ph.D. (Clemson)– energy systems; S. Cho, Ph.D. (Georgia Tech)– electro-optics; J. Cook, Ph.D. (New Mexico State)– computer architecture; C. D. Creusere, Ph.D. (California-Santa Barbara)– digital image and signal processing; M. Dawood, Ph.D. (Nebraska-Lincoln)– electromagnetics; P. L. DeLeon, Ph.D. (Colorado)– digital signal processing; P.M. Furth, Ph.D. (Johns Hopkins)– an a log/mixed signal VLSI; H. Huang, Ph.D. (Georgia Tech)– communication networks; J. Kliewer, Ph.D. (Kiel)– communications and signal processing; W. Liu, Ph.D. (Missouri Science & Tech)– control of energy systems; K. T. Ng, Ph.D. (Ohio State)– bio-electromagnetics; R. A. Paz, Ph.D. (Illinois)– robust control theory; N. R. Prasad, Ph.D. (New Mexico State)– intelligent control systems; J. Ramirez-Angulo, D.Sc. (Stuttgart-Germany)– an a log/mixed-signal VLSI; S. Ranade, Ph.D. (Florida)– energy systems; S. Stochaj, Ph.D. (Maryland)– real-time computer systems; D. Voelz, Ph.D. (Illinois)– electro-optics*

#### DEGREE: Master of Science in Electrical Engineering

#### DEGREE: Doctor of Philosophy

#### MAJOR: Engineering

#### CONCENTRATION: Electrical Engineering

#### MINOR: Electrical Engineering

The Klipsch School of Electrical and Computer Engineering offers graduate work leading to the Master of Science and Doctor of Philosophy degrees. Areas of emphasis for masters and doctoral students are communications, computer engineering, control systems, digital signal processing, electromagnetics, electric energy systems, electro-optics, and microelectronics/VLSI. Research in the above areas currently being conducted by the faculty ensures that doctoral candidates will work on the frontier of knowledge in these areas. The graduate programs are intended to provide broad graduate-level training in electrical engineering. In addition, appropriate courses in computer science, industrial engineering, mathematics, physics, and business management may be integrated into a graduate student's program of study.

Students desiring to work toward an advanced degree in electrical engineering must have completed undergraduate preparation substantially equivalent to that required for the Bachelor of Science in Electrical Engineering degree at this institution. For students with undergraduate degrees in other disciplines, see below. For further information on the Klipsch School of Electrical and Computer Engineering, please consult the web page <http://www.ece.nmsu.edu/>.

## Research Facilities and Highlights

There are extensive computer and research facilities available in the Klipsch School of Electrical and Computer Engineering. The school has numerous PC workstations contained within three different open computing labs and several research laboratories. Teaching workstations operate under Windows 7, but have access to Ubuntu (Linux) through VirtualBox. Researchers requiring larger computational resources have access to the departmental 16 processor HP Integrity rx8620 supercomputer (each of the 16 processors consists of a 4 core IA-64 processor), and a 128-processor "Beowulf" distributed memory parallel computer. An SGI Altix I8200CE cluster with a total of 22 compute nodes (2 Quadcore 4.0GHz Xeon processors with 16GB RAM per node), and a total of 15TB of storage is also available for engineering research. The internal network consists of a one Gbit/sec fiber optic backbone with 100 Mbit/sec Ethernet connections to all desktop machines. The Electrical Engineering building is linked to a large number of remote computers on campus via NMSUnet and to computers at other universities and research laboratories via the VBNS and the Internet.

The Center for Telemetry and Telemetering hosts the Manuel Lujan, Jr. Space Tele-Engineering Program and the Frank Carden Chair for Telemetry and Telemetering. Faculty and staff in the Center are involved in education and research programs focusing on telecommunications, communication theory, coding and information theory, wireless networks, digital signal processing, optical and radio frequency communications, and digital image processing. The Center has several major research sponsors including NASA, the Department of Defense, and the National Science Foundation. The director of the Center and the Frank Carden Chair is Professor Dr. Charles Creusere.

The Advanced Speech and Audio Processing Laboratory is used for both teaching and research in digital signal processing (DSP). Current research areas include speaker recognition, signal enhancement, low-bit rate coding, embedded DSP, and GPU-based pattern recognition for speech processing. The laboratory is equipped with two state-of-the-art compute servers equipped with Intel Core i7-960 3.2 GHz and NVIDIA C2050 GPU processor. Research sponsors for the laboratory include Air Force Research Laboratories, Army Research Laboratory, National Geospatial Intelligence Agency, Freescale Semiconductor, IBM, Motorola, National Science Foundation, and Texas Instruments. The director of the laboratory is Dr. Phillip L. De Leon.

The New Mexico State University R.L. Golden Particle Astrophysics Lab (PAL) is dedicated to measuring and interpreting cosmic ray spectra in an effort to better understand the structure of our universe. Recent measurements of the galactic positron and electron spectra have connections to the dark matter mystery and to the identification of sources of cosmic rays. Additional studies of solar particles (measured along with cosmic rays) will help in the understanding of how solar eruptions affect the earth. The director of PAL is Dr. Steven Stochaj.

The Electromagnetics (EM) and Microwave Laboratory is used for both teaching and research in electromagnetic fields. Current research areas include propagation through dispersive media (soil, seawater, foliage, biological tissues), UWB radar and remote sensing system analysis and design, antenna analysis, synthesis, and design, bio-electromagnetics, brain mapping, computational physics, electromagnetic interference and compatibility, high performance computing, and nondestructive evaluation. Research sponsors for the laboratory include American Heart Association, Department of Defense, Los Alamos National Laboratory, NASA, NSF, National Institutes of Health, Sandia National Laboratories, and White Sands Missile Range. The Director of the Electromagnetics and Microwave Laboratory is Dr. Kwong T. Ng.

New Mexico State University's program in Electric Utility Management (EUMP) is sponsored by a group of public and private electric utility companies and industrial organizations and hosts the PNM Chair for Utility Management and The Kersting Professorship. The Master of Science in Electrical Engineering degree program includes course work in public utilities regulation and is designed to prepare the student for a future engineering management position in the electric utility industry. An industry advisory committee provides the vital connecting link between the electric utility industry and the university, so that a coordinated effort may be achieved in realizing the following program objectives: (1) to provide a program of study at the graduate level in the planning, operation, and management of electric power generation, transmission, distribution, and utilization; (2) to supply the electric utility industry with the highest caliber of new engineering and management talent; and (3) to provide the university with the required financial and technical support to ensure a quality program. In addition, faculty in EUMP work with M.S. and Ph.D. students to conduct funded research sponsored by Sandia National Laboratories, EPRI, NSF, DOE, CEC and the electrical utility industry. Much of the current research is focused on renewable energy integration, protection, advanced control and optimization, and customer driven microgrids. Laboratory facilities are available in the El Paso Electric Power Systems laboratory. The program works closely with the Institute for Energy and Environment (IEE) and with Southwest Technology Development Institute (SWTDI) which host the solar energy experiment station. The director of the EUMP and PNM Chair for Utility Management is Dr. Satish Ranade.

Faculty and students in the VLSI Laboratory are involved in the design and analysis of analog and mixed-signal microelectronic circuits and systems. Current

research areas include high-frequency analog VLSI design; low-voltage, low-power circuits; high performance operational amplifiers and operational transconductance amplifiers; power management circuits; analog image processing; and CMOS image sensors. Research sponsors include the Los Alamos National Laboratories and Agilent technologies. The director of the VLSI Laboratory is IEEE Fellow Dr. Jaime Ramirez-Angulo.

The Electro-Optics program at NMSU offers unique opportunities to undergraduate and graduate students interested in pursuing a career in electro-optics, applied optics, photonics, or optical engineering by combining the optics resources of the Klipsch School and the Physics Department. Most of the optics classes are cross-listed in the two departments. The Klipsch School's Electro-Optics Research Laboratory (EORL) provides a variety of research opportunities in areas such as multispectral and polarimetric imaging, free-space optical communications, adaptive optics, nanophotonics and integrated electro-optic sensors and systems. Sponsors include the Air Force Office of Scientific Research, Sandia National Laboratories, Air Force Research Laboratory, Army Research Laboratory, NASA, National Geospatial-Intelligence Agency and the National Science Foundation. SPIE Fellow Dr. David G. Voelz is the director of the EORL and NMSU's Electro-Optics program.

The Computer Networking Lab (CNL) supports teaching and research in Internet and wireless sensor networks. The mission of CNL is to provide students with the opportunity to do cutting-edge research that has high practical relevance. Currently, research projects in CNL include secure data dissemination in wireless sensor networks, solar-powered sensor networks, and RFID sensor networks. The major research sponsors of CNL include US Army, DHS, Intel, Los Alamos National Lab, and Sandia National Lab. CNL is directed by Dr. Hong Huang.

Students and faculty associated with the Advanced Computer Architecture Performance and Simulation (ACAPS) Laboratory conduct research in the areas of performance modeling and simulation techniques, micro-architecture power optimization, performance analysis and optimization of large-scale scientific applications, and heterogeneous HPC computing for field-deployable systems. Equipment in the lab includes numerous state-of-the-art workstations, several contemporary servers, nVidia Tesla GPUs, Xilinx FPGAs, and more than 8TB of storage. ACAPS sponsors include the National Science Foundation, the Army High Performance Computing Research Center (AHPCRC), Sandia National Laboratories, Hewlett-Packard, and IBM. The laboratory's director is Dr. Jeanine Cook.

The Advanced Computer Engineering Laboratory (ACSEL, [www.acsel-lab.com](http://www.acsel-lab.com)) is engaged in solving problems related to high-performance and low-power computing systems with focus on VLSI chip engineering. ACSEL members are experts in high-speed digital circuits as well as low-power and ultra-low power design, specializing in energy efficient design, low-power digital circuit libraries and optimal relationship between computational energy and speed. ACSEL broader expertise is in Computer Arithmetic, Media Signal Processing, Hardware Security, Computer Architecture and Super-Computing. ACSEL sponsors are major computer and semiconductor companies such as: IBM, Intel, AMD, Fujitsu etc, as well as Semiconductor Research Council (SRC) and NSF. The director of ACSEL is IEEE Fellow, Dr. Vojin G. Oklobdzija.

The Rio Grande Institute for Soft Computing (*RioSoft*) is committed to serving private-sector and U.S. government needs in researching and developing intelligent decision-support systems and tools that aid in many aspects of strategic decision-making. Soft computing which includes fuzzy logic, neural networks, and evolutionary computation are used for modeling, analysis, and control of complex dynamical processes in various software-hardware integrated architectures. In addition RioRoboLab, a NASA Ames funded laboratory, provides facilities for research and development of intelligent autonomous and semi-autonomous systems focusing on advanced concepts of energy harvesting and energy scavenging from ambient energy sources. Research sponsors include the Defense Threat Reduction Agency, Defense Advanced Research Projects Agency, Los Alamos National Laboratory, and NASA. The director of *RioSoft* and *RioRoboLab* is Dr. Nadipuram (Ram) Prasad.

The Kazda Control Systems Laboratory is dedicated to the support of education and research in the area of Control Systems. Research involves collaborative efforts with the Mechatronics Lab in the Department of Mechanical and Aerospace Engineering, covering a wide area of robotics applications. The current thrust is a joint effort of M.E.E. and I.E. in the Reduced-Gravity/Biomechanics (RGB) Lab. This lab is sponsored by the National Science Foundation under the Major Research Instrumentation (MRI) grant. The purpose of the lab is to develop a reduced gravity simulator that can be used for research in Mechanical Engineering, Electrical Engineering, Human Biodynamic modeling, Ergonomics, Medical Rehabilitation, Dance, and Space Applications. The director of Kazda Control Systems Laboratory is Dr. Robert Paz.

## Support for Graduate Students

A number of teaching assistantships, research assistantships, and fellowships are available. Teaching assistants are recommended by individual faculty for selection by the ECE Department's Graduate Studies Committee. International students must pass university screening prior to being eligible for

selection as a TA. Nominations for new TAs are made by the advisor after a student is admitted. Research assistants are hired directly by the faculty member who has received a contract or grant for research.

The College of Engineering awards graduate scholarships and fellowships on behalf of Electrical and Computer Engineering. These include: the MIT/Lincoln Laboratory Fellowship, the Paul and Valerie Klipsch Grad Scholarship, the Admiral Paul Arthur Grad Scholarship, and the Barry Neil Rappaport Grad Scholarship. Applications can be completed on-line at <http://enr.nmsu.edu/scholarships.shtml> on or before March 1. The Electrical Utility Management Program has a limited number of fellowships for students interested in pursuing master's degrees in electrical energy systems.

### Admission

Prospective graduate students for the Master of Science or Doctor of Philosophy in Electrical Engineering must first meet the entrance requirements of the Graduate School. The prospective US graduate student should make formal application to the Graduate Student Services office (<http://gradschool.nmsu.edu/admit-form.html>). International graduate students must start with the Admissions Office (<http://international.nmsu.edu/admissions.html>). Official transcripts from all undergraduate and graduate institutions must be sent directly to the Graduate School. In addition, the student must arrange to have an official copy of the GRE (Graduate Record Examination) General Test scores sent to the Graduate School. International students must also submit their TOEFL (Test of English as a Foreign Language) scores. If the applicant meets the Graduate School's minimum requirements, the application is sent to the Klipsch School's Graduate Studies Committee for review. U.S. residents are given every chance of being successful in the pursuit of a graduate degree. If they do not meet the requirements of the Klipsch School, they can enter the Graduate School as "undeclared" where they must demonstrate competence in two or more graduate-level E E courses before they re-apply.

### Requirements for Ph.D. Degree

The Program Educational Objectives for the Doctorate in Electrical Engineering are:

1. That graduates obtain relevant, productive employment performing research in academia, government, or industry, and/or are teaching at institutions of higher education.
2. That graduates obtain relevant, productive employment with the private sector or in government and/or pursue additional advanced degrees.

The Ph.D. program is open to students with a master's degree. Exceptionally well qualified students may petition for direct entry to the Ph.D. program without first obtaining a master's degree.

### Option 1 - Ph.D. with completed MS degree

1. Complete undergraduate deficiency coursework, if the student admitted has both master's and bachelor's degrees in fields other than electrical engineering. Complete graduate deficiency coursework, which consists of three graduate core courses from three different areas of emphasis, if the student has a master's degree in a field other than electrical engineering.
2. Complete a minimum of 18 credits beyond the master's of graduate course work with the following restrictions:
  - a. E E courses must be numbered 500 or higher. Non-E E courses must be 450 or higher.
  - b. At least half of the 18 credits must be taken in the Klipsch School (E E).
  - c. At most 6 credits may be research, for example, E E 600, Doctoral Research, and E E 590 courses that are not listed as regular courses in the schedule.
  - d. Exclude credits of E E 700 Doctoral Dissertation.
  - e. If the MS degree is not E E, exclude credits from graduate deficiency coursework.

### Option 2 - Direct Ph.D. with B.S.E.E or equivalent, but no MS degree

1. Complete three graduate core courses.
2. Complete a minimum of 42 credits of graduate coursework, including the three graduate core courses with the following restrictions:
  - a. At least half of the 42 credits must be numbered 500 or higher.
  - b. At least half of the 42 credits must be taken in the Klipsch School (E E).
  - c. At most 9 credits may be research, for example, E E 600, Doctoral Research, and E E 590 courses that are not listed as regular courses in the schedule.
  - d. Exclude credits of E E 700 Doctoral Dissertation.
  - e. Exclude credits from E E 490, C S 457/C S 467/C S 477/C S 487, BCS 472, SPCD 470/SPCD 490, and COMM 485.

- f. At least half of the credits must be taken with other than a single professor.

### Common Requirements for all Ph.D. candidates

1. Participate in one semester of research seminars (E E 501, 1 cr.)
2. Take and pass the Ph.D. qualifying exam.
3. Pass a comprehensive examination. The examination must be part written and part oral. The specific format of the exam is at the discretion of the examination committee. It may cover course work, include a proposal for dissertation research, and may be preceded by a written exam.
4. Complete 18 credits of E E 700 doctoral dissertation.
5. Submit evidence for a minimum of two publications related to the dissertation research, one of which is submitted to an internationally- recognized journal, such as IEEE Transactions, and the second of which may be with a professional conference, such as an IEEE conference.
6. Pass a final oral exam which defends the dissertation.

Other limitations and requirements that apply to all Ph.D. degrees are described elsewhere in this catalog.

### Ph.D. Qualifying Exam

The Ph.D. Qualifying Exam is typically offered on the Monday just prior to the beginning of each semester. The format is one half day written exam. The examination indicates a readiness for research at the graduate level. Students answer a total of six questions with two coming from each of three areas of emphasis. Taking three graduate core courses (listed below) prepares students for the Ph.D. qualifying exam.

### Requirements and Options for M.S.E.E. Degree

The Program Educational Objectives for the Master of Science Program in Electrical Engineering are:

1. That graduates successfully apply advanced skills and techniques in one or more areas of emphasis.
2. That graduates obtain relevant, productive employment with the private sector or in government and/or pursue additional advanced degrees.

Three options exist for the Master of Science in Electrical Engineering degree. The requirements for each option are listed below:

1. Thesis- 24 credits of course work plus 6 credits of E E 599 plus oral exam
2. Technical Report- 27 credits of course work plus 3 credits of E E 598 plus oral exam
3. Course Work Only- 30 credits of course work plus oral exam or the graduate portion of the Ph.D. qualifying exam

Credits of E E 490/E E 498/E E 499, C S 457/C S 467/C S 477/C S 487, BCS 472, COMM 485, and SPCD 470/SPCD 490 do not count toward a graduate degree. Credits of E E 590, Selected Topics, are limited to a total of 9, of which at most 6 may be credits for courses that don't appear as regular classes in the printed schedule. Each area of specialization may have additional requirements for students in those areas. Other limitations and requirements that apply to all master's degrees are described elsewhere in this catalog.

### B.S./M.S. PROGRAM

This program option is designed to provide a means for ECE undergraduates to obtain both a B.S.E.E. and a M.S.E.E. degree with 154 credit hours of coursework (normally: B.S.E.E. = 130 hours, M.S.E.E. = 30 hours; total = 160 hours). Students electing to utilize this option will follow the existing undergraduate curriculum for the first seven semesters. In the final undergraduate semester, two graduate courses (>450 level) will be taken in lieu of two ECE electives listed in the undergraduate curriculum. The student receives a B.S.E.E. degree at this point. A M.S.E.E. program can be completed in three additional semesters. Students must obtain prior approval of the department before starting this program option.

### GRADUATE CORE COURSES AND BREADTH ELECTIVES

The M.S.E.E. program requires students to participate in one semester of research seminars (E E 501, 1 cr.) and take two graduate core courses from two different areas of emphasis. In addition, either a third graduate core course OR one graduate breadth course must be taken from a third area of emphasis. If a student wishes to pursue a Ph.D., the third class should come from the core class list as preparation for the Ph.D. qualifying exam. The graduate core courses, specialty areas, and credits are listed below for the Graduate Core Courses and the Graduate Breadth Electives:



**Graduate Core Courses:****Electromagnetics**

EE 515	Electromagnetic Theory I	3
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**Microelectronics/VLSI**

EE 523	Analog VLSI Design	3
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**Electro-optics**

EE 528	Fundamentals of Photonics	4
	or	
EE 529	Lasers and Applications	4

**Electric Energy Systems**

EE 543	Power Systems III	3
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**Digital Signal Processing**

EE 545	Digital Signal Processing II	3
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**Control Systems**

EE 551	Control System Synthesis I	3
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**Comp. Engineering**

EE 563	Computer Performance Analysis I	3
	or	
EE 564	Advanced Computer Architecture I	3

**Communications**

EE 571	Random Signal Analysis	3
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**The graduate breadth electives are listed below:****Microelectronics/VLSI**

EE 524	Digital VLSI Design	3
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**Electric Energy Systems**

EE 537	Power Electronics	3
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**Electromagnetics**

EE 541	Antennas and Radiation	3
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**Control Systems and Digital Signal Processing**

EE 555	Advanced Linear Systems	3
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**Communications**

EE 581	Digital Communication Systems I	3
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**M.S.E.E. Coursework Option Final Exam**

The M.S.E.E. Coursework Option Final Exam is typically offered on the Monday just prior to the beginning of each semester. The format is a half day written exam. Students answer a total of four questions with two coming from each of two areas of emphasis. Taking two graduate core courses (listed above) prepares students for the exam. The coursework option is limited to students who receive one semester or less from the department in the form of a teaching or research assistant.

**Requirements for Students without B.S.E.E. Degree or Equivalent**

Students without a B.S.E.E. degree or equivalent preparation will be expected to take classes covering the core knowledge required in our B.S.E.E. program. This includes mathematics through differential equations and basic engineering physics. The student's graduate advisor will prepare an individualized deficiency schedule, based on the student's academic background and work experience.

**The following course from our undergraduate program will be considered deficiencies for students without a B.S.E.E.:**

EE 161	Computer Aided Problem Solving	4
EE 162	Digital Circuit Design	4
EE 210	Engineering Analysis I	4
EE 260	Embedded Systems	4
EE 280	DC and AC Circuits	4
EE 310	Engineering Analysis II	3
EE 312	Signals and Systems I	3
EE 314	Signals and Systems II	4

EE 351	Applied Electromagnetics	4
EE 380	Electronics I	4

## INDUSTRIAL ENGINEERING

Department website: <http://ie.nmsu.edu/>  
(575) 646-4923  
ie@nmsu.edu

*E. Pines, department head, Ph.D. (Penn State)— quality and continuous improvement, technology policy, H. Sohn, Ph.D. (University of Iowa)— operations research, discrete optimization, network design, J. Mullen, Ph.D. (Iowa State)— stochastic processes, quality, improvement, production system design, D. J. Valles-Rosales, Ph.D. (New Mexico State)— manufacturing systems, soft computing technologies, computer integrated manufacturing, Yu-Li Huang, Ph.D. (Michigan)— health care delivery systems, operations research, operations management, Alla Kammerdiner, Ph.D. (University of Florida)— statistical analysis, data mining, network science and combinatorial optimization*

**DEGREE: Master of Science in Industrial Engineering****DEGREE: Doctor of Philosophy****MAJOR: Engineering****CONCENTRATION: Industrial Engineering**

The Department of Industrial Engineering offers graduate work leading to the degrees of Master of Science in Industrial Engineering and Doctor of Philosophy with specialization in industrial engineering. Areas of emphasis include computer modeling, operations research and systems engineering, manufacturing systems, quality, and reliability engineering.

Departmental admission requirements in addition to those of the Graduate School must be considered on an individual basis because of the diversity of backgrounds of applicants in the program. An applicant should meet or correspond directly with the department as a first step in determining his or her specific admission status. Applicants should present mathematics preparation equivalent to 9 credits of calculus for engineers, 3 credits of differential equations, and 3 credits of calculus-based probability and statistics.

Minimum credit-hour requirements for the master's degree may be met in any of the following ways: (1) 24 semester credits approved course work and 6 semester credits of thesis (I E 599) for a total of 30 semester credits, (2) 27 semester credits approved course work and 3 semester credits of project (I E 598) for a total of 30 semester credits, or (3) 30 semester credits of approved course work. Approved course work must meet all requirements of the Graduate School, represent a consistent master's program in relation to a student's graduate study goals as determined through consultation with the graduate program adviser, and be approved by a program committee of the graduate faculty of the department. Programs in the focus areas of engineering management, computer modeling, operations research, or manufacturing engineering can be developed with the aid of a faculty advisor.

Departmental facilities and equipment are available to support research efforts of graduate students, including computer terminals and laboratories. In addition to departmental facilities, supporting facilities such as the Manufacturing Technology and Engineering Center and five interdisciplinary Research Clusters are available for research work.

The Ph.D. program is research oriented with the final product being the dissertation. The general information chapter in this catalog describes the Ph.D. The program in industrial engineering also includes the following additions: the course work must include at least 12 credits at the 500 level in a related field, 6 credits of 600-level research courses covering two areas, and 18 credits of 700-level courses following successful completion of the comprehensive examination. The department does not have any foreign language or research tool requirements. Interested individuals should correspond directly with the department to determine eligibility for admission.

## MECHANICAL AND AEROSPACE ENGINEERING

Department website: <http://mae.nmsu.edu/>  
Graduate Program Website: <http://mae.nmsu.edu/graduate-programs/>  
(575) 646-3502

**ileslie@nmsu.edu**

*I.H. Leslie, department head, Ph.D. (Stanford)– heat transfer, renewable energy, A. Abdelkefi, Ph.D. (Virginia Tech)– nonlinear dynamics, energy harvesting, aeroelasticity, fluid-structure interaction, vibration and controls; C. Cai, Ph.D. (Michigan)– gaskinetic theory and gaskinetic CFD, nonequilibrium gasdynamics and plasma dynamics; V. K. S. Choo, Ph.D. (Liverpool)– composite materials, computer applications; E. G. Conley, \*\* Ph.D. (Michigan State)– optics and experimental mechanics; B. Drach, Ph.D. (New Hampshire)– mechanics of composite materials, multi-scale modeling and characterization; G. V. Garcia, associate department head, Ph.D. (Texas A&M)– damage detection, experimental mechanics, vibration; A. Gross, DEngr. (Aachen)– computational fluid mechanics, active flow control, and numerical methods; K. Kota, Ph.D. (Central Florida)– heat transfer, energy efficiency, multi-scale surface engineering and bio-inspired design; S. Kuravi, Ph.D. (Central Florida)– renewable energy, thermal systems, concentrating solar power, thermal and thermochemical/hydrogen storage; Y.S. Lee, Ph.D. (Illinois Urbana - Champaign)– aeroelastically, fluid-structure interaction, nonlinear system identification; O. Ma, Ph.D. (McGill)– dynamics, control, and robotics; Y. H. Park, Ph.D. (Iowa)– design optimization, computational solid mechanics, atomistic and molecular simulations; A. K. Sanyal, Ph.D. (Michigan)– nonlinear control and estimation, geometric mechanics, control of aerospace vehicles; I. Sevostianov, Ph.D. (St. Peter s burg, Russia)– micromechanics of materials, mechanics of biomaterials, mathematical physics; B. Shashikanth, Ph.D. (Southern California)– fluid mechanics, dynamical systems, controls; F. Shu, Ph.D. (Purdue)– experimental fluid dynamics, bifluidics and turbulent flow; M. Wei, Ph.D. (Illinois Urbana-Champaign)– computational fluid dynamics, model order reduction, control and optimization, aeroacoustics*

\*Registered Professional Engineer (NM)

\*\*Registered Professional Engineer (state other than NM)

**DEGREE: Master of Science**  
**MAJOR: Aerospace Engineering**

**DEGREE: Master of Science**  
**MAJOR: Mechanical Engineering**

**DEGREE: Doctor of Philosophy**  
**MAJOR: Aerospace Engineering**

**DEGREE: Doctor of Philosophy**  
**MAJOR: Engineering**  
**CONCENTRATION: Mechanical Engineering**

**MINOR: Mechanical Engineering**

Graduate programs of study are available leading to the degrees of Master of Science and Doctor of Philosophy in Aerospace Engineering, the Master of Science in Mechanical Engineering, and the Doctor of Philosophy in Engineering with a concentration in Mechanical Engineering. Areas of active research in mechanical engineering include the following: experimental fluids with application to wind power, computational fluid dynamics, energy systems and components, thermal management, space transportation, modeling and analysis of machining processes, micromechanics and cross property connections, computational mechanics with application to material properties, renewable energy, nonlinear dynamics and vibration, reduced order modeling in multibody dynamics, structural dynamics and fluids, robotics, composite materials and nanomaterials. Areas of active research in aerospace engineering include the following: computational, theoretical and experimental aerodynamics, vortex dynamics, flow control, aeroelasticity and flutter, space dynamics and control, spacecraft motion estimation, rarefied gasdynamics and space propulsion, ground simulation of reduced gravity environments, structural health monitoring, and unmanned aerial systems. Laboratory facilities supporting graduate research include a large subsonic wind tunnel, a large water channel, a robotics, controls and UAS lab, a reduced gravity simulation lab, a space dynamics and controls lab, and a composite materials lab. A mechanical testing lab is also available in the College of Engineering.

In addition to fulfilling the basic requirements for admission to the Graduate School, applicants are expected to have an undergraduate degree equivalent to a B.S. in mechanical or aerospace engineering from a university accredited by ABET. Graduate students whose BS degree is in a discipline other than A E or M E will normally be required to take undergraduate courses in M E or A E in order to prepare for graduate course work; such undergraduate preparatory work will be determined by the graduate coordinator on a case by case basis. A candidate for the master's degree can choose one of two options: a thesis option or a course-only option. Both options require a minimum of 30 credits of graduate study.

Doctoral candidates must complete a program of study determined by the student and his or her advisory committee. The student must successfully pass a

written qualifying examination (administered during the student's first year of full-time study) and an oral comprehensive examination administered after approximately 80 percent of the course work is completed. The student must submit and defend an acceptable dissertation based on independent investigation in a field of study approved by the advisory committee. The requirements for the M.S. and Ph.D. degrees are stated below.

**DEGREE: MASTER OF SCIENCE**  
**MAJOR: AEROSPACE ENGINEERING (30 CREDITS)**

Students may select one of two options for completing their M.S. degree. Selection of a particular option must be made during the first semester of study in conjunction with selecting a permanent adviser.

**Thesis Option**

- M E 570
- At least 18 credits of AE graduate courses (up to six credits of ME graduate courses may be substituted with the approval of the Graduate Coordinator)
- All course must be 500 level or above
- The program of study may include three credits of AE 509 (individualized studies) and/or up to six credits of AE 510 (special topics courses offered formally on a one time basis)
- Publication requirement– a refereed conference paper accepted or a refereed journal article in review or accepted by graduation. The M.S. thesis can be a reformatted version of this paper. Exceptions may be made on a case by case basis by the department head.

**Coursework Option**

- M E 570 and one core course from 4 of the 5 following topic areas:
  - Space Dynamics: AE 561 Spacecraft and Attitude Dynamics and Control, AE 562 Astrodynamics
  - Aerodynamics: AE 552 Gasdynamics, ME 530 Intermediate Fluid Mechanics, AE 533 Computational and Theoretical Fluid Mechanics
  - Structural Dynamics and Control: AE 512 Vibrations, A E 566 Aeroelasticity, AE 527 Controls of Mechanical Systems
  - Mechanics: ME 502 Elasticity, ME 504 Continuum Mechanics
  - Engineering Analysis: ME 580 Numerical Analysis, ME 518 Finite Elements
    - Four additional AE courses (500 level or above) which may be core courses listed above, research area courses, AE 509, or AE 510. Graduate ME courses may be substituted for AE courses with the approval of the Graduate Program Coordinator.
    - One course (500 level or above) from related areas. If course is not in AE or ME program, approval of the Graduate Program Coordinator is required.

**MAJOR: MECHANICAL ENGINEERING (30 CREDITS)**

Students may select one of two options for completing their M.S. degree. Selection of a particular option must be made during the first semester of study in conjunction with selecting a permanent adviser.

**Thesis Option**

- ME 570
- At least 18 credits of ME graduate courses (up to six credits of AE graduate courses may be substituted with the approval of the Graduate Coordinator)
- All course must be 500 level or above.
- The program of study may include three credits of ME 509 (individualized studies) and/or up to six credits of ME 510 (special topics courses offered formally on a one time basis)
- Publication Requirement: a refereed conference paper accepted or a refereed journal article in review or accepted by graduation. The M.S. thesis can be a reformatted version of this paper. Exceptions may be made on a case by case basis by the department head.

**Coursework Option**

- ME 570 and one core course from 4 of the 5 following topic areas:
  - Solid Mechanics: M 502 Elasticity, ME 504 Continuum Mechanics
  - Thermal Science: ME 503 Thermodynamics, ME 540 Intermediate Heat Transfer
  - Fluids: M 530 Intermediate Fluid mechanics, ME 533 Computational and Theoretical Fluid Mechanics
  - Dynamics and Vibrations: ME 511 Dynamics, ME 512 Vibrations
  - Engineering Analysis and Control: ME 580 Numerical Analysis, ME 518 Finite Element Analysis, ME 527 Control of Mechanical Systems
    - Four additional M E courses (500 level or above) which may be core courses listed above, research area courses, dual listed courses, ME 509, or ME 510. Graduate AE courses may be substituted for ME courses with the approval of the Graduate Program Coordinator.

- One course (500 level or above) from related areas. If course is not in AE or ME program, approval of the Graduate Program Coordinator is required.

### **Selection of MS Option and Permanent Adviser**

Newly admitted graduate students will be assigned a temporary adviser for the first semester, but they must select a degree option and permanent adviser before registering for the second semester.

In considering a decision about option and adviser, the student should arrange to meet with several members of the graduate faculty during the first six weeks of study to discuss specific educational objectives. The student can use these meetings to become familiar with faculty interests and research projects currently in progress. The faculty member must agree (in writing) to serve as the student's adviser.

All students must pass a final examination. The final examination is to be conducted by the student's advisory committee and is taken after completing all coursework and thesis work for the thesis option, or all coursework for the course-only option.

### **DEGREE: DOCTOR OF PHILOSOPHY MAJOR: AEROSPACE ENGINEERING**

The student's academic program is not judged satisfactory unless it prepares the student to contribute to the advancement of knowledge in the field of Aerospace Engineering. The Degree of Doctor of Philosophy is indicative of distinguished achievement in the areas of scholarship and original research. Therefore, a dissertation of high quality is required of all doctoral students in Aerospace Engineering. Students must follow the degree requirements listed below to complete the Ph.D. course of study.

- A minimum of 36 credit hours of coursework (500 level or above) beyond the Bachelor of Science degree, at least 18 of which must support the student's research area.
- A minimum of 24 credit hours of research, A E 700 - Doctoral Dissertation, which may include a maximum of 6 credit hours of A E 600 Doctoral Research. A E 600 is intended for those students who have not completed the qualification examination, a prerequisite for A E 700.
- A student is required to have one refereed journal paper accepted and a second one accepted or in review by graduation. The Ph.D. dissertation can be a compilation and reformatted version of these published or accepted journal papers. Exceptions may be made on case by case basis by the Department Head.

### **MAJOR: ENGINEERING CONCENTRATION: MECHANICAL ENGINEERING**

The student's academic program is not judged satisfactory unless it prepares the student to contribute to the advancement of knowledge in the field of Mechanical Engineering. The Degree of Doctor of Philosophy is indicative of distinguished achievement in the areas of scholarship and original research. Therefore, a dissertation of high quality is required of all doctoral students in Mechanical Engineering. Students must follow the degree requirements listed below to complete the Ph.D. course of study.

- A minimum of 36 credit hours of coursework (500 level or above) beyond the Bachelor of Science degree, at least 18 of which must support the student's research area.
- A minimum of 24 credit hours of research, M E 700 - Doctoral Dissertation, which may include a maximum of 6 credit hours of M E 600 Doctoral Research. M E 600 is intended for those students who have not completed the qualification examination, a prerequisite for M E 700.
- A student is required to have one refereed journal paper accepted and a second one accepted or in review by graduation. The Ph.D. dissertation can be a compilation and reformatted version of these published or accepted journal papers. Exceptions may be made on case by case basis by the Department Head.

### **Ph.D. Program Transfer Credits:**

A student who has completed a Master of Science degree in M E, A E, or a closely related field may transfer up to 24 credits of graduate coursework, approved by the student's advisor, into a Ph.D. program of study.

### **Selection of Permanent Ph.D. Advisor**

Newly admitted graduate students will be assigned a temporary advisor for the first semester. The student must select a permanent advisor before registering for the second semester. In selecting a permanent advisor, the student should arrange to meet with several members of the graduate faculty during the first six weeks of enrollment to discuss specific objectives. The student should use these meetings to become familiar with faculty research interests and research projects

currently in progress. The faculty member must consent (in writing) to serve as the student's advisor.

Policies governing the Ph.D. written qualifying examination, the Ph.D. written and oral comprehensive examination, the student's Ph.D. committee, and the Ph.D. dissertation are contained in the department's Graduate Program website.

# COLLEGE OF HEALTH AND SOCIAL SERVICES

Dean • Tilahun Adera  
 Associate Dean for Academic Affairs • Donna Wagner  
 Associate Dean for Research • Joseph Tomaka  
 Assistant Dean for Advancement • Jennifer Cervantes  
 Director of Finance • Aida Lopez  
 Coordinator of Student and Academic Programs • Sarah Baker

## PUBLIC HEALTH SCIENCES

Department Website: <http://publichealth.nmsu.edu>  
 (575) 646-4300

Mark J. Kittleson, PhD, FAAHB, FAAHE, department head  
[kittle@nmsu.edu](mailto:kittle@nmsu.edu)

A. Amatya, Ph.D. (U. of Illinois - Chicago) – biostatistics; J.E. Brandon, Ph.D., C.H.E.S. (Southern Illinois U.), emeritus – border health issues; S. Forster-Cox, Ph.D. (U. of New Mexico) Online Coordinator – community health education, health promotion, non-profit organizations, rural health; J. Gladstone, PhD (NMSU) - health management, Native American Health Issues; M.J. Kittleson, Ph.D., FAAHB, FAAHE (U. of Akron) – health education, technology, evaluation; C. T. Kozel, Ph.D., C.H.E.S. (U. of New Mexico) – community health education, health policy analysis, administration; C. Kratzke, Ph.D., C.H.E.S. (Old Dominion U.) – community health education, health disparities, cancer; J.McDonald, Ph.D., (U Washington); R. Palacios, Ph.D. (U. of Texas at El Paso) – stress, disease outcomes, program evaluation; S. P. Rao, Ph.D., C.H.E.S. (Texas Women’s U.) – Graduate Certificate Coordinator, domestic violence, HIV/AIDS, addictions, community health education; J. Robinson III, Ed.D., FAAHE (U. of Northern Colorado), Graduate Coordinator – health education; S.L. Wilson, Ph.D. (Southern Methodist U.) – health policy, rural health, international health, health disparities

### DEGREE: Master of Public Health

**MINORS: Gerontology  
 Public Health  
 US/Mexico Border Health Issues**

### CERTIFICATE: Graduate Public Health

The Department of Public Health Sciences offers the Master of Public Health degree (M.P.H.) in Community Health Education and Health Management, Administration and Policy. The degree program prepares public health professionals to function in a variety of settings, including health programs at the local, state, and federal government levels; profit and nonprofit organizations and agencies; worksite settings; and educational institutions. The MPH program is fully accredited by the Council on Education for Public Health (CEPH).

### Admissions Requirements

Students may be admitted on a full-time or part-time basis to the on-campus program or in the fully online version of the program, which is delivered via distance education technologies. The online program has curriculum and degree requirements in common with the on-campus program, and is covered by the same CEPH accreditation. All coursework for the online degree can be completed off-campus utilizing web-based technologies and is aimed at meeting the needs of working students and others for whom a campus-based program is not an option. In addition to meeting all admissions requirements of the Graduate School, applicants must meet the following departmental requirements:

- Complete a short bio-sketch and an essay describing the applicant's reasons for wishing to pursue the M.P.H. degree at NMSU. Any paid or volunteer work performed in a public health or related agency setting should also be described in detail, including length of work and descriptions of the work typically performed as part of the job.
- Scores from a recent administration of the GRE are required (verbal, quantitative, and analytical writing scores).
- Submit at least two letters of reference from former faculty and/or employers.

Applications are now completed online. Go to <http://prospective.nmsu.edu/graduate/apply/index.html>. For more information, contact the Graduate Coordinator at [mphapps@nmsu.edu](mailto:mphapps@nmsu.edu), or obtained via the website: [publichealth.nmsu.edu](http://publichealth.nmsu.edu).

### DEGREE: MASTER OF PUBLIC HEALTH MPH PROGRAM

#### Required of all MPH Students

#### I. Public Health Core Courses (15 credits)

MPH 510	Community and Psychosocial Aspects of Public Health	3
MPH 520	Biostatistical Applications in Public Health	3
MPH 530	Epidemiological Approaches to Disease Control and Prevention	3
MPH 540	Health Services System: Administration and Organization	3
MPH 550	Environmental Public Health Issues	3

#### II: Specializations/ Emphasis:

##### Community Health Education Core Courses (18 credits)

Those in the Community Health Education Emphasis:

MPH 570	Foundations of Public Health Education	3
MPH 572	Techniques of Health Communication/Education	3
MPH 573	Community Organization in Public Health	3
MPH 574	Health Program Planning	3
MPH 578	Evaluative Approaches in Public Health	3
MPH 579	Research and Resources in Community Health	3

##### Health Management Administration and Policy Emphasis (18 credits)

Those in the Health Management, Administration and Policy Emphasis:

MPH 541	Principles of Health Program Management	3
MPH 545	Health Services Organization and Delivery	3
MPH 546	Public Health Finance and Budget Management	3
MPH 547	Public Health Law and Ethics	3
MPH 558	Public Health Policy Analysis	3
MPH 578	Evaluative Approaches in Public Health	3

#### III. Cultural Foundation Course (3 credits)

Select one course from the cultural foundation series numbered MPH 560- MPH 569

#### IV. Additional Requirements (3 credits)

MPH 596	Field Experience	1-4
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#### V. Thesis and Non-thesis Options

Choose one of the following options in consultation with your graduate advisor.

##### Thesis Option (only for those in the Community Health Education emphasis)

MPH 599	Master's Thesis	1-6
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##### Non-thesis Option (9 credits) (available for those in the Community Health Education emphasis and the Health Management, Administration & Policy emphasis)

	Elective	3
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	Elective	3
	Elective	3

**Note:** MPH 500 may be required upon review of the MPH Admission committee. Elective courses may include other MPH courses or 500-level courses from other departments. Some MPH courses are crossed listed with HLS 400 level courses (e.g. HLS 467 Rural Health Issues and MPH 567 Rural Health Issues). Students who have previously taken one of these 400 level courses at NMSU, may not take the corresponding 500 level MPH course for degree completion credit.

The thesis option requires a total of 44-46 credit hours, while the non-thesis option requires 48 credit hours. Final examination for the non-thesis option includes both oral and written questions pertaining to the student's graduate course work. Final examination for the thesis option consists of an oral defense of the thesis and related course work.

Selected elective and option courses may also be available during summer sessions.

All MPH students must comply with the Student Code of Conduct for the Department of Public Health Sciences. This can be found online at the Department's web page (<http://publichealth.nmsu.edu>)

Students completing the Community Health Education emphasis are eligible to sit for the Certified Health Education Specialist (CHES) examination. Students completing either the Community Health Education or the Health Management, Administration and Policy emphasis are eligible to sit for the Certified Public Health (CPH) examination.

### GRADUATE CERTIFICATE: Public Health

The graduate certificate program in public health is not an official graduate degree offered by NMSU but rather a focused collection of courses that enrolled students complete in public health. These courses are designed to provide and/or enhance students' knowledge of and skills in public health practice. Those students who successfully complete the previously listed courses receive a certificate of completion statement on their official transcript and a formal certificate from the university.

#### Certificate Program Courses:

MPH 510	Community and Psychosocial Aspects of Public Health	3
MPH 530	Epidemiological Approaches to Disease Control and Prevention	3
MPH 540	Health Services System: Administration and Organization	3
MPH 550	Environmental Public Health Issues	3

Students are required to complete a three credit elective. For those who have not had any statistics courses it is strongly recommended that they complete MPH 520 as their elective. Note that students who complete the Graduate Certificate are eligible to sit for the Certified Public Health (CPH) examination.

To apply:

Apply online at <http://prospective.nmsu.edu/graduate/apply/index.html>.

International students are required to contact the Center for International Programs at 575-646-5480.

### DUAL MPH/MSW DEGREE PROGRAM

The department of Public Health Sciences and the School of Social Work offer a dual MPH/MSW degree program. The two degrees are: Master of Public Health (MPH) in Community Health Education and Master of Social Work (MSW). Student interested in pursuing the dual degree program must:

- Prepare and submit separate admissions applications to both programs
- Notify each program in writing of the intent to pursue the dual degree program
- Be officially admitted to both degree programs
- Notify the NMSU Graduate School of the intent to pursue the dual degree program
- Complete all course requirements
- Complete separate final examinations for both degree programs

If you are interested in pursuing this option please call and talk with the Graduate Program Coordinator. The dual degree waives some courses from each program and students enrolled in this program should expect to complete the program in 3 years.

## NURSING

**School Website:** <http://schoolofnursing.nmsu.edu/>

**Director and Associate Dean:** Dr. Pamela Schultz

**Graduate Nursing Advisor:** Karen Pech

(575) 646-7770

[khuttlin@nmsu.edu](mailto:khuttlin@nmsu.edu)

*C. DeBlieck, DNP (U of Minnesota)– nursing informatics and health care technologies; G. Fullbright, DNP (New Mexico State)– women's health, domestic violence, reproductive endocrinology; K. Huttlinger, Ph.D. (Arizona)– nursing, anthropology, diabetes, Native American health disparities; B. Keele, Ph.D. (Kansas)– community, clinical practice research, health disparities; T. Keller, Ph.D. (St. Louis U)– health care policy, health care and nursing administration, professional issues; S. Lynch, Ph.D. (New Mexico State)– women's health and family counseling; S. Noe, DNP (New Mexico State)– substance abuse and addictions; A. Reinhardt Ph.D. (OHSU)– administration, leadership, organization, work environments; K. Robinson, Ph.D. (U of Utah)– self management of chronic conditions including pain, patient centered outcomes, use of mHealth technology, health disparities; J. Scarbrough, Ph.D. (New Mexico State)– nursing education, health disparities; P. Schultz, Ph.D. (Texas Woman's)– mental health, cancer, health disparities; L. Summers, Ph.D. (UT- Houston)– adolescent health and mental health, telehealth; J. Tomaka, Ph.D. (SUNY-Buffalo)– stress, coping, brief intervention, health research*

**DEGREE: Master of Science in Nursing**

**SPECIALIZATION: Nursing Administration**

**DEGREE: Doctor of Nursing Practice**

**SPECIALIZATION: Adult/Geriatric Nursing**

**SPECIALIZATION: Family/Psychiatric Mental Health Nursing**

**SPECIALIZATION: Family Nurse Practitioner**

**SPECIALIZATION: Public/Community Health Nursing**

**DEGREE: Doctor of Philosophy**

**MAJOR: Nursing**

**MSN:** The School of Nursing offers graduate course work for nurses leading to a Master of Science in Nursing (M.S.N.) degree. The area of MSN study includes nursing administration, which is designed to provide students with the knowledge and experience to assume leadership roles in a variety of health care delivery systems. Students are prepared to secure middle- and top-level administrative positions in health care agencies, and to assume leadership positions in a variety of settings. Graduates meet the requirements necessary to teach in basic nursing education programs or manage continuing nursing education programs.

The program is accredited by the Commission on Collegiate Nursing Education Accreditation Commission.

Admission to the MSN program is in accordance with the general regulations of the Graduate School. Additional requirements include a B.S.N. from an accredited college or university; successful completion of an inferential statistics course within the last 5 years; three professional letters of recommendation; a letter stating personal goals for graduate education and intended specialty area; resume identifying clinical practice experience; and proof of licensure or eligibility for licensure as a Registered Nurse in any of the 50 United States, the District of Columbia or U.S. territories. Application for admission should be sent to the Graduate School. Letters of reference, personal goals, resume, and proof of licensure should be sent directly to the School of Nursing. On an individual basis, applicants who are registered nurses without a bachelor's degree in nursing, but with a bachelor's degree in another discipline may be considered for admission. To be considered, individuals must complete the full application process and, if granted conditional admission by the School of Nursing Graduate Committee successfully complete required bridge courses in nursing prior to taking any graduate nursing courses.

**DNP:** The Doctorate in Nursing Practice (DNP) prepares individuals who can assume advanced nursing practice roles within the health care arena in the areas of family psychiatric/mental health, adult/geriatric, and public/community health nursing. The focus of the DNP is on advanced nursing practice directed towards improving nursing care outcomes for individuals, families, communities, and systems. The program emphasis is on cultural competence, evidenced-based practice, and translation of research to practice as it relates to improving the care of individuals, families, groups, and communities experiencing or at risk for health disparities. The complexity of health care combined with rapidly increasing knowledge and the need for both evidence-based practice and translation of research to practice support the goals of the doctorate of nursing practice (DNP).

**Ph.D.:** The intent of the nursing Ph.D. program is to prepare individuals who can assume leadership roles in academia, including the scholarship of teaching,

research, and professional service activities. The focus of the program is on nursing scholarship to facilitate development of new knowledge and nursing education directed at improving nursing care outcomes for individuals, families, communities, and systems. Holistic nursing scholarship as it relates to improving the care of individuals, families, groups, and communities experiencing or at risk for health disparities is the emphasis of the program. Holistic nursing scholarship acknowledges the interrelationship of mind, body, and spirit with an emphasis on health promotion and disease prevention. An empowerment/social justice framework guides the distinctive emphasis on border and international context.

Admission to the Ph.D. and DNP programs is in accordance with the general regulations of the Graduate School. Additional requirements include: a MSN from an accredited college or university (for the Ph.D. program); a BSN from an accredited program for the BSN to DNP; and a MSN with clinical certification in a nursing specialty area for the MSN to DNP; successful completion of an upper division statistics course for the DNP program and a graduate level statistics course for the Ph.D. program (taken within the last five years); three professional letters of recommendation; a letter stating personal goals for graduate education, completions of writing requirement, interview with nursing faculty, resume identifying practice experience; and proof of licensure or eligibility for licensure as a Registered Nurse in any of the 50 United States, the District of Columbia, or U.S. territories. For the DNP program, students must also take courses in advanced pathophysiology, advanced assessment, and advanced pharmacology in addition to specialty courses within their area of study. The focus of specific clinical experiences varies with student interest and in consultation with faculty advisors. Students in the DNP program complete a Scholarly Project. Students in the Ph.D. program complete a dissertation. All materials should be sent to the School of Nursing with Graduate School application materials placed in a separate envelope. Contact the DNP and Ph.D. programs for full and part-time options.

### DEGREE: MASTER OF SCIENCE IN NURSING

**MSN:** The School of Nursing offers graduate course work for nurses leading to a Master of Science in Nursing (M.S.N.) degree with a specialization in Nursing Administration. This specialization is designed to provide students with the knowledge and preparation to assume leadership roles in a variety of health care delivery systems. The program is accredited by the Commission on Collegiate Nursing Education Accreditation Commission.

Admission to the MSN program is in accordance with the general regulations of the Graduate School. Additional requirements include a B.S.N. from an accredited college or university; successful completion of an inferential statistics course within the last 5 years; three professional letters of recommendation; a letter stating personal goals for graduate education and intended specialty area; resume identifying clinical practice experience; and proof of licensure or eligibility for licensure as a Registered Nurse in any of the 50 United States, the District of Columbia or U.S. territories. For admission information, contact the NMSU Office of Admissions, <http://prospective.nmsu.edu/>.

### SPECIALIZATION: Nursing Administration

The MSN course of study leading to the master's degree in Nursing Administration follows:

#### MSN: Administration

NURS 505	Theoretical Foundations of Advanced Nursing	3
NURS 506	Health Policy and the Environment of Professional Nursing Practice	3
NURS 507	Nursing Research in Evidence-Based Practice	3
NURS 530	Promoting Health Behavior	3
NURS 562	Innovations and Health Care Organizations	3
NURS 563	Human Resource Management in Nursing	3
NURS 564	Nursing Fiscal Management	3
NURS 565	Advanced Nursing Leadership	3
NURS 566	Seminar in Nursing Administration- Roles	3
NURS 567	Nursing Informatics	3
NURS 595	Advanced Field Work in Nursing	1-6
	Electives	3

NURS 595: (12P)

#### Thesis Track

A ST 505	Statistical Inference I	4
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#### Non-thesis Track

	Minor or focus area:	6-9
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### DEGREE: Doctor of Nursing Practice

**DNP:** The Doctorate in Nursing Practice (DNP) prepares individuals who can assume advanced nursing practice roles within the health care arena in the areas of family psychiatric/mental health, adult/geriatric, and public/community health nursing. The focus of the DNP is on advanced nursing practice directed towards improving nursing care outcomes for individuals, families, communities, and systems. The program emphasis is on evidenced-based practice and translation of research to practice as it relates to improving the care of individuals, families, groups, and communities experiencing or at risk for health disparities. The DNP program at NMSU includes tracks for post-BSN preparation in an advanced practice specialty and a track for post-MSN preparation for the certified advanced practice nurse.

#### DNP Students: Core Courses

NURS 500	Applied Statistics for Evidence-Based Practice	3
NURS 507	Nursing Research in Evidence-Based Practice	3
NURS 511	Advanced Pathophysiology for Clinical Nursing	3
NURS 512	Advanced Clinical Pharmacology	3
NURS 515	Advanced Nursing Assessment	3
NURS 518	Genetics and Health	2
NURS 530	Promoting Health Behavior	3
MPH 530	Epidemiological Approaches to Disease Control and Prevention	3
NURS 562	Innovations and Health Care Organizations	3
NURS 565	Advanced Nursing Leadership	3
NURS 567	Nursing Informatics	3
NURS 649	Innovations and Health Care Organizations	3
NURS 651	Applied Nursing Science for the APN	3
NURS 652	Translational Methods and Evidence-Based Practice	3
NURS 658	The Aging Adult	3
NURS 697	Professional Roles for Advanced Practice Clinical Nursing	3
NURS 698	Advanced Clinical Residency	1-8
NURS 699	Clinical Scholarly Project	1-4

NURS 698: 1-20(4/32)

#### MSN to DNP

NURS 500	Applied Statistics for Evidence-Based Practice	3
NURS 507	Nursing Research in Evidence-Based Practice	3
NURS 518	Genetics and Health	2
NURS 530	Promoting Health Behavior	3
MPH 530	Epidemiological Approaches to Disease Control and Prevention	3
NURS 562	Innovations and Health Care Organizations	3
NURS 565	Advanced Nursing Leadership	3
NURS 567	Nursing Informatics	3
NURS 649	Innovations and Health Care Organizations	3
NURS 651	Applied Nursing Science for the APN	3
NURS 652	Translational Methods and Evidence-Based Practice	3
NURS 698	Advanced Clinical Residency	1-8
NURS 699	Clinical Scholarly Project	1-4

NURS 698: 1-20(4/32)

### SPECIALIZATION: Family/Psychiatric Mental Health Nursing

#### Required Courses

NURS 506	Health Policy and the Environment of Professional Nursing Practice	3
NURS 540	Advanced Psychosocial Pathology for Family, Psychiatric-Mental Health Nursing	3
NURS 649	Innovations and Health Care Organizations	3
NURS 659	Addictive Disorders	3
NURS 655	Psychopharmacology for Advanced Practice	2
NURS 660	Family, Psychiatric Mental Health Nursing I	5

NURS 662	Family, Psychiatric-Mental Health Nursing II	5
NURS 664	Family, Psychiatric Mental Health Nursing III	5

**SPECIALIZATION: Adult/Geriatric Nursing****Required Courses**

NURS 670	Diagnostic Reasoning	3
NURS 671	Primary Care in Acute Illness	3
NURS 672	Primary Care in Chronic Illness	4
NURS 673	Integrated Primary Care	4
NURS 676	Women's Health	3
NURS 684	Lifestyle Change and Adherence Issues with Diverse Populations	3

**SPECIALIZATION: Public/Community Health Nursing****Required Courses**

MPH 550	Environmental Public Health Issues	3
NURS 680	Advanced Public/Community Health Nursing I	3
NURS 681	Advanced Public/Community Health Nursing II: Assessment & Planning	4
NURS 682	Advanced Public/Community Health Nursing III: Implementation & Evaluation	4
NURS 683	Advanced Public/Community Health Nursing IV: Roles & Administration	4
NURS 684	Lifestyle Change and Adherence Issues with Diverse Populations	3
NURS 685	Epidemiology for Advanced Public/Community Health Nurse	2

**DEGREE: DOCTOR OF PHILOSOPHY  
MAJOR: NURSING**

**Ph.D.:** The intent of the nursing Ph.D. program is to prepare individuals who can assume leadership roles in advancing the scholarship of teaching, research, and professional service activities. The focus of the program is on nursing scholarship to facilitate development of new knowledge and nursing education directed at improving nursing care outcomes for individuals, families, communities, and systems.

Admission to the Ph.D. and DNP programs is in accordance with the general regulations of the Graduate School. Additional requirements include: a MSN from an accredited college or university (for the Ph.D. program); a BSN from an accredited program for the BSN to DNP; and a MSN with clinical certification in a nursing specialty area for the MSN to DNP; successful completion of an upper division statistics course for the DNP program and a graduate level statistics course for the Ph.D. program (taken within the last five years); three professional letters of recommendation; a letter stating personal goals for graduate education, completions of writing requirement, interview with nursing faculty, resume identifying practice experience; and proof of licensure or eligibility for licensure as a Registered Nurse in any of the 50 United States, the District of Columbia, or U.S. territories.

For the DNP program, students must also take courses in advanced pathophysiology, advanced assessment, and advanced pharmacology in addition to specialty courses within their area of study. The focus of specific clinical experiences varies with student interest and in consultation with faculty advisors. Students in the DNP program complete a Scholarly Project. Students in the Ph.D. program complete a dissertation. All materials should be sent to the School of Nursing with Graduate School application materials placed in a separate envelope. Contact the DNP and Ph.D. programs for full and part-time options.

**Required Courses**

NURS 600	Philosophy of Science in Nursing	3
NURS 601	Theory I: Methods and Processes of Nursing Knowledge Development	3
NURS 602	Theory II: Contemporary Substantive Nursing Knowledge	3
NURS 606	Quantitative Methods in Nursing Research	3
NURS 607	Qualitative Methods in Nursing Research	3
NURS 610	Nursing Education: Pedagogy and Roles	3
NURS 620	Advanced Health Care Statistics I	3
NURS 621	Advanced Health Care Statistics II	3

NURS 623	Mixed Methods	3
NURS 624	Measurement in Culturally Diverse Border Populations	3
NURS 630	Issues in Studying Health of Culturally Diverse and Border Populations	3
NURS 631	Population Based Approaches to Health Promotion	3
NURS 650	Behavioral Approaches and Determinants of Nursing and Health	3
NURS 690	PhD Nursing Seminar: Developing Research in Nursing	1-3
NURS 700	Doctoral Dissertation	1-9
	Electives	9

Those enrolled as Ph.D. students have dissertation and non-dissertation options (check with advisor). All students must complete a written and oral examination after completing 41-47 credit hours.

**SOCIAL WORK**

Department website: <http://socialwork.nmsu.edu/>  
(575) 646-2143

socwork@nmsu.edu

<http://socialwork.nmsu.edu>

Tina Hancock, DSW, Director

*T. Barnett-Queen, Ph.D. (South Carolina)– technology and social work education, mental health, supervision; R. Blair, Ph.D. (Utah)– mental health, individual therapy; S Burns, M.S.W. (Michigan) - direct practice; O. Cabada, M.S.W. (Texas) - mental health, social justice, I. de la Rosa, Ph.D. (Michigan)– program evaluation, research; E. Gergerich, Ph.D. (Arkansas) - gerontology, M. Gurrola, Ph.D. (Arizona) - social justice, immigration; T. Hancock, D.S.W. - domestic violence, immigration; G. Leedy, Ph.D. (Louisiana) - mental health, community-based social work, public health; F. Nedjat-Haiem, Ph.D. (California) - gerontology; M. Ortiz, M.S.W. (NMSU)– cultural competence, practice; D.L. Wagner, Ph.D. (Portland State Univ.) - gerontology, community planning; W. Whittlesey-Jerome, Ph.D. (Texas-Arlington)– mental health, policy, research*

**DEGREE: Master of Social Work****MINORS: Alcohol and Drug Counseling (Interdisciplinary)  
Gerontology (Interdisciplinary)**

The School of Social Work offers full-time and part-time graduate study in Las Cruces and Albuquerque leading to the Master of Social Work (M.S.W.) degree. The program is designed to provide academic and fieldwork education with an emphasis in Advanced Generalist Practice with Populations of the Southwest based on the foundation first year of generalist practice. The program is fully accredited by the Council on Social Work Education (CSWE).

Admission to the program is in accordance with the general regulations of the Graduate School, which include a completed undergraduate degree from an accredited institution. In addition to applying to the Graduate School, application must also be made to the School of Social Work. The application to the School of Social Work spells out admission requirements that include submitting a application form, a written statement, a current resume and personal references and statistics course. Applicants having a degree from a non-liberal arts area must show coursework that includes two courses from the humanities, two from the natural and biological sciences (with one course containing content in human biology) and three from the behavioral and social sciences, with at least one course in sociology or psychology. Applicants are also required to complete a Basic Statistics course prior to beginning their MSW program of study. The program does not grant academic credit for work or other life experience in lieu of social work course or field content.

The School of Social Work is committed to ensuring a culturally diverse student population to enhance the social work profession at both state and national levels. To meet this goal of diversity, the school makes an effort to recruit and retain a diverse student population.

Applicants who qualify for advanced standing may complete the program with 36 credits rather than 60 credits. Admission to the advanced-standing program is for highly qualified applicants who have a Bachelor of Social Work degree (B.S.W.) from a social work program accredited by the CSWE and earned within seven years of beginning the advanced standing program, a cumulative GPA of at least 3.0 (higher is preferred) in the last 60 hours and a two-year post

BSW degree work experience. As part of the M.S.W. application, those applying to the advanced standing program will, in addition to meeting all admission requirements for the full-time, two-year program or part-time, three-year program, submit two additional letters of reference, one each from a B.S.W. field liaison and B.S.W. field supervisor or instructor, and a copy of the final B.S.W. field evaluation.

## DEGREE: MASTER OF SOCIAL WORK GRADUATE SOCIAL WORK PROGRAM

The requirements for the Master of Social Work degree include 60 credits of designated graduate courses (36 credits of designated graduate courses for those accepted for advanced standing); a cumulative grade-point average of at least 3.0 on a 4.0 scale in all course and fieldwork, and for those electing the thesis option, the completion of a thesis. The thesis requires a slightly different course of study, including an approved proposal. Those students who plan to pursue a doctoral degree are encouraged to elect the thesis option.

Note that all social work courses must be taken in sequence. Successful completion of course work for each semester is a prerequisite for the course work of the following semester.

Any social work graduate student who receives an F in a social work course is dismissed from the program and must reapply for admission to the MSW program. Any social work student who receives a D in a social work course must repeat the course. Any social work student who receives 2 D's in social work courses is dismissed from the program and must reapply for admission to the MSW program.

An integral part of a graduate social work program is completing the practicum experience. For those enrolled in the two-year program, two practicum placements will be required (12 credits), which result in the student's spending 950 hours in the field. For those students entering the program with advanced standing, one field placement (6 credits) is required, totaling 500 hours in the field. Students are offered a wide range of field settings in New Mexico and West Texas. Students should be prepared to travel some distance and be responsible for their own transportation costs.

### Application Deadlines

The deadline for complete applications is February 15th of each year.

- Early applications received by January 1st will be given first consideration for Graduate Assistantships.
- Late applications that are complete will be considered when received on a space available basis.

### Course of Study:

Full-Time Program (60 cr.).  
Advance-Standing (33 cr.).

### Year One

#### Fall Semester (15 cr.)

MSW 509	Sociocultural Concepts and Populations of the Southwest	3
MSW 510	Human Behavior and the Social Environment I	3
MSW 520	Social Work Practice I	3
MSW 551	Generalist Field Practicum I	6

#### Spring Semester (15 cr.)

MSW 500	Social Problems and Social Welfare Policy	3
MSW 521	Social Work Practice II	3
MSW 552	Generalist Field Practicum II	3
MSW 560	Social Work Research	3

### Year Two

#### Fall Semester (15 cr.)

MSW 524	Practice III: Advanced Practice with Individuals	3
MSW 525	Practice IV: Advanced Generalist Practice with Groups	3
MSW 554	Advanced Generalist Field Experience I	3
MSW 561	Advanced Generalist Research	3
	or	
MSW 599	Graduate Thesis	0-6

### Spring Semester (15 cr.)

MSW 503	Policy Analysis and Change	3
MSW 526	Practice V: Advanced Practice with Families	3
MSW 527	Practice VI: Advanced Practice with Organizations and Communities	3
MSW 555	Advanced Generalist Field Experience II	3

### Course of Study: Advanced Standing (33 cr.)

Full-Time Advanced Standing begins in Summer and then follows the Year Two schedule, with the addition of 3 cr. MSW or/outside elective in both fall and spring semesters.

#### Summer

MSW 559	Practice and Research	3
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### MSW Electives (choose at least one to complete the two elective requirement)

MSW 501	Social Work Leadership and Administration	3
MSW 541	Alcohol and Other Drugs	3
MSW 542	Violence in the Family	3
MSW 543	Family and Child Welfare Practice	3
MSW 547	Social Work Mental Health Practice	3
MSW 563	Social Work with Hispanic Populations	3
MSW 564	Social Work with Native American Populations	3
MSW 590	Family and Child Welfare Policy	3
MSW 596	International Social Work and Social Welfare	3
MSW 597	Special Topics	1-3

### Other disciplines for one requirement:

MSW elective courses not listed above, Sociology, Anthropology, Psychology, Health Science, Family and Consumer Science, Counseling and Education Psychology, Economics, Management, Government, Statistics, Women's Studies, Criminal Justice.

### Course of Study: Part-Time Program (60 cr.)

### Year One

#### Fall Semester

MSW 509	Sociocultural Concepts and Populations of the Southwest	3
MSW 510	Human Behavior and the Social Environment I	3

#### Spring Semester

MSW 500	Social Problems and Social Welfare Policy	3
MSW 560	Social Work Research	3

### Year Two

#### Fall Semester

MSW 520	Social Work Practice I	3
MSW 551	Generalist Field Practicum I	6

#### Spring Semester

MSW 521	Social Work Practice II	3
MSW 552	Generalist Field Practicum II	3

#### Summer

MSW 503	Policy Analysis and Change	3
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### Year Three

#### Fall Semester

MSW 524	Practice III: Advanced Practice with Individuals	3
MSW 554	Advanced Generalist Field Experience I	3
MSW 561	Advanced Generalist Research	3
	or	
MSW 599	Graduate Thesis	0-6



**Spring Semester**

MSW 526	Practice V: Advanced Practice with Families	3
MSW 527	Practice VI: Advanced Practice with Organizations and Communities	3
MSW 555	Advanced Generalist Field Experience II	3

**Part-Time Advanced Standing (33 cr.)****Year One****Summer**

MSW 559	Practice and Research	3
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**Fall Semester**

MSW 525	Practice IV: Advanced Generalist Practice with Groups	3
MSW 561	Advanced Generalist Research	3
	or	
MSW 599	Graduate Thesis	0-6

**Spring Semester**

MSW 503	Policy Analysis and Change	3
MSW 527	Practice VI: Advanced Practice with Organizations and Communities	3

**Year Two****Fall Semester**

MSW 524	Practice III: Advanced Practice with Individuals	3
MSW 554	Advanced Generalist Field Experience I	3

**Spring Semester**

MSW 526	Practice V: Advanced Practice with Families	3
MSW 555	Advanced Generalist Field Experience II	3

**MSW Electives**

MSW 501	Social Work Leadership and Administration	3
MSW 541	Alcohol and Other Drugs	3
MSW 542	Violence in the Family	3
MSW 543	Family and Child Welfare Practice	3
MSW 563	Social Work with Hispanic Populations	3
MSW 564	Social Work with Native American Populations	3
MSW 590	Family and Child Welfare Policy	3
MSW 597	Special Topics	1-3

**Related Outside Elective Examples (choose one graduate level):**

MSW elective courses not listed above, Sociology, Anthropology, Psychology, Health Science, Family and Consumer Science, Counseling and Education Psychology, Economics, Management, Government, Statistics, Women's Studies, Criminal Justice.

**JOINT MSW/MPH DEGREE PROGRAM**

The School of Social Work and the Department of Health Science offer a joint MSW/MPH degree program. The two degrees are: Master of Social Work (MSW) and Master of Public Health (MPH) in Community Health Education. Students interested in pursuing the joint degree program must:

- Prepare and submit separate admissions applications to both programs
- Notify each program in writing of the intent to complete the joint degree program
- Be officially admitted to both degree programs
- Notify the NMSU Graduate School of the intent to complete the joint degree program
- Complete all course requirements for both degree programs
- Complete separate final examinations for both degree programs

If you are interested in pursuing this option please call and talk to the Graduate Program Coordinator. It is anticipated that students in this program will take three academic years to complete the joint MSW/MPH degree programs.

**MINOR: ALCOHOL AND DRUG COUNSELING**

This minor involves the departments of: Counseling and Educational Psychology; Criminal Justice; Family and Consumer Science; Health Science; Nursing; and Social Work. Completion of this minor will prepare students for completion of the coursework necessary to take the exam for state licensure as a drug and alcohol counselor in the State of New Mexico. If you are interested in the minor please request an information sheet from the Graduate Program Coordinator that will outline the program requirements and specify the application process.

**MINOR: GERONTOLOGY**

The Department of Health Science offers an online Graduate Minor in Gerontology. The Minor in Gerontology program is designed in part for non-traditional, location-bound students, who are working or otherwise occupied on a full-time basis. Health and human service professionals, current students, and others who are interested in acquiring basic knowledge in an interdisciplinary gerontology context are encouraged to consider this program. If you are interested in the minor please request an information sheet from the Graduate Program Coordinator that will outline the program requirements and provide contact information.

# COURSES

## COURSE LISTINGS

Courses are titled in the following style:

ASTR 110G Introduction to Astronomy (4)

- Course number - (110) indicates the course is a freshman course.
- Suffix (G) - indicates a New Mexico Common Core course.
- Suffix (V) - indicates a Viewing a Wider World course.
- Credits – the number within the parenthesis is the credit hour(s) for each course

### Course Number Designation

100-199 – Freshman courses  
 200-299 – Sophomore courses  
 300-399 – Junior courses  
 400-499 – Senior courses  
 450-499 – Senior or graduate courses  
 500-599 – First-year graduate courses  
 600-699 – Advanced graduate courses  
 700 – Ph.D. dissertation

In order to register for 300-level courses, a student must have met the basic academic skills requirements.

The letter N will be added as a suffix to the course number when the course credits are not applicable to the baccalaureate and specified associate degrees.

## A E - AEROSPACE ENGINEERING

A E 509 - Individualized Study (3)

Individualized study covering specialized topics in aerospace engineering. Consent of instructor required. Restricted to A E M E majors.

A E 510 - Special Topics (1-6)

Topics in aerospace engineering. May be repeated for a maximum of 6 credits. Consent of instructor required.

A E 512 - Vibrations (3)

Free and forced vibrations for discrete and continuous systems with single or multiple degrees of freedom. Introduction to nonlinear and random vibration and solution techniques for such systems. Cross-listed with: M E 512

A E 525 - Nonlinear Structural Dynamics (3)

Modern techniques to analyze and simulate nonlinear dynamical systems that arise in structural dynamics. The course will cover the following topics: summary of linear theory of multi-degree of freedom systems; sources of nonlinearity encountered in structural dynamics; effects of nonlinearity on structural response; nonlinear normal modes; reduced order modeling methods; data analysis methods; and applications from among aeroelasticity, energy pumping, structural health monitoring, system identification, and others. Cross-listed with: M E 525

A E 527 - Control of Mechanical Systems (3)

Rigorous introduction to the control of dynamical systems, with a focus on mechanical systems. Includes basic systems theory, controllability, feedback and stabilization, observers and dynamic feedback, and applications of methods to systems of importance in mechanical engineering. Consent of instructor required. Cross-listed with: M E 527

A E 529 - Nonlinear and Optimal Control (3)

Introduction to optimal control theory, Pontryagin's Maximum Principle, control of simple mechanical systems, Lagrangian and Hamiltonian methods, introduction to geometric control-Lie algebras, distributions, controllability and observability. Cross-listed with: M E 529

A E 530 - Intermediate Fluid Mechanics (3)

Application of exact and empirical solutions to fundamental flow problems, including viscous and inviscid behavior. These applications establish a theoretical basis for the origin and physical role of common terms in the governing equations. Cross-listed with: M E 530

A E 533 - Computational and Theoretical Fluid Mechanics (3)

Application of fluid mechanics theory and computational approaches to advanced flow problems, including viscous/inviscid and laminar/turbulent behavior. Complex flow problems addressed through development of a theoretical formulation, followed by application of computational fluid dynamic (CFD) tools, and finally presentation and validation of solution data. Pre/Corequisite(s): M E 530 or consent of instructor. Cross-listed with: M E 533

A E 552 - Introduction to Gasdynamics (3)

Gas kinetics, rarefied gas dynamics, collision dynamics; velocity distribution function, finite rate chemical process; thermal nonequilibrium and chemically reacting flows; introduction to quantum and statistical mechanics; Boltzmann equation and the BGK model; moments of the Boltzmann Equation; the Navier-Stokes Equation; the structure of shock waves.

A E 554 - Introduction to Plasmadynamics and Space Weather (3)

Equilibrium neutral gaskinetic theory; Neutral gas interactions: drag, contamination, erosion and glow; Particle Interactions, hypervelocity and shielding theory; Debye length & sheaths, plasma frequencies; Magneto-hydro-dynamics; Radiation theory, solar wind effects, cosmic rays; Plasma Interactions: surface charging, current collection, arcing; Radiation estimations; Solar wind; Magnetosphere.

A E 561 - Spacecraft Attitude Dynamics and Controls (3)

Rigid body kinematics and spacecraft attitude descriptions including Euler angles, Euler parameters, classical and modified Rodrigues parameters, and stereographic orientation parameters; Wahba's problem, q-method, and QUEST algorithms; torque-free attitude dynamics; motion and stability due to spinning craft and gravity gradient torque; passive and active methods of attitude control; nonlinear regulator and attitude tracking using feedback control laws.

A E 562 - Astrodynamics (3)

Two-body problem, orbit analysis, and classical orbit determination methods; trajectory design and optimization; orbital maneuvers using impulsive or continuous thrust; relative motion and rendezvous; perturbations and Lagrange planetary equations; interplanetary mission design including gravity assists; introduction to the three-body problem, halo orbits, and invariant manifolds in mission design.

A E 564 - Flight Dynamics and Stability (3)

Static and dynamic aerodynamic coefficient force and moment modeling; steady flight; equations of motion; longitudinal and lateral stability; coupled motions; nonlinear effects; applications to aircraft and re-entry vehicles.

A E 565 - Statistical Orbit Determination (3)

Theory of batch and sequential (Kalman) filtering as applied to satellite ranging data, including a review of necessary concepts of probability and statistics; orthogonal transformation techniques, square root filtering, and consider covariance analysis. Course work includes a term project that allows students to apply theory to an actual satellite orbit determination problem.

A E 566 - Aeroelasticity (3)

Introduction to aeroelasticity with emphasis on fluid-structure interactions occurring in aircraft. Phenomena considered include flutter/LCD (limit cycle oscillation), buffeting, divergence, and control reversal. Primary emphasis on structural dynamics, with use of simple aerodynamic models.

A E 575 - Propulsion (3)

Thermodynamics and dynamics of air breathing aircraft power plants; engine performance; off-design equilibrium running of turbojet engines; centrifugal compressors; jet, rocket, and ramjet engines; elective propulsion principles and devices for space vehicles.

A E 598 - Special Research Programs (1-3)

Individual investigations, either analytical or experimental. May be repeated for a maximum of 6 credits. Restricted to A E M E majors.

A E 599 - Master's Thesis (0-15)

Thesis. Graded: Thesis/Dissertation.

A E 600 - Doctoral Research (1-15)

This course number is used for assigning credit for research performed prior to successful completion of the doctoral qualifying examination. Graded: Thesis/Dissertation.

A E 698 - Special Research Programs (1-3)

May be repeated for a maximum of 6 credits.

A E 700 - Doctoral Dissertation (0-15)

Dissertation. Graded: Thesis/Dissertation.

**A EN - AGRICULTURAL ENGINEERING****A EN 459 - Design of Water Wells/Pumping Systems (3)**

Design of water wells; selection and specification of pumps and power units. Prerequisite: C E 382.

**A EN 475 - Soil and Water Conservation (3)**

Types and extent of erosion. Design and operation of structural and vegetative systems to control erosion. Elements of hydrology. Prerequisite: C E 331. Corequisite: C E 382 or consent of instructor.

**A EN 478 - Irrigation and Drainage Engineering (3)**

Design and operation of surface and sprinkler irrigation systems; pumping and conveyances; introduction to principles and practices of drainage systems and wells. Prerequisite: C E 382 or consent of instructor.

**A EN 498 - Special Topics (1-3)**

Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.

**A ST - APPLIED STATISTICS****A ST 450 - Special Topics (1-4)**

Specific subjects and credits announced in the Schedule of Classes. Maximum of 4 credits per semester and a grand total of 9 credits.

**A ST 456 - Statistical Methods and Data Analysis (3)**

Methods for sampling and estimation; analysis of variance and elementary experimental designs; linear regression and correlation; multiple regression, variable selection methods and residual analysis; introduction to statistical packages. Prerequisite: A ST 251G, A ST 311, or equivalent.

**A ST 498 - Independent Study (1-3)**

Individual studies directed by consenting faculty with prior approval of the department head. Maximum of 3 credits per semester and a grand total of 3 credits.

**A ST 501 - Statistical Methods I (4)**

Applications of statistical techniques in analysis and interpretation of experimental data; estimation and testing, analysis of variance, elementary experimental designs, linear regression and correlation. Taught in Spanish only. Prerequisite: consent of instructor.

**A ST 502 - Statistical Methods II (4)**

Statistical models for analyses of variance, covariance, and multiple regression; nonparametric statistics; components of variance; designs and analyses for multifactor experiments. Taught in Spanish only. Prerequisite: E ST 501 or consent of instructor.

**A ST 503 - SAS Basics (2)**

An introduction to the statistical software package, SAS, and its utilization in an interactive computing environment, primarily PC/SAS. Provides a fundamental understanding of the structure of SAS, its data management capabilities, and how to invoke a variety of descriptive and simple statistical SAS procedures. Corequisite(s): A ST 505, or consent of instructor.

**A ST 504 - Statistical Software Applications (1)**

Optional Computing course to accompany A ST 506. Computer analysis of topics covered in A ST 505 and A ST 506. Prerequisite: A ST 503 or consent of instructor. Corequisite: A ST 506 or A ST 502 or consent of instructor.

**A ST 505 - Statistical Inference I (4)**

A qualitative introduction to the concepts and methods of statistical inference. Sampling, frequency distributions ( $z$ ,  $t$ ,  $x^2$ ,  $F$ ), estimation, and testing. One-way analysis of variance. Simple linear regression. Prerequisite: consent of the instructor.

**A ST 506 - Statistical Inference II (3)**

Introduction to multiple regression; the analysis of variance for balanced studies; multiple comparisons, contrasts, factorials, experimental designs through split plots. Prerequisite: A ST 505 and the ability to use a standard computer package such as SAS (may be satisfied by A ST 503) or consent of instructor.

**A ST 507 - Advanced Regression (3)**

Examination of multiple regression; residual analysis, collinearity, variable selection, weighted least squares, polynomial models, and nonlinear regression: linearizable and intrinsically nonlinear models. Prerequisites: A ST 503 and A ST 505 or consent of instructor.

**A ST 508 - Analysis of Advanced Designs and Related Topics (3)**

Complete and incomplete block designs; fixed, mixed, and random models; unbalanced data; analysis of covariance; nested experiments; fractional factorials. Prerequisites: A ST 504, and one of A ST 502 or A ST 506; or consent of instructor.

**A ST 515 - Statistical Analysis with R (3)**

Introduction to R data types, basic calculations and programming, data input and manipulation, one and two sample tests, ANOVA, regression, diagnostics, graphics, probability distributions, and basic simulations in the R software environment. Prerequisite(s): A ST 505 or equivalent with consent of instructor.

**A ST 521 - Sampling Methodology (3)**

Methodology of sampling finite populations using design-based (simple random, stratified, systematic, cluster, and multistage), model-based (regression and ratio estimators), and adaptive sampling. Properties of estimators under all designs are discussed. Prerequisite: either A ST 456, A ST 501, A ST 505, A ST 565, or consent of instructor.

**A ST 522 - Survey Sampling (2)**

Techniques of survey sampling (mail questionnaire and telephone surveys) applicable to social sciences. Techniques of questionnaire preparation and methods of evaluating results are presented. Prerequisite: A ST 521, or consent of instructor.

**A ST 523 - Biological Sampling (s) (3)**

Methods of sampling biological populations: area frame, quadrant, line intercept, line transect, and mark-recapture. Prerequisite: A ST 501 or A ST 505 or consent of instructor.

**A ST 524 - Selected Topics in Sampling (2)**

Treatment of nonresponse in sample surveys; response error modeling and estimation. Other topics to be selected from among the following: approximate methods for variance estimation, panel rotation sampling, longitudinal survey design and estimation, telephone random-digit-dialing, model based estimation, and multiplicity sampling. Prerequisite: A ST 521 or consent of instructor.

**A ST 545 - Time Series Analysis and Applications (3)**

A systematic exposition of the methods for analyzing, modeling, and forecasting time series. Emphasizes underlying ideas and methods rather than detailed mathematical derivations, using SAS, BMDP, IMSL, and Fortran. Prerequisites: A ST 503 and A ST 501 or A ST 505, or consent of instructor.

**A ST 550 - Special Topics (1-4)**

Specific subjects to be announced in the Schedule of Classes. Maximum of 4 credits per semester. No more than 9 credits toward a degree.

**A ST 551 - Introduction to Statistical Consulting (1)**

Consideration of published material in the consulting process. Prerequisite: consent of instructor. Restricted to majors. Graded S/U.

**A ST 552 - Advanced Statistical Consulting (1)**

Continuation of A ST 551 with emphasis on dealing with clients in order to identify statistically relevant features of a research study. Prerequisite: A ST 551. Restricted to majors. Graded S/U.

**A ST 553 - Practicum in Statistical Consulting (1)**

Supervised experience under the guidance of senior faculty. Prerequisite: A ST 552. May be repeated for a maximum of 2 credits. Restricted to majors. Graded S/U.

**A ST 555 - Applied Multivariate Analysis (3)**

Multivariate analysis of linear statistical models, including MANOVA and repeated measures. Analysis of correlation and covariance structures, including principal components, factor analysis, and canonical correlation. Classification and discrimination techniques. Prerequisites: A ST 506 and A ST 504 or consent of instructor.

**A ST 565 - Statistical Analysis I (4)**

An analytic introduction to the theory and methods of statistical inference. Sampling, frequency distributions ( $z$ ,  $t$ ,  $x^2$ ,  $F$ ), estimation, testing, and simulation. Prerequisite: MATH 291G or consent of instructor.

**A ST 566 - Statistical Analysis II (4)**

Continuation of A ST 565. Prerequisite: A ST 565 or consent of instructor.

**A ST 567 - Applied Linear Models I (3)**

The mean model, including constraints, approach to linear models; nonidentity variance-covariance matrices. Some emphasis on computational aspects and relation to statistical packages. Prerequisite: A ST 566 or consent of instructor.

**A ST 568 - Applied Linear Models II (3)**

The relation of full to less-than-full rank linear models; complex data structures, including messy data, empty cells, and components of variance: extensions to categorical data analysis and nonparametric methods. Continues some emphasis on computational aspects. Prerequisite: A ST 567.

**A ST 596 - Independent Study (1-3)**

Individual studies directed by consenting faculty with prior approval by department head. Prerequisite: consent of instructor. May be repeated for a maximum of 3 credits.

**A ST 598 - Special Research Problems (1-6)**

Individual analytical or experimental projects. Restricted to majors. Graded S/U.

**A ST 599 - Master's Thesis (1-6)**

Thesis.

**ACCT - ACCOUNTING****ACCT 451 - Auditing Theory and Practices (3)**

Auditing standards, audit evidence, auditors reports and opinions, and professional responsibilities. Prerequisite(s): ACCT 351 and C or better in ACCT 302.

**ACCT 455 - Federal Taxation II (3)**

Federal income tax laws applicable to partnerships, corporations, fiduciaries, tax research, tax planning. Prerequisite(s): C or better in ACCT 403 or consent of instructor.

**ACCT 456 - Accounting for Nonprofit Organizations (3)**

Control and reporting problems unique to governmental units and other nonprofit organizations. Fund accounting principles, procedures, and reports. Prerequisite(s): C or better in ACCT 302.

**ACCT 457 - Mergers, Acquisitions, and Partnerships (3)**

Consolidated financial statements, accounting for partnership formation and liquidation. Prerequisite(s): C or better in ACCT 302.

**ACCT 459 - Ethics and Professionalism in Accounting (3)**

Introduction to ethical reasoning, integrity, objectivity, independence, and professional accounting issues. Students will apply the concepts and theories to accounting-specific cases. Prerequisite: grade of C or better in ACCT 451 or concurrent enrollment or consent of instructor. Same as ACCT 559.

**ACCT 460 - Fraud Examination and Prevention (3)**

Covers business fraud as it is occurring in American society. Emphasis is on occupational fraud and financial statement fraud. Examines various types of fraud, its symptoms and effective investigation techniques. Effective fraud prevention measures are discussed throughout the course. Emphasizes case studies and the application of principles to actual fraud cases. Prerequisites: A C or better in ACCT 451 or concurrent enrollment.

**ACCT 490 - Selected Topics (1-3)**

Current topics in accounting. Prerequisites vary according to the seminar offered. May be repeated for a maximum of 12 credits under different subtitles.

**ACCT 498 - Independent Study (1-3)**

Individual studies directed by consenting faculty with the prior approval of the department head. Prerequisites: junior or senior standing and consent of instructor. A maximum of 3 credits may be earned.

**ACCT 500 - Concepts in Accounting I (1.5)**

Development and use of accounting information for management decision making. Prerequisite(s): Admitted to MBA program or consent of course department. Restricted to: Includes MBA majors.

**ACCT 501 - Concepts in Financial Accounting (1.5)**

Interpretation and use of financial accounting information for making financing, investing, and operating decisions. Prerequisite(s): Admitted to MBA program or consent of course department. Restricted to: Includes MBA majors.

**ACCT 502 - Concepts in Managerial Accounting (1.5)**

Development and use of accounting information for management decision making. Prerequisite(s): Admitted to MBA program or consent of course department. Restricted to: MBA majors.

**ACCT 503 - Accounting for Managers (3)**

Concepts and principles of financial and managerial accounting. Presents techniques used to measure business transactions, prepare financial statements, techniques for management decision-making, planning, and

control. Not open to MAcc students. Prerequisite(s): B or better in ACCT 222 and ACCT 221.

**ACCT 510 - Technical and Professional Communication for Accountants (3)**

Effective writing strategies for professional communications. Students will learn to write with a professional style and proper English usage and to work with a variety of technical and lay audiences. Emphasis on initiation, planning, composition, and evaluation of business and accounting workplace scenarios to develop communication skills used in a business environment. Restricted to: Master of Accountancy majors.

**ACCT 525 - Advanced Cost-Managerial Accounting (3)**

Advanced cost-managerial concepts with a quantitative emphasis. Integrates cost-managerial concepts, quantitative tools, organization theory, behavioral concepts and computer methodology. Prerequisite: ACCT 353.

**ACCT 530 - Advanced Accounting (3)**

This course is designed to provide in-depth study of current financial accounting concepts related to business combinations, financial statement consolidations, and foreign currency transactions and translations. Prerequisite(s): ACCT 302 with a grade of C or better. Restricted to: Master of Accountancy majors.

**ACCT 544 - Financial Statement Analysis and Valuation (3)**

Valuation of firms using financial information, financial statement analysis, and the valuation of individual assets and liabilities. Prerequisite(s): ACCT 302; Graduate students only.

**ACCT 550 - Special Topics (3)**

Seminars in current topics in various areas of accounting including financial, managerial, auditing, taxation, systems, and fund accounting. Prerequisites vary according to topic being offered.

**ACCT 551 - Advanced Auditing Theory and Practice (3)**

Understanding and evaluating internal control in an EDP environment. Statistical sampling applications and current issues in auditing. Prerequisites: ACCT 451 and ACCT 452.

**ACCT 554 - Accounting Theory (3)**

Contemporary theoretical basis of accounting. An in-depth study of generally accepted accounting principles and current issues in accounting. Prerequisite(s): ACCT 302 or consent of instructor.

**ACCT 555 - Federal Tax Research (3)**

Tax research methodology including case materials, critical judicial decisions, journal articles, and research services. Emphasis on tax planning. Prerequisite: ACCT 403 or consent of instructor.

**ACCT 559 - Ethics and Professionalism in Accounting (3)**

Introduction to ethical reasoning, integrity, objectivity, independence, and professional accounting issues. Students will apply the concepts and theories to accounting-specific cases. Prerequisites: C or better in ACCT 451 or concurrent enrollment. Same as ACCT 459.

**ACCT 560 - Taxation of Corporations and Shareholders Advanced (3)**

Effects of taxation on the organization, operation, and reorganization of corporations and on their shareholders. Prerequisite(s): ACCT 455 or consent of instructor.

**ACCT 564 - Financial Accounting Research (3)**

Interpretation and application of accounting principles to financial reporting issues of business and nonbusiness organizations. Consent of instructor required. Prerequisite(s): Undergraduate degree in accounting or equivalent. Restricted to Master of Accountancy majors.

**ACCT 565 - Estate Planning and Taxation (3)**

Effects of income, gift, and estate taxation on accumulation and preservation of an estate. Prerequisite: ACCT 455 or consent of instructor.

**ACCT 570 - Taxation of Partnerships (3)**

Taxation of partnership contributions and distributions, transfer of partnership interests, and allocations of partnership income. Also includes taxation of S corporations. Prerequisites: graduate students only; ACCT 403 or consent of instructor.

**ACCT 580 - Professional Accountancy (3)**

Prepares students for the accounting profession and professional certification through study of a wide range of topics similar to those a student might encounter in their first year of employment. Prerequisite(s): Graduate students only.

**ACCT 598 - Independent Study (1-3)**

Individual studies directed by consenting faculty with prior approval of the department head. A maximum of 3 credits may be earned. Prerequisite: consent of instructor.

**ACCT 599 - Master's Thesis (0-15)**

Thesis.

**AEEC - AGRICULTURAL ECONOMICS AND ECONOMICS****AEEC 501 - Microeconomic Theory (3)**

A rigorous re-examination of the pricing mechanism in the goods and factor markets. Development of theoretical tools of general applicability. Prerequisite(s): ECON 371 and ECON 457, or consent of instructor.

**AEEC 502 - Macroeconomic Theory (3)**

Contemporary aggregative theory regarding the interrelationships among national income, employment, the price level, money supply and interest rates, and implications of this theory for public policy in a mixed economy.

**AEEC 511 - Advanced Futures and Options Markets (3)**

Advanced hedging and speculating strategies using futures and options contracts. Coverage includes interest rates, stock indexes, metals, currencies, livestock, and grains. Concepts of price analysis (technical and fundamental) and basis analysis; technical paper is required. Prerequisite: AG E 311, FIN 311, or consent of instructor. Crosslisted with: FIN 511.

**AEEC 520 - International Agricultural Trade Theory and Policy (3)**

Review and analysis of international trade models. Analysis of the effects of trade instruments such as tariffs, quotas, and subsidies on welfare and income distribution. Analysis of bilateral, regional, and multilateral trade agreements and their effect on the agricultural sector from both country-specific and global perspectives. Prerequisite: ECON 371.

**AEEC 522 - Public Sector Economics I (3)**

Introduction to the economic rationale for government intervention in the economy and the effects of that intervention on economic agents and the economy in general. Emphasis on the expenditure side of government policies. Prerequisite: ECON 334 or ECON 434. Same as GOVT 522.

**AEEC 523 - Public Sector Economics II (3)**

A continuation of AEEC 522. Concentrates on the economic effects of taxation. Same as GOVT 523.

**AEEC 526 - Global Food Supply Chain Management (3)**

This course aims to provide students a basic understanding of supply chain management issues, and encourages them to analyze problems from a systems perspective, and introduce them to a number of decision tools that are currently being used by the industry such as process analysis, product design, waiting line management, quality control, just-in-time, and inventory management.

**AEEC 528 - Economic Development (3)**

A graduate-level exposition of microeconomic and macroeconomic theory of why and how nations allocate resources to grow and develop. Strong emphasis is given to understanding the economic problems facing developing nations.

**AEEC 540 - Econometrics I (3)**

An integration of quantitative and statistical techniques for research and management in economics and business. Prerequisite(s): ECON 457 and ECON 405 or A ST 505.

**AEEC 545 - Advanced Agricultural Policy (3)**

Historical and cultural background of food and agricultural policy in the United States. Analysis of food and agricultural problems, policy-making and implementation. Economic evaluation of specific U.S. food and agricultural policy instruments, their domestic and international impacts. Same as AG E 445V with additional work required at the graduate level. Cannot receive credit for both AG E 445V and AEEC 545. Prerequisite: consent of instructor.

**AEEC 550 - Advanced Microcomputer Applications in Agriculture (3)**

An advanced course in electronic spreadsheets and the concepts and tools of database management emphasizing agricultural applications. Prerequisites: AG E 250, CS 110G or consent of instructor. Taught with A GE 450 with additional work required at the graduate level. Cannot receive credit for both AG E 450 and AEEC 550.

**AEEC 551 - Advanced Agribusiness Marketing (3)**

Applications course in which self-managed teams apply marketing theory in the development and presentation of marketing plans for food and

agribusiness firms. Course includes analysis of marketing problems with emphasis on strategic marketing issues changing trade policies, and global competitiveness. Prerequisite: consent of instructor.

**AEEC 556 - Advanced Agribusiness Management (3)**

Integration of production, marketing, accounting, finance, agricultural policy, human behavior, and business environment concepts in management of agricultural businesses using a decision case approach.

**AEEC 560 - Quantitative Methods for Resource Management (3)**

Emphasis is on the development and use of applied numerical models for the assessment and management of agricultural, environmental and natural resources and systems. This course will introduce students to concepts and applications of mathematical programming (e.g., linear and non-linear programming) and of system dynamics (e.g., simulation) to problems of resource management. Case studies and numerical examples are developed to provide students with hands-on training in optimization and dynamic simulation software (e.g., MS Excel Risk Solver, Powersim, GAMS). Prerequisite(s): 1. ECON 371 or equivalent 2. A ST 251G, or A ST 311 or STAT 251G (MATH 2313) or equivalent.

**AEEC 575 - Advanced Water Resource Management and Policy (3)**

Focuses on issues, approaches and methods used in the assessment of water resource management and policy problems. Extends and further develops student understanding and comprehension of specific economic concepts and methods that are useful in the assessment and management of water resources, including cost-benefit analysis, welfare economics, non-market valuation, watershed management, and consideration of equity and ethical concerns. Students will develop critical reasoning, communication and analytic skills through active class discussions and assignments that emphasize both quantitative and written products.

**AEEC 580 - Natural Resources and Environmental Policy (3)**

Surveys and analyzes natural resource and environmental policy, both domestic and global, in terms of content and context, policy, processes, policy models, levels of government, and values and ethical positions. Includes public lands policies, private property issues, air and water quality, waste disposal, energy and sustainable development with emphasis on natural resources and agriculture.

**AEEC 585 - Production Economics (3)**

Application of microeconomic theory to problems and decisions of food and agricultural firms. The theoretical foundation of production economics and the theory of the firm are developed. Prerequisites: MATH 142G, ECON 371, and ECON 457.

**AEEC 589 - Global Agribusiness Environment (3)**

Covers the integration of free trade, social equity, environmental and transnational corporation's aspects of agribusiness from a food and global market perspective and within the framework of open systems theory, the socio-ecological perspective (OSTE). Prerequisite: Graduate students only.

**AEEC 590 - Special Topics (3)**

Seminars in selected current topics in the various areas of agricultural economics and economics. Offerings will carry a subtitle. Prerequisite: consent of instructor.

**AEEC 591 - Agribusiness Management Seminar (1)**

One agribusiness topic or firm will be investigated in depth each semester. Production, marketing, accounting, finance, policy, and/or business environment issues will be emphasized. Prerequisite: Consent of instructor. May be repeated for a maximum of 4 credits.

**AEEC 593 - Internship (1-6)**

Supervised professional on-the-job training experience in policy analysis.

**AEEC 594 - Internship (1-6)**

One semester to six months internship with a regulated firm or public utility commission. A faculty member will direct and evaluate the internship. For AEEC regulatory option students only.

**AEEC 595 - Internship (1-6)**

Supervised professional on-the-job learning experience. Limited to Master of Agriculture candidates. No more than 6 credits toward a degree.

**AEEC 596 - Individual Study (1-3)**

Individual study programs. Each offering will carry a subtitle. Maximum of 3 credits in a semester and 6 credits in a program. Prerequisite: consent of instructor.

**AEEC 597 - Non-Thesis Research Project (1-3)**

Individual investigations, either analytical or experimental. Maximum of 3 credits per semester. No more than 3 credits toward a degree.

**AEEC 598 - Creative Component Project (3-6)**

Individual investigations, either analytical or experimental. A minimum of 3 to 6 credits per semester. No more than 6 credits toward degree. Consent of instructor required. Prerequisite(s): Consent of Instructor. Restricted to AEEC majors.

**AEEC 599 - Master's Thesis (0-15)**

Thesis.

**AG E - AGRICULTURAL ECONOMICS****AG E 450 - Advanced Microcomputer Applications in Agriculture (3)**

An advanced course in electronic spreadsheets and the concepts and tools of database management emphasizing agricultural application. Same as AEEC 550 with additional work for graduate credit. Cannot receive credit for both AG E 450 and AEEC 550. Prerequisite: AG E 250 or consent of instructor.

**AG E 451 - Agribusiness Market Planning (3)**

Applications course in which self-managed teams develop and present marketing plans for agribusiness firms. Emphasis on integrating the marketing mix, particularly promotional elements. Prerequisites: AG E 305 or MKTG 305 or consent of instructor. Same as MKTG 451.

**AG E 452 - Food and Agricultural Products Marketing Research Techniques and Written and Oral Presentation Skill (3)**

This course focuses on learning marketing research methods applicable to developing new food and agricultural products and repositioning existing products for new markets. Students will be required to prepare precise written and oral marketing plans to industry standards and will have opportunities to present written and oral plans at national competitions.

**AG E 454 - Community Economic Development (3)**

In this course students acquire knowledge and understanding of the tools and techniques and the process by which people in a community study the economic conditions of that community, determine its economic needs and unfulfilled opportunities, decide what can and should be done to improve the economic conditions in that community, and then move to achieve agreed-on economic goals and objectives. Prerequisite(s): ECON 251G and ECON 252G.

**AG E 456 - Agribusiness Management (3)**

Integration of production, marketing, accounting, finance, agricultural policy, human behavior, and business environment concepts in management of agricultural businesses using a decision case approach. Prerequisites: Senior standing. Main campus only.

**AG E 458 - Economics of Making and Marketing Wine (3)**

Economics of making and marketing wine for small commercial wineries and amateurs. The class starts with selecting, crushing, and fermenting grapes and all the steps required through bottling the wine. Students must be 21 to enroll in the class. Consent of instructor required.

**AG E 470 - Real Estate Appraisal (3)**

This course addresses issues influencing the value of real estate with some emphasis upon rural properties. Topics include courthouse records, property taxes, appraisal methodology, expert courtroom testimony, condemnation, and legal issues. Students will take field trips and write appraisals. Course material is relevant to students in Finance, Accounting, and Pre-Law, as well as Agriculture. Accredited for hours to apply to both pre-licensing and continuing education requirements of the New Mexico Real Estate Commission for both Appraisers and Real Estate Brokers. Prerequisite(s): Junior or above standing. Crosslisted with: FIN 470

**AG E 475 - Water Resource Management & Policy (3)**

Emphasis on integrating natural and social sciences, analytic methods, and critical reasoning skills to evaluate water resource policy and management issues. Extensive use of data and numerical applications applied to a variety of water resource topics. Familiarity with MS Excel or similar software is desirable. Prerequisite: junior or above standing.

**AG E 491 - Linear Programming Methods (1)**

Methods, techniques, and uses of linear and quadratic programming applications in agricultural economics.

**AG E 499 - Senior Thesis (3)**

Develop a thesis project with a faculty advisor. The senior thesis requires students to work creatively to apply business and economic principles to address a problem of concern. Prerequisites: consent of department head and have senior standing. Restricted to AEAB majors.

**AGRO - AGRONOMY****AGRO 450 - Special Topics (1-4)**

Specific subjects to be announced in the Schedule of Classes. Maximum of 4 credits per semester and a total of 9 credits toward a degree.

**AGRO 462 - Plant Breeding (3)**

Principles and practices involved with the genetic improvement of plants. Prerequisites: ANSC/AGRO/BIOL/HORT 305. Same as HORT 462.

**AGRO 471 - Plant Mineral Nutrition (3)**

Basic and applied aspects of plant requirements for soil-derived minerals and the processes whereby minerals are acquired, absorbed, translocated, and utilized throughout the plant. Prerequisite: EPWS/BIOL 314, or concurrent enrollment, or consent of instructor. Same as HORT 471 and EPWS 471.

**AGRO 483 - Sustainable Production of Agronomic Crops (4)**

Characteristics and objectives of sustainable agricultural systems with application to the production, utilization, and improvement of cereal grain, fiber, forage and oilseed crops. Corequisite(s): AGRO 365 or HORT 365.

**AGRO 492 - Diagnosing Plant Disorders (3)**

Systematic diagnosis of the physiological, pathological, and entomological causes of plant disorders. Prerequisites: EPWS 303 and EPWS 310. Same as EPWS 492 and HORT 492.

**AGRO 500 - Special Topics (1-4)**

Specific subjects and credits to be announced in the Schedule of Classes. Maximum of 4 credits per semester. No more than 9 credits toward a degree.

**AGRO 505 - Research Orientation (4)**

Training in writing research proposals, presentation of research results, and interpretation of research results. Crosslisted with: HORT 505 and SOIL 505

**AGRO 506 - Plant Genetics (3)**

Advanced treatment of the principles of classical genetics and heredity with emphasis on the nature and action of the gene including molecular analysis. Prerequisite: AGRO 305 or consent of instructor. CHEM 345 recommended. Same as HORT 506.

**AGRO 511 - Introduction to Weed Science (f) (4)**

Covers the principles of weed science with emphasis on characteristics of invasive plants, methods of integrated weed management, and current issues impacting weed management. Includes identification of local weeds. Research paper required for graduate credit. Prerequisites: CHEM 111G and BIOL 190 or BIOL 211G, or consent of instructor. Same as EPWS 511.

**AGRO 514 - Soil-Plant Relationships (3)**

Physical, chemical, and biological soil environment as it affects plant and crop growth. Prerequisites: BIOL 314, SOIL 252. Same as HORT 514 and SOIL 514.

**AGRO 515 - Crop Physiology (3)**

Whole plant physiological processes as related to growth, development, yield, quality and post harvest physiology of crop plants within the environment of the crop community. Prerequisite(s): EPWS/BIOL 314 or consent of instructor. Crosslisted with: HORT 515

**AGRO 516 - Molecular Analysis of Complex Traits (3)**

Provide a comprehensive overview of molecular genetic analysis of complex phenotypes, including case histories/experiments in plants, animals and humans. Emphasize technological developments in DNA marker technologies and their application to molecular quantitative genetics. Explore the efficient application of these technologies in the future to complex genetic systems, breeding, and other areas of life sciences. Prerequisite: AGRO 305 or consent of instructor. Same as HORT 516.

**AGRO 533 - Environmental Physiology of Plants (3)**

Integral responses of plants and crop productivity to naturally occurring and modified environmental factors such as radiation, temperatures, water vapor, carbon dioxide, and air flow. Prerequisite: BIOL 314 or consent of instructor. Same as BIOL/HORT 533.

**AGRO 590 - Graduate Seminar (1)**

Current research discussions presented by masters level graduate students. Not more than one credit toward the degree. Same as HORT/SOIL 590. Crosslisted with: HORT590 and SOIL590.

**AGRO 595 - Internship (1-6)**

Supervised professional on-the-job learning experience. Limited to Master of Agriculture candidates. Not more than 6 credits toward the degree.

**AGRO 597 - University Teaching Experience (1-3)**

Certain graduate students will be permitted to teach up to one-third of one AGRO/HORT/SOIL/ES course. The student will prepare and deliver lectures and will prepare, administer, and grade at least one examination. The professor in charge of the course will attend and evaluate the student's lectures. Consent of instructor required. Restricted to: Main campus only. Restricted to Agronomy and Horticulture Graduate Students. Crosslisted with: HORT 597 and SOIL 597

**AGRO 598 - Special Research Programs (1-6)**

Individual investigations, either analytical or experimental. Maximum of 6 credits per semester. No more than 9 credits towards degree. Same as SOIL 598.

**AGRO 599 - Master's Thesis (0-15)**

Thesis.

**AGRO 600 - Doctoral Research (1-15)**

Research.

**AGRO 609 - Breeding for Plant Disease Resistance (3)**

A practically-oriented course of lectures and discussion on concepts and principles of breeding for disease and pest resistance. Labs familiarize students with preparation, quantification, and application of inoculum to hosts. Same as HORT 609.

**AGRO 610 - Advanced Crop Breeding (4)**

Applications of breeding principles to crop improvement. Emphasis on breeding methodologies using modern techniques, including biotechnology. Prerequisite: AGRO 462 or consent of instructor. Same as HORT 610.

**AGRO 620 - Instrumentation in Agronomy (3)**

Use of instruments used in research in all areas of agronomy including gas chromatography, high performance liquid chromatography, neutron soil moisture probe, and other instruments. Same as HORT/SOIL 620.

**AGRO 670 - Biometrical Genetics and Plant Breeding (3)**

A statistical approach to gene action and population parameters as applied to plant improvement. Prerequisite: AGRO 462 or consent of instructor. Same as HORT 670.

**AGRO 685 - Plant Genetic Engineering (3)**

Analysis of plant genome structure and potential applications of emerging molecular techniques to the genetic improvement of plants. Prerequisites: HORT/AGRO 585 and AGRO/HORT 506 or CHEM 545, or consent of instructor. Same as HORT/BIOL 685.

**AGRO 694 - Doctoral Seminar (1)**

Current research discussions presented by doctoral level graduate students. Not more than 2 credits toward the degree. Prerequisite: doctoral level graduate students. Same as SOIL 694.

**AGRO 696 - Doctoral Proposal (1)**

Current research proposal written by doctoral level graduate students. Not more than 1 credits toward the degree. Prerequisite: doctoral level graduate students. Same as SOIL 696.

**AGRO 697 - University Teaching Experience (1-3)**

Certain graduate students will be permitted to teach up to one-third of one AGRO/HORT/SOIL/ES course. The student will prepare and deliver lectures and will prepare, administer, and grade at least one examination. The professor in charge of the course will attend and evaluate the student's lectures. Consent of instructor required. Crosslisted with: HORT 697 and SOIL 697

**AGRO 698 - Topics in Agronomy (1-6)**

Topics of current interest, designated by title and credit. Maximum of 6 credits per semester. No more than 9 credits toward a degree.

**AGRO 700 - Doctoral Dissertation (0-15)**

Dissertation.

**ANSC - ANIMAL SCIENCE****ANSC 450 - Equine Assisted Learning (3)**

Covers the complex relationship between horses and humans. Students are introduced to human psychological theories and methods of how people and horses can work together and the application of such structured learning settings using horses to achieve learning outcomes. Students will also be introduced to horsemanship including proper use and maintenance of equipment, safety, handling, basic care, behavior of horses and benefits of the horse. Consent of instructor required. Crosslisted with: FCS 450

**ANSC 458 - Livestock Behavior, Welfare and Handling (3)**

Principles of animal behavior and evaluation of management practices on animal welfare in confined and rangeland livestock operations. Low stress livestock handling techniques. Design of livestock handling facilities. Prerequisite(s): RGSC 294 or ANSC 100. Crosslisted with: RGSC 458

**ANSC 462 - Parasitology (3)**

Same as EPWS 462.

**ANSC 462 L - Parasitology Lab (1)**

Classification, biological effects, and management of animal parasites of man, domestic animals, and wildlife. One-hour lab is optional. Same as EPWS 462.

**ANSC 468 - Advanced Dairy Herd Management (3)**

The course is offered through the Southern Great Plains Dairy Consortium in Clovis, NM, and will include breeding, nutrition, physiology, health and management of large herd dairies of the Southwest. Students must apply for the course through the Consortium, and can take it more than once, as topics vary. Consent of instructor required. Prerequisite(s): ANSC 304.

**ANSC 480 - Environmental Physiology of Domestic Animals (3)**

Influence of environmental factors on physiological processes of domestic animals. Prerequisite: ANSC 370.

**ANSC 484 - Ruminant Nutrition (3)**

Energy, nitrogen, and mineral nutrition of ruminants with special emphasis on digestive physiology and metabolism of nonprotein nitrogen compounds. Prerequisite: ANSC 422.

**ANSC 488 - Equine Nutrition and Exercise Physiology (3)**

Students will gain an in-depth understanding of nutrition and exercise physiology in the horse. Students will investigate the response of major physiological systems to exercise, conditioning and training, gastrointestinal physiology, nutrition requirements and clinical nutrition of the horse. Prerequisite(s)/Corequisite(s): Junior standing or consent of instructor.

**ANSC 501 - Advanced Animal Nutrition (so) (3)**

Emphasis on digestive physiology and metabolism. Basic mechanisms involved in the intake, digestion, and absorption of nutrients studied. Prerequisite(s): CHEM 211 or consent of instructor. Crosslisted with: HNDS 501

**ANSC 504 - Animal Physiology Techniques (se) (4)**

Radioimmunoassay procedures. Methods and procedures for conducting reproductive physiology research in livestock. Includes animal preparation, sample collection, laboratory and cell culture procedures. Prerequisite: consent of instructor.

**ANSC 507 - Laboratory Techniques in Nutrition (f) (4)**

Methodology and experimental procedures in measuring nutrient requirements and value of diets. Prerequisites: ANSC 422 or consent of instructor. Same as HNDS 507.

**ANSC 509 - Endocrinology of Domestic Animals (f) (3)**

The role of hormones in growth, development, metabolism, temperature regulation, lactation, and reproduction of domestic animals, including commercial applications.

**ANSC 510 - Range Nutrition Techniques (se) (3)**

Animal and plant methods of determining quantity and quality of range forage. Prerequisite: ANSC 484 or consent of instructor. Same as RGSC 510.

**ANSC 512 - Research Methods in Animal Science (s) (4)**

Procedures used in animal science research, including planning and conduct of investigations and interpretation of results. Same as HNDS 512.

**ANSC 515 - Graduate Seminar (1)**

Current topics. Same as HNDS 517.

**ANSC 520 - Advanced Nutritional Management I: Feedlot (se) (3)**

Emphasis on feeding systems for beef cattle from weaning to slaughter. Primary focus on feedlot nutrition and management. Prerequisite: ANSC 484 or consent of instructor.

**ANSC 521 - Advanced Nutritional Management II: Cow Calf/Stocker (so) (3)**

Emphasis on nutritional management for cow-calf and stocker operations. Primary focus on applications to range animal nutrition and management. Prerequisite: ANSC 484 or consent of instructor.

**ANSC 522 - Animal Nutrition (f) (3)**

Nutrient utilization and measurement; nutrient requirements for the various body functions. Taught with ANSC 422 and same as HNDS 522 with additional requirements for graduate students. Recommended for nonmajors. Prerequisite(s): CHEM 211. Crosslisted with: HNDS 522

**ANSC 560 - Rumen Microbiology (so) (3)**

Issues in ruminal and gastrointestinal microbiology. Includes physiological and genetic mechanisms in carbohydrate and nitrogen utilization. Prerequisites: ANSC/HNDS 501 and CHEM 546. Same as FSTE 560.

**ANSC 588 - Equine Nutrition and Exercise Physiology (3)**

Students will gain an in-depth understanding of nutrition and exercise, conditioning and training, gastrointestinal physiology, nutrition requirements and clinical nutrition of the horse. Prerequisite(s)/Corequisite(s): ANSC 304 and ANSC 422.

**ANSC 598 - Special Research Programs (1-4)**

Individual investigations, either analytical or experimental. Maximum of 4 credits per semester. No more than 6 credits toward a degree. Consent of Instructor required.

**ANSC 599 - Master's Thesis (0-15)**

Thesis. Consent of Instructor required. Thesis/Dissertation Grading.

**ANSC 600 - Research (1-15)**

This course is for Ph.D. students before they have completed qualifiers. Consent of Instructor required. Prerequisite(s): ANSC 421 or consent of instructor. Thesis/Dissertation Grading.

**ANSC 602 - Advanced Reproductive Physiology (fo) (3)**

Mechanisms of reproductive function; research methodology. Prerequisite: ANSC 421 or consent of instructor.

**ANSC 602 L - Molecular Techniques in Reproductive Physiology (fo) (2)**

Molecular biology techniques used in the study of reproductive physiology in domestic animals. Extraction of RNA, DNA from endocrine tissues, northern analysis, culture of pituitary/ovarian tissue. Mechanisms of hormone action. Prerequisite: consent of instructor.

**ANSC 603 - Cardiovascular and Neural Physiology (so) (3)**

Anatomical and physiological considerations of the cardiovascular and nervous systems of domestic animals; interactions between these systems and how they elicit control over various body functions. Prerequisite: ANSC 370.

**ANSC 604 - Hypothalamo-Hypophyseal-Pineal Endocrinology (fe) (1)**

Hormones and other neurochemicals synthesized and secreted by the hypothalamus, pituitary, and pineal glands. Neuroendocrinology of the hypothalamo-hypophyseal axis. Prerequisite: ANSC 509.

**ANSC 605 - Gonadal and Uterine Endocrinology (fe) (1)**

Endocrinology of mammalian ovaries, testes, and uteri including developing trophoblasts. Prerequisite: ANSC 509.

**ANSC 606 - Endocrinology of Pregnancy, Parturition, and Lactation (fe) (1)**

Hormones and other chemical messengers involved in maintenance of pregnancy, control of parturition, and initiation and maintenance of lactation in farm animals. Prerequisite: ANSC 509.

**ANSC 621 - Metabolic Functions and Dysfunctions (fe) (3)**

Physiological chemistry of ruminants and other domestic animals, with attention to metabolic dysfunctions and nutritional toxicology. Prerequisites: CHEM 345 and ANSC 501. Same as HNDS 621.

**ANSC 625 - Nutrient Metabolism I: Mineral, Vitamin, and Nitrogen Metabolism (fo) (4)**

Cellular metabolism, physiological function(s), toxicities, and deficiencies of minerals, vitamins and nitrogen in ruminants and nonruminants. Prerequisite: ANSC/HNDS 501. Same as HNDS 625.

**ANSC 626 - Nutrient Metabolism II: Carbohydrates, Lipids, and Energetics (se) (4)**

Basic principles of carbohydrate, lipid, and energy metabolism; integration of metabolism with emphasis on nutritional and biochemical processes related to efficiency of nutrient use. Prerequisite: ANSC 501 or HNDS 501. Same as HNDS 626.

**ANSC 698 - Special Research Programs (1-4)**

Advanced individual investigations, either analytical or experimental. Maximum of 4 credits per semester. No more than 6 credits toward a degree. Consent of Instructor required.

**ANSC 700 - Doctoral Dissertation (0-15)**

Dissertation. Consent of Instructor required. Thesis/Dissertation Grading.

**ANTH - ANTHROPOLOGY****ANTH 452 - Practical Fauna Analysis (1)**

Advanced laboratory exercises in the identification of animal bone recovered from paleontological and archaeological contexts. Prerequisite: consent of instructor. May be repeated for a maximum of 3 credits.

**ANTH 455 - Federal Indian Policy (3)**

Federal Indian policy and its impact on Native Americans. This course will provide basic understanding of how federal Indian policy impacts almost all activities and situations with Native Americans. Course will also look at issues such as sovereignty and how it impacts most interactions with tribal groups.

**ANTH 458 - Anthropology of Reproduction (3)**

Human life cycle is studied from biological, evolutionary, cross-species, and cross-cultural perspectives. Coverage of pregnancy, birth, infancy, childhood, puberty, adulthood, menopause, aging, senescence, and death. Prerequisite: ANTH 201G or consent of instructor.

**ANTH 459 - Peru: From Incas to Inca Kola (3)**

Explores issues of cultural and national identity in Peru from the Incas to the present, focusing on the modern period. Themes include indigenous resistance and adaptation to colonial rule, nationalism, militarism, terrorism, globalization, and the drug trade. Crosslisted with: HIST 459

**ANTH 467 - Archaeology of the American Southwest (3)**

Description and analysis of prehistoric archaeology of the American Southwest including paleo-environmental reconstruction, culture change, and relations with contemporary cultures. Prerequisite: ANTH 315.

**ANTH 472 - Primate Behavior and Ecology (3)**

Survey of the social behavior and ecology of nonhuman primates.

**ANTH 473 - Primate Adaptation and Evolution (3)**

Survey of the adaptations and evolutionary history of nonhuman primates. Prerequisite: ANTH 355 or consent of instructor.

**ANTH 473 L - Primate Evolution Laboratory (1)**

Laboratory with exercises on non-human primate adaptation and evolution. Consent of instructor required. Prerequisite(s): ANTH 355 or consent of instructor.

**ANTH 474 - Human Osteology (3)**

A survey of the functional, developmental, and evolutionary biology of the human skeleton. Identifying bones and teeth from hands-on experience with skeletal and dental material. Provides a foundation for human evolutionary studies, bioarchaeology and forensic anthropology. Prerequisite: ANTH 355, 370 or equivalent.

**ANTH 474 L - Human Osteology Lab (1)**

Laboratory for ANTH 474. Experiences and activities related to identifying teeth and bones of the human skeleton. Prerequisites: ANTH 355, 370 or equivalent.

**ANTH 477 - Faunal Analysis (3)**

Detailed study and analysis of taphonomic processes affecting animal bone recovered from archaeological and paleontological contexts. Prerequisite: either ANTH 315, ANTH 355, or BIOL 330.

**ANTH 485 - Field Experience (1-3)**

Anthropological or archaeological field work experience in private, state and federal agencies. Must spend 30 hours in a field setting per credit hour earned. Prerequisite: complete 12 ANTH credits and consent of instructor. May be repeated for a maximum of 6 credits.

**ANTH 488 - Archaeological Field School Advanced (1-6)**

Archaeological field methods, including excavations of prehistoric sites, record keeping, mapping and analysis of data. Consent of Instructor required.

**ANTH 497 - Special Topics (1-6)**

Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits. Prerequisite(s): Junior or above standing.

**ANTH 500 - Seminar in Anthropological Theory (3)**

Detailed focus on specific areas of anthropological theory. Course subtitled in the Schedule of Classes. Course may be repeated. Prerequisite(s): graduate standing in Anthropology or consent of instructor.

**ANTH 501 - Concepts in Anthropology (3)**

Survey of concepts and theories central to the subdisciplines of anthropology.

**ANTH 502 - Fundamentals of Anthropology (1-4)**

Review of fundamental knowledge and theories in biological, cultural, or linguistic anthropology or archaeology. Graded S/U.

**ANTH 504 - Cultures of Africa (3)**



- Explores the rich history and cultural diversity of the continent of Africa. The course first examines the historical processes that shaped modern Africa, including the evolution of modern humans in Africa, the origins of agriculture and pastoralism, the formation of indigenous African states, the slave trade, and European colonialism. The course also looks at contemporary African societies, including hunter-gatherer, pastoral, and farming/fishing peoples. In addition, contemporary issues facing modern Africa such as famine and agricultural policy, the status of women, and environmental challenges such as deforestation are discussed. Taught with ANTH 404. Crosslisted with: HIST 504
- ANTH 505 - Issues in Anthropological Practice (3)**  
Anthropological approaches to research design, implementation, and dissemination. Restricted to: Main campus only.
- ANTH 506 - Advanced Studies in Physical Anthropology (1-3)**  
Lectures, seminars, or laboratory research in selected topics. May be repeated for a maximum of 12 credits. Prerequisite(s): graduate standing in Anthropology or consent of instructor.
- ANTH 507 - Advanced Studies in Archaeology (1-3)**  
Lectures, seminars, field or laboratory research in selected topics. May be repeated for a maximum of 12 credits. Prerequisite(s): graduate standing in Anthropology or consent of instructor.
- ANTH 508 - Advanced Studies in Cultural Anthropology (1-3)**  
Lectures, seminars, or field research in selected topics. May be repeated for a maximum of 12 credits. Prerequisite(s): graduate standing in Anthropology or consent of instructor.
- ANTH 509 - Advanced Studies in Anthropological Linguistics (1-3)**  
Lectures, seminars, or field research in selected topics. May be repeated for a maximum of 12 credits.
- ANTH 510 - Southwestern Anthropology (3)**  
Examination of major theoretical and applied issues in southwestern anthropology.
- ANTH 511 - Mesoamerican Anthropology (3)**  
Examination of major theoretical, historical, and applied issues in Mesoamerican anthropology.
- ANTH 512 - Analytical Methods in Anthropology (3)**  
Quantitative analytical methods of anthropology examined in detail. Applied problem sets include physical and cultural anthropology, linguistics, and archaeology. Prerequisite: graduate standing or consent of instructor.
- ANTH 513 - Biological Anthropology (3)**  
Examination of major theoretical and methodological issues in biological anthropology.
- ANTH 514 - Advanced Issues in the Archaeology of Religion (3)**  
Explores the methods and theories used to study prehistoric religion.
- ANTH 515 - Applied Anthropology (3)**  
Examines the intellectual roots of applied anthropology and early case studies of anthropologists working as administrators. Examines the ethical and methodological approaches that applied anthropologists employ. Examination of case studies that show the role of applied anthropologists in improving human service delivery, cultural preservation, planning and implementing programs of participatory change, advocacy, and economic development. Taught with ANTH 415.
- ANTH 516 - Advanced Archaeology of the American Southwest (3)**  
Advanced topics in Southwestern archaeology including ritual architecture, environmental reconstruction, violence, site formation processes, and experiment and research.
- ANTH 517 - Advanced Topics in Mesoamerican Archaeology (3)**  
Specific subjects in Mesoamerican archaeology to be announced in the Schedule of Classes. Prerequisite: graduate standing. May be repeated for a maximum of 6 credits.
- ANTH 518 - Advanced Historical Archaeology in Latin America (3)**  
Examination of theoretical and methodological issues in historical archaeology in Latin America from 1450 to present, including conquest, colonialism, capitalism, and modernity as anthropological processes. The contributions and limitations of historical, ethnohistorical, and archaeological evidence are emphasized.
- ANTH 519 - Advanced Topics in Prehistoric Archaeology (3)**  
Seminar on specialized research archaeology. Prerequisite: graduate standing.
- ANTH 520 - Ethnographic Field Methods (3)**  
Basic methodologies used in conducting qualitative ethnographic research. Projects in participant observation, ethnographic interviews, life history interviews, folk taxonomy construction, and coding of field notes.
- ANTH 522 - Archaeological Field School-Graduates (2-6)**  
Techniques of archaeological data collection, analysis, and interpretation. Emphasis on archaeological field work in the Southwest.
- ANTH 523 - Archaeological Mapping (3-6)**  
Techniques for mapping archaeological sites and recording spatial distributions of archaeological data using a variety of surveying equipment and computer mapping software.
- ANTH 525 - Issues in Language and Culture (3)**  
Anthropological perspective on the communication process.
- ANTH 526 - Historical Archaeology in Latin America (3)**  
Examination of major theoretical and methodological issues in historical archaeology in Latin America, including conquest, colonialism, capitalism, and modernity as anthropological processes. The contributions and limitations of historical, ethnohistorical, and archaeological evidence are emphasized. Prerequisite(s): graduate standing in Anthropology or History or consent of instructor.
- ANTH 530 - Forensic Anthropology and Human Osteology (3)**  
Detailed study of the human skeleton with attention to health and demographic structure of prehistoric populations. Forensic applications are also considered.
- ANTH 531 - Issues in Nutritional Anthropology (3)**  
Evolutionary and cross-cultural perspective on human nutrition.
- ANTH 532 - Advanced Issues in the Anthropology of Religion (3)**  
Cross-cultural overview of spiritual beliefs and religious change. Topics include Shamanism, ethnomedicine, revitalization movements, and women's roles in spiritual life. Additional work required for graduate credit.
- ANTH 533 - Advanced Issues in Women, Gender, and Culture (3)**  
Survey of the history of anthropological ideas about gender and women, and a comparison of gender roles, relations, and ideologies across a range of cultures. Same as W S 533.
- ANTH 534 - Advanced Human Evolution (3)**  
Advanced overview of human biological evolution from the emergence of Miocene apes to the modern human diaspora. Prerequisite: ANTH 355 or consent of instructor.
- ANTH 534 L - Advanced Human Evolution Lab (1)**  
Advanced laboratory in human evolution, includes exercises and activities to learn the human fossil record.
- ANTH 535 - Economic Anthropology (3)**  
Study of the theoretical development, major topics, and current theoretical concerns in economic anthropology. Anthropological analysis of economic systems, from subsistence economies to the impact of international market systems.
- ANTH 536 - Anthropology of Development (3)**  
The study of global processes of social and economic change, and their impact on non-Western societies.
- ANTH 537 - Applied Medical Anthropology (3)**  
This course introduces students to applications of medical anthropological perspectives to health care, international development, public health, and health policy.
- ANTH 538 - Plants, Culture, and Sustainable Development (3)**  
Study of role of indigenous cultures and indigenous knowledge systems in plant domestication, ethnoecology, and preservation of traditional crop diversity. Examination of issues related to conserving cultural diversity, food systems, food security and biodiversity.
- ANTH 539 - Culture and Foodways (3)**  
Study of interaction between food and culture from anthropological perspective. Study of role of food in cultural history, social relations, ritual, and identity. Examination of impact of globalization of food systems on traditional cultures, local food systems, and food security.
- ANTH 540 - Cultural Resource Management (3)**  
Study of federal and state of New Mexico historic preservation laws and regulations and their application in current Cultural Resource Management and a review of relevant case studies.

**ANTH 541 - Decolonizing Methodologies in Native American Studies (3)**

This course utilizes decolonizing methodologies and praxis to gain insight into the complex effects of oppression and colonization. Critical and indigenous concepts are used to identify and analyze hegemonic, ethnocentric, historic and contemporary human rights and social justice issues of indigenous people. Research theory and methodology such as community participatory action research that is collaborative, inclusive, and pragmatic to ethics, intellectual property, and cultural boundaries of indigenous people is emphasized.

**ANTH 542 - Cultural Resource Management II (3)**

Continuation of ANTH 540 to include the study of cultural resource management practices, research design, and completion of proposals in response to requests. Overview of management practices and budgeting of projects and specialized studies (geophysical investigations, National Register nominations).

**ANTH 543 - Indigenous Ways of Knowing (3)**

This course examines Indigenous knowledge and ways of knowing as a means to gain an appreciation of an epistemology and ontology that may be outside the boundaries of Eurocentric theory, concepts, and principles. Knowledge development through mythology and story telling is viewed from the nature of difference rather than comparative analysis.

**ANTH 545 - Advanced Museology I (3)**

Museum philosophy, history, administration, and collection management. Emphasis on collecting, cataloging, care, and exhibition, as well as ethics, public responsibility, and grantsmanship.

**ANTH 547 - Museum Field Methods (3)**

Basic methodologies used in conducting museum research away from the museum, including collections evaluation, collections acquisition, donor interviews, educational outreach, and development.

**ANTH 548 - Museums & Society (3)**

Examines theoretical frameworks that shape museum administration, exhibits and collections development. Examines themes of gender, space, place, multiculturalism, national and international politics in museum contexts.

**ANTH 559 - Peru: From Incas to Inca Kola (3)**

Explores issues of cultural and national identity in Peru from the Incas to the present, focusing on the modern period. Themes include indigenous resistance and adaptation to colonial rule, nationalism, militarism, terrorism, globalization, and the drug trade. Same as GOVT 565 and HIST 559.

**ANTH 572 - Advanced Primate Behavior and Ecology (3)**

Advanced review of non-human primate social behavior and ecology.

**ANTH 573 - Advanced Primate Adaptation and Evolution (3)**

Advanced review of non-human primate adaptation and evolution.

**ANTH 573 L - Advanced Primate Adaptation and Evolution Laboratory (1)**

Laboratory with exercises on non-human primate adaptation and evolution.

**ANTH 574 - Advanced Human Osteology (3)**

Advanced Human Osteology surveying the functional, developmental and evolutionary biology of the human skeleton. Identifying bones and teeth from hands-on experience with skeletal and dental material. Provides a foundation for human evolutionary studies, bioarchaeology and forensic anthropology.

**ANTH 574 L - Advanced Osteology Laboratory (1)**

Laboratory for ANTH 574. Experiences and activities related to identifying teeth and bones of the human skeleton.

**ANTH 576 - Lithic Technology Organization (3)**

Advanced seminars and laboratory exercises to learn and develop techniques and methods that will help us determine how to interpret behavioral and cultural information from lithic (stone tool) data. Consent of Instructor required.

**ANTH 577 - Faunal Analysis (3)**

Detailed study and analysis of taphonomic processes affecting animal bone recovered from archaeological and paleontological contexts.

**ANTH 578 - Advanced Lab Methods in Archaeology (3)**

Examination of advanced laboratory techniques used in the analysis of archaeological materials.

**ANTH 579 - Anthropological Research Design (3)**

Implementing research projects in anthropology, including the writing of grant proposals and research papers.

**ANTH 581 - Graduate Study in Cultural Conservation (4)**

Same as ENGL 581, HIST 581.

**ANTH 585 - Method and Theory in Archaeology (3)**

Focus on major methodological and theoretical aspects of contemporary archeology.

**ANTH 587 - Field Work in Latin America (3-12)**

Covers anthropological field methods in Latin America that also incorporate in-field lab analysis. Prerequisite: consent of instructor. No S/U grading.

**ANTH 595 - Practicum in Anthropology (1-6)**

Internship in local, state, national, and international settings, applying anthropological concepts and theories in real-world situations. May be repeated for a maximum of 6 credits toward a degree. Consent of instructor required. Graded: S/U. Prerequisite(s): graduate standing. Restricted to ANTH majors.

**ANTH 596 - Readings (1-6)**

Individual study of selected readings and topics. May be repeated for a maximum of 6 credits. Consent of instructor required.

**ANTH 597 - Internship (1-9)**

Anthropological or archaeological internship in private, state, or federal agency. May be repeated for a maximum of 18 credits. Consent of instructor required. Prerequisite(s): graduate standing. Restricted to ANTH majors.

**ANTH 598 - Special Research Problems (1-6)**

Individual analytic or experimental investigations. May be repeated under different subtitles for a maximum of 6 credits. Consent of instructor required. Prerequisite(s): graduate standing. Restricted to ANTH majors.

**ANTH 599 - Master's Thesis (0-15)**

Thesis. Consent of instructor required. Prerequisite(s): graduate standing. Restricted to ANTH majors.

**ART - ART****ART 311 L - FLIP CHINA (1)**

This course consists of a FLIP trip to China, Spring 2014. Consent of Instructor required. Crosslisted with: HIST323 L, ART511 L and HIST549 L.

**ART 450 - Advanced Drawing and Painting: Special Topics (3-6)**

Advanced drawing and painting course focusing on the following topics: Identity, Place, Spirituality, and Body. Topics will be announced in the course schedule. May be repeated up to 12 credits. Prerequisite(s): 12 credits of ART 350.

**ART 451 - Time-Based Media (3)**

Advance figure drawing class with emphasis on developing technical and conceptual skills. Prerequisite: ART 350. May be repeated up to 27 credits. Restricted to ART majors.

**ART 454 - Design Discourse (3)**

Discussion of issues related to visual communications and graphic design. Research and semester-long studio project supplement readings and discussion. May be repeated for a maximum of 6 credits. Prerequisite(s): ART 356.

**ART 455 - Advanced Graphic Design Special Topics (3)**

Advanced graphic design course focusing on the following topics: visual communication, system graphics, typography, portfolio preparation, art of the book and professional practice. Topics will be announced in the course schedule. Each topic may only be taken once. May be repeated up to 12 credits. Prerequisite(s): 6 credits of ART 355.

**ART 456 - Advanced Graphic Design: Portfolio Development and Professional Practice (3)**

Advanced graphic design projects with an emphasis on conceptual development, portfolio preparation, and professional practices. Prerequisite: ART 455. May be repeated for a maximum of 12 credits. Restricted to majors.

**ART 457 - Advanced Typographic Design and the Computer (3)**

Advanced projects exploring use of typography in visual communication. Electronic and conventional print applications emphasized. May be repeated for a maximum of 6 credits. Prerequisite(s): ART 255 and ART 256.

**ART 458 - The New Mexico Studio of Design (3)**

An advanced graphic design studio providing a design service for nonprofit community organizations. Client-based projects produced by students from concept to completion. May be repeated for a maximum of 6 credits. Prerequisite(s): ART 355.

**ART 459 - Advanced Digital Illustration (3)**

- Illustration course for graphic designers emphasizing the creation of editorial, informational, and cultural illustrations, using vector and bitmap computer programs. Prerequisite: ART 359, or consent of instructor. May be repeated for a maximum of 6 credits.
- ART 460 - Painting Workshop (3)**  
Media, materials and advanced technical problems of contemporary painters. May be taken up to 6 credits. Prerequisite(s): ART 350 and ART 361.
- ART 461 - Painting Workshop II (3)**  
Advanced issues in contemporary painting. May be repeated for a maximum of 6 credits. Restricted to majors. Prerequisite(s): ART 460.
- ART 465 - Advanced Sculpture Special Topics (3-6)**  
Thematic classes deepen students' knowledge of contemporary sculpture and extended media through a series of interpretive assignments that culminates in a unified body of work. Course topics include: "Artists' Maps", "Installation Art/Land Art", "Sculpture and the 1960s", "Sculpture and the 1970's". Topics will be announced in the course schedule. May be repeated up to 18 credits. Prerequisite(s): 3 credits of ART 365 or permission of the instructor.
- ART 470 - Advanced Digital Photography (3-6)**  
Advanced photography course focused on digital image processing, digital workflow, and digital printing procedures, with an emphasis on photography as an art medium and development of students' personal photographic practice. May be repeated up to 15 credits. Prerequisite(s): ART 370, ART 373 or consent of instructor.
- ART 471 - Digital Video and Narrative Concepts (3)**  
Topics will be announced in the course schedule. Special semester long focus may include a seminar designed to introduce the student to the practice of time-based art, its applications within an interdisciplinary art practice, as well as its historical, critical and theoretical context. May be repeated up to 18 credits. Prerequisite(s): 12 credits at 300 level.
- ART 473 - Advanced Analog Photography (3-6)**  
Advanced photography course focused on skills and techniques of black and white film with an emphasis on photography as an art medium and development of students' personal photographic practice. May be repeated up to 15 credits. Prerequisite(s): ART 370 and ART 373, or consent of instructor.
- ART 474 - Advanced Ceramics Design and Production (3)**  
Advanced ceramics course focusing on the technical processes of throwing, prototyping, mold making, glaze calculation, and alternative firing. Discussions may also include issues of professional practice, marketing, and branding. May be repeated up to 12 credits. Prerequisite(s): ART 374 and ART 375, or consent of instructor.
- ART 475 - Advanced Ceramics Sculptural Concerns (3-6)**  
Advanced ceramics course focusing on conceptual development as it relates the creation of a unified body of work. Topics may include discussions of advanced techniques, professional practices, and contemporary issues in ceramics. May be repeated up to 15 credits. Prerequisite(s): ART 374 and ART 375, or consent of instructor.
- ART 476 - Advanced Museum/Gallery Research Internship (1-9)**  
Advanced research internship in museum or gallery. Requirements determined by instructor in cooperation with supervising museum/gallery professional. For art history credit. Prerequisite: ART 376 and consent of instructor. May be repeated for a maximum of 9 credits. Course may not be audited.
- ART 477 - Independent Research Problems in Art History (1-9)**  
Advanced research on special problems to be conducted under supervision of art history faculty. May be taken up to 12 credits. Consent of instructor required. Prerequisite(s): ART 295G, ART 296G, ART 297 and one 300 level art history course and consent of instructor.
- ART 478 - Seminar: Selected Topics in Art History (3)**  
Reading, research, and discussion of advanced problems. Topics will be announced in the course schedule. Each topic may be only taken once. Non-art/art history majors, contact instructor for consent. Prerequisite(s): ART 295G, ART 296G, and ART 297 or ART 298, and one 300 level art history course.
- ART 479 - Art Theory, Criticism, and Historiography (3)**  
Theories and methodologies in art history and art criticism. Consent of instructor required. Prerequisite(s): ART 295G, ART 296G, ART 297 and one 300 level art history course and consent of instructor.
- ART 480 - Special Topics in Printmaking (3)**  
Special topics in printmaking. Emphasizing conceptual approaches to printmaking and development of individual content. Topics will be announced in the course schedule. May be repeated up to 18 credits. Prerequisite(s): 6 credits of ART 380.
- ART 485 - Advanced Metals: Special Topics (3-6)**  
Advanced Metals/Jewelry course focusing on the following topics: conceptual development and personal aesthetic and style, professional practices, contemporary issues in Metals/Jewelry, and senior exhibition. Techniques may include enameling, coloring, historical processes, and digital technology. Topics will be announced in the course schedule. Each topic may only be taken once. May be repeated up to 18 credits. Prerequisite(s): 6 credits of ART 385.
- ART 490 - Museum Conservation Internship (1-6)**  
The goal of this internship is to provide a student with a practical learning experience in museum collection conservation so that they can relate their experience to what they learn in the classroom about preventive conservation techniques and policies. It will provide the student an opportunity to learn skills and knowledge needed in working with museum collections. Tasks and projects will be assigned by the instructor.
- ART 494 - Special Topics in Studio (3)**  
Specific subjects and credits to be announced in the Schedule of Classes. No more than 9 credits toward a degree.
- ART 495 - Undergraduate Studio Thesis (3)**  
Special research and independent study leading to undergraduate thesis exhibition. Prerequisite: consent of instructor. Restricted to majors. Course may not be audited.
- ART 496 - Fundamentals of Studio Management (1)**  
Advanced studio course designed to introduce students to the fundamentals of studio management. Includes training in proper tools use and maintenance; safety procedures; and practical experience with studio oversight. Concurrent registration in advanced level studio course of the same media area required. Prerequisite: consent of instructor. May be repeated for a maximum of 3 credits. Restricted to majors. Graded S/U.
- ART 497 - Readings in Art History (3)**  
In-depth study of art historical writing. May be taken up to 12 credits. Consent of instructor required. Prerequisite(s): ART 295G, ART 296G, ART 297 and one 300 level art history course.
- ART 499 - Problems in Studio Art (1-6)**  
Critique class emphasizing conceptual approaches to studio art in the development of individual content. May be repeated up to 6 credits. Consent of Instructor required.
- ART 500 - Special Topics in Art History Advanced (3)**  
Specific subjects to be announced in the Schedule of Classes. Prerequisite: graduate status. May be repeated for a maximum of 12 credits.
- ART 501 - Museum Conservation Techniques I (3)**  
Examines the philosophy of museum conservation of works of art in all media and in all contexts. Includes discussions of the theory of conservation as well as student laboratory projects involving testing and conservation of objects. Taught with ART 401.
- ART 502 - Museum Conservation Techniques II (3)**  
Examines the philosophy of museum conservation of works of art in all media and in all contexts. Includes discussions of the theory of conservation as well as student laboratory projects involving testing and conservation of objects. Taught with ART 402. Consent of Instructor required. Prerequisite(s): ART 501.
- ART 503 - Preventive Conservation/Collections Care (3)**  
Introduces the student on how to mitigate the deterioration and damage of cultural property through the formulation and implementation of policies and procedures. The course addresses most aspects of collections management and care for objects in storage and exhibitions. Taught with ART 403.
- ART 504 - The Classical Style in the Western Tradition (3)**  
Analysis of the emergence of Greco-Roman style in the Ancient world and its interpretation and reception in the Western European art tradition up to the contemporary period; taught with ART 302. Consent of instructor required.
- ART 505 - Medieval Art (3)**  
History of painting, stained glass, sculpture, architecture and manuscript illumination in Europe from the Early Christian period to the end of the Gothic period; taught with ART 305. Consent of instructor required. Prerequisite(s): ART 295G; Graduate Standing.
- ART 506 - Medieval Manuscript Illumination (3)**  
History of manuscript production and illumination in Western Europe from the Early Christian period to the middle of the 16th century; taught with ART 306.

- Consent of instructor required. Prerequisite(s): ART 295 and ART 305 or ART 505.
- ART 510 - Advanced Native American Art (3)**  
Cross-cultural introduction to art of the prehistoric and historic native people of the North, Central, and South Americas. The artistic expression and the function of art considered in diverse cultural and environmental contexts. Prerequisite: graduate standing.
- ART 511 - Art of China (3)**  
Survey of the art of China from the Pre-historic period to modern day; taught with ART 311. Prerequisite(s): Graduate Standing.
- ART 520 - Art and Architecture in Pre-Columbian Mesoamerica (3)**  
Analysis of the art and culture of the Mesoamerican peoples before the arrival of Columbus in the New World. Includes an in-depth formal and historical analysis of architecture, sculpture, painting, pottery and metal works of Mixtec, Toltec, the Aztec, Maya, and other cultures and civilizations. Prerequisite: graduate standing.
- ART 521 - Pre-Columbian Art and Architecture of the Andes (3)**  
Examines the arts and history of pre-Columbian Andean cultures in a cultural context. Analysis of their architecture, sculpture, pottery, jewelry, textiles, and featherwork. Prerequisite: graduate standing.
- ART 523 - Italian Renaissance Art (3)**  
History of painting, sculpture and architecture in Italy from the 14th century to the end of the 16th century; taught with ART 323. Consent of instructor required. Prerequisite(s): Graduate standing.
- ART 525 - Northern Renaissance Art (3)**  
History of painting, manuscript illumination and graphics in Northern Europe from the late 14th century to the mid-16th century; taught with ART 325. Consent of instructor required. Prerequisite(s): ART 295G, ART 296G and Graduate standing.
- ART 528 - Art and Architecture in Northern Europe (3)**  
Architecture, painting, and sculpture in Flanders, Holland, France, England, and Germany as indigenous developments and as reflections of the Italian Baroque. Prerequisite: graduate standing.
- ART 529 - Survey of Western Architecture (3)**  
Survey of history of Western architecture from prehistoric time to the present. Prerequisite(s): Graduate standing.
- ART 530 - Modern Architecture (3)**  
Study of the architecture of the later eighteenth, nineteenth and twentieth centuries in the context of technological, social and stylistic changes. Focus on the works of Louis Sullivan, Frank Lloyd Wright, and European architects of the International Style, and the current reaction. Prerequisite: graduate standing.
- ART 533 - Baroque Art and Architecture in Italy, Spain, and Hispanic Latin America (3)**  
Concentration on Italian and Spanish Baroque architecture, painting, and sculpture, as well as the art and architecture of Spanish vice-royalties of the Americas. Prerequisite: graduate standing.
- ART 536 - The African American in Art (3)**  
Traces the inclusion of African American subjects and producers of art in the U.S. from the nations beginnings to the present. Slavery, civil rights, and racial pride are discussed as academic and avant-garde traditions in African American art. Fulfill requirements of ART 336 plus graduate-level research. Prerequisite(s): ART 297 or consent of instructor. Graduate standing.
- ART 537 - American Art to 1900 (3)**  
Covers the history of painting, sculpture, architecture, and other arts in the United States from the colonial period to 1900. Prerequisite: graduate standing.
- ART 538 - Late Eighteenth- and Nineteenth-Century European Art (3)**  
History of painting, sculpture, architecture, and other arts created in Europe from 1789 to 1900. Prerequisite: graduate standing.
- ART 539 - Advanced History of Photography (3)**  
Course studies history, theory and use of photographic practices in art, especially from formal introduction of the process in 1839 to the present. Prerequisite(s): ART 295G, ART 296G, and ART 297; Graduate standing.
- ART 542 - Twentieth-Century Art I, 1900-1945 (3)**  
History of painting, sculpture, and other arts in Europe, the United States, and elsewhere from 1900 to 1945. Prerequisite: graduate standing.
- ART 543 - Twentieth-Century Art II, 1945-Present (3)**  
History of painting, sculpture, and other arts in Europe, the United States, and elsewhere from 1945 to the present. Comprehensive research paper required. Prerequisite: graduate standing.
- ART 544 - Art and Life in Renaissance Italy (3)**  
Examines how Italian Renaissance textual and visual culture offered Europe new ways of seeing and portraying itself, 1350-1550. Topics include: Florence, Venice, Rome, Leonardo, Michelangelo, Titian, humanism, the Medici, and republican and courtly culture. Prerequisites: ART 295, 296, 297. Same as HIST 542.
- ART 549 - Advance Figure Drawing (3)**  
Advanced figure drawing class with emphasis on developing technical and conceptual skills. Prerequisite: ART 449
- ART 550 - Drawing and Painting Workshop (3-6)**  
Graduate level drawing and painting course focusing on the development of concepts, expression and visual form. May be repeated up to 27 credits. Restricted to: ART majors.
- ART 555 - Graphic Design (3)**  
May be repeated up to 27 credits.
- ART 560 - Painting Workshop (3-9)**  
Advanced work with painting skills. Emphasis on critical analysis and development of body of work. Restricted to graduate art students. May be repeated up to 27 credits.
- ART 565 - Sculpture Media (3-9)**  
May be repeated up to 27 credits.
- ART 566 - Digital Photography, Image Capture and Output (3)**  
Introduction to digital workflow in photography. Topics include digital camera operation, RAW file processing, scanning, color management and printing. Course will emphasize concepts of ideation and thematic coherence. May be repeated up to 6 credits.
- ART 568 - Advanced Large Format Photography and Advanced Printing (3)**  
Introduction to the 4x5 view camera, advanced printing techniques, zone system and hybrid darkroom/digital practice. Emphasis on development of advanced skills in technical process, ideation, content generation and critical inquiry. Consent of instructor required. Prerequisite(s): ART 270, ART 271, ART 274.
- ART 569 - The Constructed Image (3)**  
Covers advanced work with manipulation of conventional photographic materials and issues of post visualization. Emphasis on creation of an extended body of work. Prerequisite: consent of instructor. Restricted to majors.
- ART 570 - Advanced Introduction to Photography (3-9)**  
Introduction to photography with digital cameras. Basic camera operation, picture composition, image processing and digital workflow. Image culture and the role of the still, lens-made image in contemporary society. Students must come equipped with an appropriate laptop computer, software and digital camera (consult with instructor). Consent of instructor required. Prerequisite(s): ART 270.
- ART 571 - Advanced Introduction to Film and Darkroom (3)**  
Introduction to silver based photographic materials, film development, enlargement printing and darkroom work. Students will work with a range of cameras including: medium format, toy and pinhole. Emphasis on understanding the syntax of silver halide photographic materials. Development of conceptual vocabulary and the creation of images with thematic unity. May be repeated for a maximum of 6 credits. Consent of instructor required. Prerequisite(s): ART 271.
- ART 573 - Non-Silver Photographic Processes (3)**  
Advanced work with historic photographic processes. Emphasis on creation of an extended body of work. Taught with ART 373. Consent of instructor required. Prerequisite(s): ART 270, ART 271, ART 274. Restricted to ART majors.
- ART 575 - Ceramic Arts (3-9)**  
May be repeated up to 27 credits.
- ART 576 - Museum/Gallery Research Internship (1-9)**  
Research internship in museum or gallery. Requirements determined by instructor in cooperation with supervising museum/gallery professional. For art history credit. Prerequisite: graduate standing. May be repeated for a maximum of 9 credits.
- ART 577 - Independent Research Problems in Art History (1-9)**

Advanced research on special problems to be conducted under supervision of art history faculty. May be repeated for a maximum of 9 credits. Consent of instructor required. Prerequisite(s): Graduate standing.

**ART 578 - Seminar: Selected Topics in Art History (3)**

Reading, research, and discussion of advanced problems. Prerequisite: graduate standing. May be repeated for a maximum of 9 credits.

**ART 579 - Graduate Seminar: Art Theory, Criticism, Historiography (3)**

Theories and methodologies in art history and art criticism. Prerequisite: graduate standing.

**ART 580 - Printmaking Workshop (3-6)**

May be repeated for a maximum of 33 credits. Prerequisite(s): Graduate standing.

**ART 582 - Advanced Digital Capture and Output (3-9)**

Advanced digital workflow, scanning, image processing software, digital printing, color management. Advanced digital printing skills. Emphasis on understanding the syntax of digital photographic processes. Development of conceptual vocabulary and the creation of images with thematic unity. Consent of instructor required. Restricted to ART majors.

**ART 583 - Advanced Studio to Photograph (3)**

Studio photography and lighting technique. Advanced exploration of formal methods, visual narrative, staged imagery and location work. Emphasis on independent projects and development of thematic unity. Reading and critique.

**ART 585 - Metals and Jewelry Design (3-9)**

May be repeated up to 27 credits.

**ART 587 - Exhibition Studies (3)**

Exhibition theory through practice. Gallery operations and management: collecting, conservation, exhibiting, and public responsibility.

**ART 589 - Visual Culture of the 1950s (3)**

Focuses on major cultural trends and historical events in 1950s America. Offers analysis of art, films, and pop culture phenomena of the period. Fulfill all requirements of ART 389 plus graduate-level research. Prerequisite(s): Either ART 297, ART 342, or consent of instructor. Graduate standing.

**ART 590 - Visual Culture of the 1960s (3)**

Focuses on major cultural trends and historical events in 1960s America. Offers analysis of art, films, and pop culture phenomena of the period. Fulfill all requirements of ART 390 plus graduate-level research. Prerequisite(s): Either ART 297, ART 343, or consent of instructor. Graduate standing.

**ART 591 - Visual Culture of the 1970s (3)**

Focuses on major cultural trends and historical events in 1970s America. Offers analysis of art, films, and pop culture phenomena of the period. Fulfill all requirements of ART 391 plus graduate-level research. Prerequisite(s): Either ART 297, ART 343, or consent of instructor. Graduate standing.

**ART 592 - Visual Culture of the 1980s (3)**

Focuses on major cultural trends and historical events in 1980s America. Offers analysis of art, films, and pop culture phenomena of the period. Fulfill all requirements of ART 392 plus graduate-level research. Prerequisite(s): Either ART 297, ART 343, or consent of instructor. Graduate standing.

**ART 593 - History of Collage (3)**

Examines theory and practice of collage, assembly, and montage in 2 and 3-dimensional, 20th century art. Emphasis on the art of the Schwitters, Picasso, Cornell, Hoch, Ernst, Ryan, Rauschenberg, and Schapiro. Fulfill all requirements of ART 393 plus graduate-level research. Prerequisite(s): Either ART 297, ART 342, ART 343, or consent of instructor.

**ART 595 - Problems in Studio (1-6)**

Individualized study in specialized studio areas not covered by other advanced courses. May be repeated up to 12 credits. Consent of Instructor required.

**ART 596 - Graduate Studio Seminar (3)**

Explores issues in contemporary art making and their relationship to personal work. Presentation of research in oral, visual, and written form. May be repeated for a maximum of 18 credits. Restricted to majors. Prerequisite(s): Graduate standing.

**ART 597 - Readings in Art History (3)**

In-depth study of historical writing about art. Prerequisite: graduate standing. May be repeated for a maximum of 9 credits.

**ART 598 - Studio Thesis (1-15)**

Special research in studio, leading to an exhibition and written thesis statement.

**ART 599 - Art History Thesis (0-15)**

Art history master's thesis research. May be repeated for unlimited credit. Restricted to masters level art history students. Consent of instructor required. Prerequisite(s): Graduate standing.

**ART 511 L - Art of China (FLIP Tour to China) (1)**

This course consists of a FLIP trip to China, Fall 2014. Consent of Instructor required. Crosslisted with: ART311 L, HIST549 L and HIST323 L

**ASTR - ASTRONOMY**

**ASTR 461 - Astronomy for Teachers (3)**

Illustration and presentation of concepts of astronomy in different subject areas to broaden teacher preparation for science education in public schools.

**ASTR 500 - Seminar (1)**

Organized group study treating selected topics.

**ASTR 505 - Astronomy and Astrophysics I (f) (3)**

Application of physical principles to problems in modern astronomy. Emphasis will be on radiation mechanisms and radiation transfer in astronomical systems. Prerequisite: consent of instructor.

**ASTR 506 - Astronomy and Astrophysics II (s) (3)**

A sequel to ASTR 505 with emphasis on basic dynamics and (magneto) hydrodynamics. Prerequisite: consent of instructor.

**ASTR 508 - Astronomy for Educators (3)**

Assists K-12 teacher in developing pedagogy and content knowledge in the subject of astronomy. Addresses New Mexico benchmarks and standards.

**ASTR 509 - Astronomy Laboratory Workshop for Educators (3)**

Intensive laboratory experience in Astronomy intended for educators. Part of the Masters of Art in Teaching (MAT) curriculum. Pre/Corequisite(s): ASTR 508 or consent of instructor. Restricted to MAT Program majors.

**ASTR 535 - Observational Techniques I (f) (3)**

Up-to-date introduction to modern observational astronomy in a two-semester sequence. Topics include: introduction to computers, error analysis in data, the different types of optical telescopes, and optical and infrared photometry, image processing, and detectors.

**ASTR 536 - Observational Techniques in Astronomy II (s) (3)**

Sequel to ASTR 535. The second half of the course emphasizes observational techniques in spectroscopy, radio astronomy, and high energy astrophysics. Prerequisite: ASTR 535.

**ASTR 545 - Stellar Spectroscopy (3)**

This course covers the physics of stellar atmospheres with emphasis on using spectra as a diagnostic tool for understanding the properties of stars. Topics include spectral classification, radiative transfer, gas equilibrium physics, line and continuum opacities, adiabatic and superadiabatic convection, and extraction of observed quantities from spectra for deducing physical conditions of the source.

**ASTR 555 - Galaxies I (3)**

Fundamentals of the properties of galaxies and the components that they are made of stars and stellar populations, gas and dust, central black holes, and dark matter. Introduction to basic concepts of galaxy formation.

**ASTR 565 - Stellar Interiors (3)**

Internal constitutions of stars, computation of stellar models, and stellar evolution. Prerequisite: consent of instructor.

**ASTR 575 - Computational Astrophysics (3)**

Scientific programming in the C language for astronomical applications. Explore key algorithms and standard techniques for imaging and spectroscopic data analysis. Topics include pointers, data structures, dynamic memory allocation, and least squares fitting, grid and iterative search methods, LCG random number generators, Monte Carlo simulations, numerical integration, and astronomical image and spectrum manipulation. Applications to real astronomical datasets are emphasized.

**ASTR 598 - Special Research Programs (1-6)**

Individual investigations, either analytical or experimental.

**ASTR 599 - Master's Thesis (0-15)**

Master's level research in astrophysics or observational astronomy.

**ASTR 600 - Pre-dissertation Research (1-15)**

Research.

**ASTR 605 - Interstellar Medium (3)**

Problems associated with gas and dust in the galaxy and with diffuse and planetary nebulae.

**ASTR 610 - Radio Astronomy (3)**

Techniques and observations stressing the operational approach to measurement and how the observations are intimately interwoven throughout modern astrophysics. Prerequisite: consent of instructor.

**ASTR 616 - Galaxies II (3)**

Advanced topics in galaxies. Includes a detailed description and understanding of the Milky Way and topics in galaxy formation and evolution. Consent of Instructor required. Prerequisite(s): Consent of instructor.

**ASTR 620 - Planetary Science I (3)**

Evaluation and analysis of observational data on solar system objects to determine their nature and physical conditions, with emphasis upon atmospheres (composition, structure, thermodynamics, evolution, etc.)

**ASTR 621 - Planetary Science II (3)**

The physical processes involved in planetary system formation are addressed. Specific foci include molecular cloud collapse, disk processes, and competing theories of planet formation within disks. Additional topics to be discussed may include: the solar wind, planetary magnetic fields, planetary ring processes, and mineralogy.

**ASTR 625 - Cosmology (3)**

Discussion of our current knowledge of the structure of the universe and current research methods. Topics include the distance scale, clustering of galaxies, large-scale structure, metrics, dark matter, and cosmological probes such as distant quasars, radio galaxies, and gravitational lenses. Prerequisite: consent of instructor.

**ASTR 630 - Methods of Statistical Analysis for Modern Astronomy (3)**

Graduate class for students interested in applying statistical techniques to modern astrophysical data sets. Topics include a review of probability and probability distribution functions, implications of techniques for statistical inference, regression and multivariate analysis, data smoothing, data mining, survival analysis and time domain analysis. Applications to real astronomical data sets will be emphasized with all topics.

**ASTR 670 - Heliophysics (3)**

Explore the Sun and its processes, the heliosphere, and its interactions with the planets. Topics include: A introductory description of space weather and its physics; energy interaction with the space environment; the quiet Sun and its interactions with planetary atmospheres (with an emphasis on Earth); Magnetohydrodynamics; frozen-in flux; the solar wind; magnetized fluid dynamics; the active Sun (flares and coronal mass ejections); the effects of Space Weather.

**ASTR 675 - Star Formation and Evolution (3)**

The beginning and ending phases of stellar evolution. Topics include star formation and bipolar outflows, the basics of stellar interiors, evolution of close double stars, stellar mass loss, and the end phases of stellar evolution; planetary nebulae, neutron stars and black holes.

**ASTR 698 - Special Topics. (1-9)**

Special topics.

**ASTR 700 - Doctoral Dissertation (0-15)**

Dissertation.

**AXED - AGRICULTURAL AND EXTENSION EDUCATION****AXED 456 - Introduction to Research Methods (3)**

Introduction to research design and methodology in education and behavioral sciences. Overview of common research designs and data collection strategies. Prepares students to critique published research and understand basic skills including hypothesis development and conducting a literature search. Prerequisite: junior standing.

**AXED 460 - Methods in Career and Technical Laboratory Instruction (2)**

For students planning to teach agricultural or technology education at a secondary or postsecondary level. Focus on planning, delivering, and evaluating instruction in laboratories; and on CPR, first aid, and NCCER certifications. Laboratory safety and tool, equipment, and laboratory management systems are also emphasized. Restricted to AXED Majors.

**AXED 466V - John Muir: Lessons in Sustainability (3)**

This course examines the life of John Muir in the context of sustainability. Muir was a farmer, inventor, explorer, botanist, glaciologist, conservationist, and noted nature author. He was influential in the National Parks movement

and in starting the Sierra Club. Living in the natural world influences his faith and philosophy. By examining his life and the themes that shaped it, students will develop an understanding of what it means to live sustainably and to contribute beyond their personal lives to a sustainable past.

**AXED 469 - Experiential Learning in Career/Technical Education for Exceptional Learners in a Diverse Society (3)**

Addresses the planning, delivering and evaluation of experiential learning activities for students with special needs. Specific strategies for working with students with special needs in a shop or laboratory setting within the Career and Technical Education environment will be included. Taught with AXED 569 and SPED 569. Prerequisite(s): SPED 350. Crosslisted with: SPED 469

**AXED 475 - Leadership On Agricultural and Natural Resource Issues (3)**

Investigates leadership concepts and group dynamics as they relate to a changing world and complex agricultural and natural resource issues. Topics include emotional intelligence, leading change, political leadership, facilitating agreement, team building, and managing conflict in agricultural and natural resource settings.

**AXED 480 - International Agricultural Development (3)**

Introduction to Agricultural topics (products, people, environment, culture, etc) that affect international development. Topics provide students with awareness, knowledge and understanding of teaching, research and service opportunities for those seeking experience or careers in international agricultural development. Taught with AXED 580.

**AXED 484 - Methods of Teaching Physical Science in Agriculture (3)**

Students learn to set up and teach in a modular agriscience laboratory, utilizing a variety of technologies. Modules covered will focus on incorporating physical science into agriculture and may include: Soils and plant nutrients, water quality, water systems, entomology, integrated pest management, and renewable energy applications. Students may develop their own modules and/or experiments. Methods of teaching physical science labs in agriscience will be emphasized

**AXED 485 - Methods of Teaching Biological Science in Agriculture (3)**

Students learn to set up and teach in a modular agriscience laboratory, utilizing a variety of technologies. Modules covered will focus on incorporating biological science into Agriculture and may include: plant growth, animal and plant anatomy, microscopy, tissue culture, electrophoresis, DNA analysis, microbiology, food science and vermiculture. Students may develop their own modules and/or experiments. Methods of teaching biological agriscience labs will be emphasized. Prerequisite(s): Junior standing or above.

**AXED 486 - Effective Management of Volunteer Programs (3)**

For individuals currently involved in, or interested in being involved in, the management and supervision of volunteer programs. Emphasis on practical application, utilizing a research and academic base. Explores the roles, functions, and tasks of volunteers and managers of volunteers including recruitment, orientation and training, supervision, evaluation, recognition and retention.

**AXED 488 - 4-H Youth Development (1)**

On-line course explores 4-H Youth Development as an integral part of the Cooperative Extension Service. Topics to be addressed include mission, philosophy, delivery modes, audiences and partnerships. Course is relevant for anyone interested in pursuing a career in Cooperative Extension.

**AXED 489 - The FFA Organization: An Overview (1)**

Online course addressing the history, mission, philosophy and structure of the New Mexico and National FFA Organizations and their relationship to supervised agriculture experiences and the agricultural education curriculum. Course is relevant for anyone interested in pursuing a career in agricultural education.

**AXED 490 - Independent Study in Agricultural, Extension, or Technology Education (1-3)**

Specific subjects are agreed upon by the student and instructor. Prerequisites: junior or senior standing and consent of instructor. May be repeated for a maximum of 6 credits.

**AXED 499 - Undergraduate Research (1-4)**

Research experience in agricultural, extension, and technology education with applications to selected issues and problems. Prerequisites: consent of instructor, adviser, and department head.

**AXED 500 - The Diffusion and Adoption of Agricultural Innovations (3)**

Factors that influence rates of diffusion and adoption of innovations. Consequences of adopting or rejecting innovations. Processes by which change agents influence introduction and adoption of innovations. Taught with AXED 400 with differential assignments for graduate students.

**AXED 515 - Youth Program Development and Management (3)**

Designed for professionals involved in youth group activities. Basic concepts in planning, conducting, and managing educational youth programs in a variety of organizations. Same as AXED 415 with differentiated assignments for graduate students.

**AXED 525 - Graduate Teaching Methods (3)**

Examines the teaching and learning process, emphasizing the use of appropriate methods for teaching career and technical education subjects to youth or adults in formal and nonformal educational settings. Includes principles of teaching and learning styles, levels of cognition, syllabus development, lesson planning, teaching using a variety of methods, and evaluating students. For students who have no prior education in teaching methods.

**AXED 530 - Teaching Adults in Nonformal Settings (3)**

The adult and postsecondary learner; adult learning styles and principles; use of community resources and problem-solving techniques; and learning strategies for adults in formal and nonformal education. Same as AXED 430 with differentiated assignments for graduate students.

**AXED 536 - Keys for Agricultural and Rural Development (3)**

Introduction to concepts of development, the process of change, key factors that contribute to agricultural and rural development in a community, and strategies employed to effect change with implications for international students or domestic students planning to work internationally.

**AXED 544 - Planning and Methods in Nonformal Education (3)**

Identifying trends and resources of a community and planning community-based extension and nonformal education programs. Preliminary methods for teaching and evaluating nonformal education programs. Same as AXED 444 with differentiated assignments for graduate students.

**AXED 545 - Developing Excellent Programs in Career and Technical Education (3)**

Students learn to develop excellence in the three components of a successful secondary school program in career and technical education: classroom and laboratory instruction, career and technical student organizations, and career development activities. Community-based program planning, utilizing partners, program marketing, and professional development are addressed as strategies for achieving excellence. Methods of obtaining financing and maintaining accountability of the program are discussed. Same as AXED 445 with differentiated assignments for graduate students.

**AXED 546 - Methods for Teaching Agricultural and Technology Education (3)**

Methods of instruction and presentation, selection of teaching aids and support materials, classroom management, development of a complete educational program, and microteaching experiences. Same as AXED 446. Prerequisites: GPA of 3.0 or above. Restricted to AXED Majors

**AXED 547 - Directed Teaching in Agricultural or Technology Education (4-9)**

Fourteen-week off-campus professional experience in directed teaching and observation provided in selected centers under secondary agricultural and technology supervising teachers. Prerequisites: A teaching methods class and consent of instructor. Same as AXED 447 with reduced credit hours for graduate students. Restricted to AXED Majors

**AXED 548 - Directed Teaching in Extension Education (4-9)**

Four- to fourteen-week professional experiences in directed teaching and observation provided in cooperative extension at the county, regional, or state level. Prerequisite: consent of instructor. Same as AXED 448 with reduced credit hours for graduate students. Restricted to majors. Main campus only.

**AXED 549 - Directed Field Experience in Agricultural or Technology Education (4-9)**

A four-to-fourteen-week supervised learning experience in an approved teaching setting with application to educational, agricultural, technological, communications, public relations, or environmental practices. Prerequisite: consent of instructor. Same as AXED 449 with reduced credit hours for graduate students. Restricted to majors. Main campus only.

**AXED 556 - Research Methods (3)**

Students learn the research process as it is applied to solving problems in the behavioral sciences. Prepares students to conduct and critique research and to diffuse research findings. Implications, applications, and ethics of research also stressed. Students develop a research proposal for a problem of their choice. Same as FCSC 556.

**AXED 565 - New Mexico Water Issues (3)**

Designed for agricultural and natural resource professionals who must educate others or provide leadership on complex water issues in New Mexico. Students will travel to four distinct geographic and cultural regions of the state and study water policies, issues, and delivery technologies in each region. Specific areas covered will be determined by resource professionals

who will present past, current and future issues involved in the distribution of water. Urban impacts on water use will also be investigated.

**AXED 569 - Experiential Learning in Career/Technical Education for Exceptional Learners in a Diverse Society (3)**

Addresses the planning, delivering and evaluation of experiential learning activities for students with special needs. Specific strategies for working with students with special needs in a shop or laboratory setting within the Career and Technical Education environment will be included. Taught with SPED 469 and AXED 469. Prerequisite(s): SPED 350 or SPED 500. Crosslisted with: SPED 569

**AXED 571 - Data Collection and Analysis (3)**

Introduction to basic concepts of data collection and analysis. Interpretations from observational studies and controlled experiments. Roles of descriptive and inferential statistics in a complete data analysis. Mean, median, standard deviation, and graphical summaries of data. Correlation and simple regression. One- and two-sample tests and confidence intervals. Chi-square tests and basic analysis of variance. Competency in arithmetic and algebra required. An undergraduate statistics course recommended.

**AXED 575 - Leadership on Agricultural and Natural Resource Issues (3)**

Investigates leadership concepts and group dynamics as they relate to a changing world and complex agricultural and natural resource issues. Topics include emotional intelligence, leading change, political leadership, facilitating agreement, team building, and managing conflict in agricultural and natural resource settings. Taught with AXED 475 with differential assignments for graduate students.

**AXED 580 - International Agricultural Development (3)**

Introduction to agricultural topics (products, people, environment, culture, etc.) that affect international development. Topics provide students with awareness, knowledge and understanding of teaching, research, and service opportunities for those seeking experience or careers in international agricultural development and education. Taught with AXED 480.

**AXED 586 - Effective Management of Volunteer Programs (3)**

For individuals currently involved in, or interested in being involved in, the management and supervision of volunteer programs. Emphasis on practical application, utilizing a research and academic base. Explores the roles, functions, and tasks of volunteers and managers of volunteers including recruitment, orientation and training, supervision, evaluation, recognition and retention. Taught with AXED 486 with differentiated assignments for graduate students.

**AXED 590 - Special Topics (1-4)**

Specific subjects and credits to be announced in the Schedule of Classes. Maximum of 4 credits per semester. No more than 6 credits toward degree.

**AXED 594 - Workshops in Agricultural, Extension, and Technology Education (1-3)**

Workshop procedures applied to current trends in agricultural, extension, and technology education. Maximum of 7 credits toward a degree.

**AXED 595 - Internship/Cooperative Experience (1-6)**

Supervised professional on-the-job learning experience. Prerequisite: Consent of instructor. Maximum of 6 credits toward a degree.

**AXED 597 - Program Evaluation (3)**

Techniques to assist adult, career and technical, and nonformal personnel in making systematic appraisal of their programs.

**AXED 598 - Creative Component (1-4)**

For nonthesis program. Individual investigations or projects, either qualitative or quantitative studies. Prerequisite: consent of instructor. Maximum of 6 credits toward a degree.

**AXED 599 - Master's Thesis (1-6)**

Thesis.

**B A - BUSINESS ADMINISTRATION****B A 485 - The Business of Science and Technology (3)**

This course examines business practices for science and technology organizations. The main focus of this course is to show the commercialization process, using business processes to transform an invention into a marketable product. For example, biomedical science discoveries reach patients through collaborative interactions among universities, private industry, and the government over a period of time. Strategic planning, marketing, finance accounting and management practices facilitate the transformation process. Topics include patents, funding, business plan preparation, risk management, and ethical conduct. This course will also address historical, current and global perspectives of science-driven and technology-driven businesses. Not open to MBA students.

**B A 490 - Selected Topics (3)**

Prerequisites vary according to the seminar being offered.

**B A 491 - Business Administration and Economics Internship and Cooperative Education III (1-3)**

Applications of the principles of business administration and economics. Registration in one course allowed per co-op work phase; a minimum of 12 work weeks is required. Open only to students in the College of Business. Option of S/U or a grade. The amount of academic credit (1-3 cr.) will be determined by the academic experience and not by the work experience.

**B A 498 - Independent Study (1-3)**

Individual studies directed by consenting faculty with the prior approval of the department head. Prerequisite: junior or above standing and consent of instructor. A maximum of 3 credits may be earned.

**B A 500 - Finance and Macroeconomics (3)**

Application and integration of financial theory, concepts and practice. Macroeconomic theory and public policy, national income concepts, unemployment, inflation, economic growth and international payment problems.

**B A 550 - Special Topics (3)**

Interdisciplinary seminar in selected current business topics. Prerequisite(s): Prerequisites vary according to the seminar being offered.

**B A 585 - The Business of Science and Technology (3)**

This course examines business practices for science and technology organizations. The main focus of this course is to show the commercialization process, using business processes to transform an invention into a marketable product. For example, biomedical science discoveries reach patients through collaborative interactions among universities, private industry, and the government over a period of time. Strategic planning, marketing, finance accounting and management practices facilitate the transformation process. Topics include patents, funding, business plan preparation, risk management, and ethical conduct. This course will also address historical, current and global perspectives of science-driven and technology-driven businesses. Not open to MBA students.

**B A 590 - Professional Paper/Presentation (3)**

Paper written in close coordination with sponsoring professor and presented near the end of the student's final semester in the M.B.A. program. The paper will consist of a professional business report, a case study of a business or organization or a research report. Prerequisite(s): Minimum of 3.0 average in: ACCT 503, BLAW 502, FIN 503, and MKTG 503 or AECC 551. Restricted to: MBA majors.

**B A 598 - Special Research Programs (1-3)**

Individual investigations either analytical or experimental. A maximum of 3 credits may be earned. Prerequisite: consent of instructor.

**B A 599 - Master's Thesis (0-15)**

Thesis.

**BCHE - BIOCHEMISTRY****BCHE 451 - Special Topics (1-3)**

Same as CHEM 451. Prerequisite: consent of instructor. May be repeated for a maximum of 12 credits.

**BCHE 455 - Independent Studies (1-3)**

Independent studies directed by consulting faculty. Prerequisite: consent of instructor.

**BCHE 494 - Techniques in Genetic Engineering (3)**

Laboratory techniques required for experimentation with recombinant DNA such as nucleic acid isolation and purification, polymerase chain reaction (PCR), sequence analysis, and directed mutagenesis using genetic material from both prokaryotic and eukaryotic organisms. Consent of Instructor required. Prerequisite(s): C or better in BCHE 395 and BCHE 396 or GENE 315, and consent of instructor.

**BCHE 540 - Seminar in Biochemistry (1)**

Formal seminar presentation in current topics in biochemical research. May be repeated for a maximum of 3 credits.

**BCHE 542 - Biochemistry I (3)**

Relationship between macromolecular structure and function. Basic enzymology. Energy metabolism. Prerequisite(s): CHEM 314 and CHEM 431 or CHEM 433; or BCHE 395 or equivalent.

**BCHE 545 - Molecular and Biochemical Genetics (3)**

An accelerated treatment of the molecular basis of gene expression. Discussion of chemical, enzymological, and genetic techniques of molecular biology. Prerequisite: BCHE 542 or equivalent. Same as BIOL 545.

**BCHE 546 - Biochemistry II (3)**

Intermediary metabolism: catabolic and anabolic pathways of carbohydrates, lipids, amino acids, and nucleic acids, including their regulation. Prerequisite: BCHE 542 or BCHE 395 with consent of instructor

**BCHE 590 - Discussions in Biochemistry (1)**

Current research problems in biochemistry. May be repeated for a maximum of 6 credits. S/U Grading (S/U, Audit).

**BCHE 598 - Special Research Programs (1-3)**

May be repeated for a maximum of 6 credits. Same as CHEM 598. Graded S/U.

**BCHE 599 - Master's Thesis (0-15)**

May be repeated for a maximum of 6 credits. Same as CHEM 599.

**BCHE 600 - Research (1-15)**

May be repeated for a maximum of 20 credits. PR/U grading. Same as CHEM 600.

**BCHE 645 - Nucleic Acid Metabolism (3)**

Study of the enzymology of proteins that act on nucleic acids as well as the effect of DNA and RNA structure on metabolic processes. Taught with BCHE 451. Prerequisite(s): 'C' or better in BCHE 395 or BCHE 542.

**BCHE 647 - Physical Biochemistry (3)**

Fundamental applications of physical chemistry to the investigation of biological metabolites and biological macromolecules, including proteins, oligo-nucleotides, and molecular arrays with an emphasis on understanding biological functions based on chemical structures. Taught with BCHE 451. Prerequisite(s): 'C' or better in CHEM 431 or CHEM 433 or BCHE 542.

**BCHE 648 - Proteins and Enzymes (3)**

Theories and mechanisms of enzyme catalysis, chemical modification of proteins, general acid-base catalysis and nucleophilic catalysis as they pertain to enzymes, advanced enzyme kinetics, and formulation of enzymatic rate equations. Prerequisite: BCHE 546.

**BCHE 649 - Topics in Biochemistry (1-3)**

Selected topics of current interest designated by title and credit. May be repeated for a maximum of 3 credits.

**BCHE 650 - Advanced Seminar (1)**

Discussion of biochemical research in progress that relates to a doctoral candidate's thesis research. Intended for students who have earned a master's degree or the equivalent and has made significant research progress for preparation of the doctoral dissertation. May be repeated for a maximum of 3 credits.

**BCHE 700 - Doctoral Dissertation (0-20)**

May be repeated for a maximum of 20 credits. Graded PR/U. Same as CHEM 700.

**BCIS - BUSINESS COMPUTER SYSTEMS****BCIS 450 - Systems Design, Development and Implementation (3)**

Design, development and implementation of business information processing systems. Includes maintenance, evaluation and system management considerations. Prerequisite: C or better in BCIS 350.

**BCIS 455 - Design of On-Line Business Systems (3)**

Covers analysis, design, and development of on-line, real-time computerized business-information systems. Prerequisite: C or better in BCIS 350; and BCIS 322 or concurrent enrollment or consent of instructor.

**BCIS 458 - Knowledge Management and Decision Support (3)**

Design, evaluation and implementation of computerized decision systems. IS majors may not use this course to satisfy IS major requirement. Prerequisite(s): C or better in BCIS 338 or consent of instructor.

**BCIS 465 - Business Systems Simulation (3)**

Simulation of business systems. Model design, implementation, testing and analysis. Prerequisites: C or better in BCIS 322 and STAT 251G.

**BCIS 470 - Object-Oriented Systems Development Techniques (3)**

Design and implementation of n-tier information systems in the object-oriented environment, including web-based interfaces, business logic, and database communication. Prerequisite: C or better in BCIS 350; and BCIS 322 or concurrent enrollment or consent of instructor.

**BCIS 475 - Database Management Systems (3)**



Design, development, and use of database management systems in the business environment. Prerequisite: C or better in BCIS 350 or consent of instructor.

**BCIS 480 - E-Commerce Security (3)**

Introduction to securing network-based applications from internal and external threats. Fundamentals of network security, including TCP/IP, firewalls, intrusion detection, and vulnerability. Prerequisite(s): C or better in BCIS 350 or ET 377 or consent of instructor.

**BCIS 482 - Management of Information Security (3)**

Provides management overview of information security and thorough examination of administration of information security. Surveys field of information security including planning, policy and programs, protection and people relative to information security. Prerequisite: BCIS 110 or equivalent. Taught with BCIS 575.

**BCIS 485 - Enterprise Resource Planning (3)**

This course covers concepts in enterprise resource planning (ERP). Topics include how ERP integrates business processes across functional areas--such as the procurement process and the sales order process--and how businesses use ERP information systems in day-to-day operations as well as for performance monitoring. SAP R/3 software will be used in several hands-on examples of ERP software as a real-world example of an ERP system. IS majors are restricted from taking this course to satisfy IS requirements. Prerequisite(s): C or better in BCIS 338 or BCIS 350 or ACCT 351.

**BCIS 490 - Selected Topics (1-3)**

Current topics in business systems analysis. Prerequisites vary according to topics being covered. May be repeated for a maximum of 12 credits under different subtitles.

**BCIS 495 - Enterprise Information Portals (3)**

Enterprise information portal (EIP) is a framework for integrating information, people and processes across organizational boundaries using web-based technologies. In this class, you will explore the wide range of options (EIP's) (e.g. SAP Netweaver Portal) provided to integrate ERP solutions, third-party applications, legacy systems, databases, unstructured documents, internal and external Web content, and collaboration tools. Taught with BCIS 565. Prerequisite(s): BCIS 485.

**BCIS 498 - Independent Study (1-3)**

Individual studies directed by consenting faculty with prior approval of the department head. Prerequisites: junior or above standing and consent of instructor. May be repeated for a maximum of 3 credits.

**BCIS 502 - Business Information Systems (3)**

Analysis of information systems as integral parts of business organizations, including the responsibility of management to understand their capabilities and uses in handling the organization's information flow and providing appropriate information for decision making. Prerequisite: graduate students only.

**BCIS 540 - Information Systems Analysis and Design (3)**

Information systems development methodologies and the system life cycle. Justifying and managing systems development projects. Prerequisite: graduate students only.

**BCIS 550 - Special Topics (1-3)**

Seminars in selected current topics in business computer systems. Prerequisites vary according to topic being offered. May be repeated for a maximum of 3 credits.

**BCIS 558 - Knowledge Management and Decision Support (3)**

Design, evaluation and implementation of computerized decision systems. Same as BCIS 458 with differential assignments for graduate students.

**BCIS 560 - Enterprise Resource Planning & Business Processes (3)**

Enterprise-wide information systems and their use in enterprise resource planning (ERP). This course will examine the many cross-functional business processes. Other topics include ERP implementation issues, change management, and business process reengineering. Hands-on exercises use SAP/3 Enterprise software. Consent of instructor required. Prerequisite(s): C or better in ACCT 351 or BCS 502 or consent of instructor.

**BCIS 565 - Enterprise Information Portals (3)**

Enterprise information portal (EIP) is a framework for integrating information, people and processes across organizational boundaries using web-based technologies. In this class, you will explore the wide range of options (EIP's) (e.g. SAP Netweaver Portal) provide to integrate ERP solutions, third-party applications, legacy systems, databases, unstructured documents,

internal and external Web content, and collaboration tools. Taught with BCIS 495. Prerequisite(s): BCIS 485.

**BCIS 575 - Management of Information Security (3)**

Provides management overview of information security and thorough examination of administration of information security. Surveys field of information security including planning, policy and programs, protection and people relative to information security. Prerequisite: BCIS 110 or equivalent. Same as BCIS 482.

**BCIS 580 - Systems Design, Development, and Implementation (3)**

Covers design, development and implementation of business information processing systems. Includes maintenance, evaluation and system management considerations. Prerequisite: either BCIS 350, BCIS 540, or consent of instructor. Same as BCIS 450 with differentiated assignments for graduate students.

**BCIS 584 - Object-Oriented Systems Development Techniques (3)**

Business information systems development in the object-oriented environment. Taught with BCIS 470 with differentiated assignments for graduate students. Prerequisite(s): C or better in BCIS 322 or consent of instructor.

**BCIS 585 - Design of On-Line Business Systems (3)**

Analysis, design, and development of on-line, real-time computerized business information systems. Taught with BCIS 455 with differentiated assignments for graduate students. Prerequisite(s): C or better in BCIS 322 or consent of instructor.

**BCIS 587 - Business Systems Simulation (3)**

Simulation of business systems. Model design, implementation, testing, and analysis. Taught with BCIS 465 with differentiated assignments for graduate students. Prerequisite(s): C or better in BCIS 322 or consent of instructor; and A ST 251 or STAT 251.

**BCIS 590 - E-commerce Security (3)**

Introduction to securing network-based applications from both internal and external threats. Fundamentals of network security including TCP/IP, firewalls, intrusion detection and vulnerability discussed. Not open to students who have taken BCIS 480. Prerequisites: C or better in BCIS 460 or consent of instructor. No S/U or audit option.

**BCIS 595 - Database Management Systems (3)**

Design, development, and use of database management systems in the business environment. Prerequisite: BCIS 350 or consent of instructor. Same as BCIS 475 with differentiated assignments for graduate students.

**BCIS 598 - Independent Study (1-3)**

Individual studies directed by consenting faculty with prior approval of department head. A maximum of 3 credits may be earned. Prerequisite: consent of instructor.

**BIL - BILINGUAL EDUCATION**

**BIL 489 - Topics (3)**

Course subtitled in the Schedule of Classes. May be repeated three times for a maximum of 9 credits.

**BIL 505 - The Bilingual Preschool Child (3)**

Principles of multicultural education applied to preschool and primary levels. Focus on issues, methods, and materials.

**BIL 520 - Issues in Schooling for Bilingual Learners (3)**

Identification and consideration of current thought and directions in bilingual education, nationally and internationally.

**BIL 522 - Literacy-Language Instruction for Bilingual Students (3)**

Framework and strategies for developing the written language abilities of bilingual learners, with attention to the interrelationships among reading, writing, and oral language.

**BIL 545 - Bilingual/Multicultural Schooling and Community Relations (3)**

Rationale, information pertinent to the school and the community in a setting involving economic, cultural, and linguistic diversity.

**BIL 550 - Internship in Bilingual Education IV (1-6)**

Advanced experience in educational bilingual settings for prospective bilingual education teachers. Maximum of 6 credits.

**BIL 560 - Selected Topics in Bilingual Education III (1-6)**

Various topics on current requests and needs in bilingual education. Maximum of 6 credits. BIL561. The Bilingual Exceptional Student 3 cr.

Introduction to bilingual/multicultural special education. Same as SPED 561, SPED 661.

**BIL 570 - Directed Study in Bilingual Education III (1-6)**

Independent research topics in bilingual education based on particular individual interest or needs.

**BIL 616 - Acquiring Emancipatory Discourses: TESOL/BIL (3)**

An elaboration of understandings of bi- and multilingualism and related models of education based on current research and practice.

**BIL 617 - Multiple Critical Literacies (3)**

An exploration of the multiple literacies that operate on the individual, classroom, community, cultural and societal levels.

**BIL 623 - Curricular Mediation for Democratic Communities (3)**

Problematicization of the various relationships, roles, and leadership considerations which emerge within educational institutions, their structures, and their culturally democratic practices in the classroom, community, and society. Restricted to doctoral-level students of any major. Same as EDUC 623, ECED 623.

**BIL 633 - Praxis and Reflexivity (3)**

The cyclical research processes of continuous self and systemic (re)evaluation vis-a-vis classroom, community, and society with an eye toward reflection, growth, change, and larger forms of social agency. Prerequisite: consent of instructor. Restricted to doctoral-level students of any major. Same as ECED 633, EDUC 633, RDG 633, EDLT 633.

**BIL 635 - Critical Theory and Pedagogy (3)**

Same as EDUC 635.

**BIL 637 - Social Justice Issues in Education (3)**

Same as EDUC 637.

**BIL 663 - Assessment and Consultation for Exceptional Multicultural Populations (3)**

Covers formal and informal methods of assessments as well as consultation models for multicultural populations. Same as BIL 563, SPED 563.

**BIL 670 - Directed Study in Bilingual Education IV (1-6)**

Independent research topics in bilingual education based on particular individual interest or needs.

**BIOL - BIOLOGY**

**BIOL 450 - Special Topics (1-3)**

Specific subjects announced in the Schedule of Classes and offered as scheduled courses. May be repeated for unlimited credit.

**BIOL 451 - Physiology of Microorganisms (3)**

Aspects of cellular physiology unique to prokaryotes. Prerequisite(s): C or better in BIOL 311, either BCHE 341 or BCHE 395, and MATH 121G.

**BIOL 462 - Conservation Biology (3)**

Examination of the value of biological diversity, the natural processes that control biological diversity, and the ways in which human activities have resulted in the loss of biological diversity, both regionally and globally. Prerequisite(s): BIOL 301 and MATH 191.

**BIOL 465 - Invertebrate Zoology (4)**

Survey, ecology, behavior and physiology. BIOL 322 recommended. Prerequisite(s): MATH 121G, BIOL 111G, and junior-level standing.

**BIOL 466 - Invertebrate Zoology Field Trip (1)**

A one-week field trip for the study of marine invertebrates. Registrants must provide own camping gear. Graded: S/U. Prerequisite(s): MATH 121G, BIOL 465 or equivalent (or concurrent enrollment) or consent of instructor.

**BIOL 467 - Evolution (3)**

Covers theory, historical background, population variation, natural selection, adaptation, speciation. Prerequisite(s): BIOL 111G, BIOL 305 or GENE 320, and MATH 121G.

**BIOL 469 - Biology of Emerging Infectious Diseases (3)**

This class will investigate the evolutionary and ecological drivers of disease emergence. The effect of emerging diseases on human health will be addressed throughout the class, but the class will also consider the consequences of disease emergence for the health of wildlife and plant populations. Additionally, the class will consider the mechanisms used to control disease emergence and why they succeed or fail. Prerequisite(s): MATH 121G, Introductory Genetics (BIOL 305 or equivalent) or consent of the instructor.

**BIOL 470 - Developmental Biology (3)**

The purpose of this course is to introduce students to the principles that govern the development of a single fertilized egg cell into a complex multicellular organism. These principles, and often the molecular mechanisms by which they are accomplished, appear to be universal for all multicellular organisms including both plants and animals. We will explore issues such as: how cells become committed to particular cell fates and how this commitment is maintained; how organs acquire particular shapes, sizes and positions; the developmental causes of some human diseases; how the environment affects development; and, how changes in development provide the material basis for evolutionary change. Prerequisite(s): BIOL 211G, BIOL 305, and MATH 121G.

**BIOL 471 - Molecular and Cellular Mycology (3)**

Exploration of the world of fungi with emphasis on fungal molecular biology and development. Including discussion of fungal taxonomy and genomics. Prerequisite(s): MATH 121G and BIOL 311 required, BCHE 341 or BCHE 395 recommended, or consent of instructor.

**BIOL 472 - Primate Behavior and Ecology (3)**

Survey of the social behavior and ecology of nonhuman primates.

**BIOL 473 - Ecology of Microorganisms (3)**

The metabolic interactions of microorganisms in the environment, with emphasis on their roles in ecological processes. Prerequisite(s): MATH 121G, BIOL 311 or consent of instructor.

**BIOL 474 - Immunology (3)**

Basic concepts of the immune response. Prerequisite(s): MATH 121G, BIOL 305, and CHEM 211 or CHEM 313.

**BIOL 475 - Virology (3)**

Mechanisms of viral infections of animals and man. Prerequisite(s): MATH 121G, BIOL 311, and either BCHE 341 or BCHE 395.

**BIOL 476 - Soil Microbiology (3)**

Same as SOIL 476.

**BIOL 476 L - Soil Microbiology Laboratory (1)**

Same as SOIL 476L.

**BIOL 477 - Applied and Environmental Microbiology (4)**

A lecture-laboratory course on the microorganisms and the reactions they mediate which either impact the environment or have industrial applications. Reading of current literature will be emphasized. Topics include bioremediation, water quality, and aspects of industrial and food microbiology. Prerequisite(s): MATH 121G, BIOL 311, and 311L, or consent of instructor.

**BIOL 478 - Molecular Biology of Microorganisms (3)**

The biochemical basis for gene mutation, recombination, and expression with emphasis on prokaryotes. Includes fundamentals of recombinant DNA technology. Prerequisite(s): MATH 121G, BIOL 305 and BIOL 311. Pre/Corequisite(s): BCHE 341 or BCHE 395.

**BIOL 479 - Medical Microbiology (3)**

An in-depth overview of microbial pathogens associated with human infectious disease. Etiological agents, pathogenesis, and processes leading to the disease state and the therapies of infectious disease. Prerequisite(s): MATH 121G and BIOL 311 required, BIOL 474 recommended.

**BIOL 479 L - Medical Microbiology Laboratory (1)**

Overview of common procedures used by medical microbiologists to identify agents of disease or microbial pathogen traits. Prerequisite(s): MATH 121G, BIOL 311. Pre/Corequisite(s): BIOL 479.

**BIOL 480 - Animal Behavior (3)**

A survey of the field of animal behavior. BIOL 322 recommended. Prerequisite(s): MATH 121G, BIOL 111G, and junior-level standing.

**BIOL 480 L - Animal Behavior Laboratory (1)**

Laboratory and field experiences in animal behavior. Prerequisite(s): MATH 121G, BIOL 111, and junior level standing. BIOL 322 recommended. Corequisite(s): BIOL 480.

**BIOL 482 - Microbial Systematics (2)**

Systematics of prokaryotic organisms, and consideration of fungi and protists. Integration of morphological, biochemical, molecular, and genetic information in determining group relationships. Problems encountered when applying classic systematic principles to organisms without significant contribution of sexual reproduction. Consent of instructor required. Prerequisite(s): MATH 121G, BIOL 311 (or equivalent) and consent of instructor.

**BIOL 484 - Animal Communication (3)**

An examination of how animals produce and perceive signals, what factors influence the form of signals in different sensory modalities, and how conflicts

- between senders and receivers affect signaling strategies. Weekly discussion from the primary literature and group research products. Prerequisite(s): BIOL 111G or consent of instructor, and MATH 121.
- BIOL 488 - Principles of Conservation Genetics (3)**  
Fundamentals of the genetics of small populations. Genetic technologies used in studying small populations. Application of genetics and evolution to the conservation of biological populations. Prerequisite(s): MATH 121G and BIOL 305.
- BIOL 489 - Genetic Aspects of Population Biology (3)**  
Basic theory of population genetics and how that theory has guided, and been influenced by, studies of natural populations. Prerequisite(s): MATH 121G and BIOL 305 or equivalent.
- BIOL 490 - Neurobiology (3)**  
Fundamentals of neurobiology with an emphasis on properties of neurons and glia, principles of synaptic transmission, development of nervous system and organization of motor and sensory systems. Prerequisite: BIOL 211, BIOL 305, MATH 142G, or MATH 191G, and CHEM 211 or CHEM 313.
- BIOL 498 - Biology Research Programs (1-3)**  
Directed studies and research experiences, by arrangement with instructor. May be repeated for a maximum of 6 credits.
- BIOL 503 - Advanced Primate Adaptation and Evolution (3)**  
Advanced review of non-human primate adaptation and evolution.
- BIOL 503 L - Advanced Primate Adaptation and Evolution Laboratory (1)**  
Laboratory with exercises on non-human primate adaptation and evolution.
- BIOL 506 - Biological Electron Microscopy (f) (5)**  
Principles and use of light microscope, transmission and scanning electron microscope; specimen preparation, thick and ultrathin sectioning, analysis of micrographs.
- BIOL 507 - Plant Systematics (4)**  
Principles and methods, classification, and identification of representative plant families. In addition student collections will emphasize independent identification of difficult groups. Prerequisite: BIOL 110. Not open to students who have taken BIOL 312 or equivalent.
- BIOL 508 - Biology for Educators (3)**  
Assists K-12 teachers in developing pedagogy and content knowledge in biology. The document "New Mexico Science Content Standards, Benchmarks, and Performance Standards" provides a focus for the content area covered and methodologies emphasized.
- BIOL 510 - Current Topics in Biology (2)**  
Current progress in various biological disciplines. Review of pertinent primary biological literature and oral presentations by experts. May be repeated for a maximum of 6 credits. Graded S/U.
- BIOL 514 - Plant Physiology (2)**  
Same as EPWS 514. Prerequisites: BIOL 211G and CHEM 112G.
- BIOL 520 - Molecular Cell Biology (3)**  
An in-depth look at cellular processes and structures at the molecular level. Emphasis is placed on formal student presentations and discussions of current literature. Prerequisite: BIOL 377 or equivalent.
- BIOL 523 - Mechanisms of Microbial Pathogenicity (3)**  
Comparative study of various human pathogens, including bacteria, viruses and mycoplasma. Evaluation of effects and responses of the host to infection. Prerequisite: BIOL 479.
- BIOL 527 - Symbiosis (3)**  
In-depth treatment of the ecology, evolution, and mechanisms that are found in symbiotic systems. Prerequisite: graduate status.
- BIOL 533 - Environmental Physiology of Plants (3)**  
Integral responses of plants and crop productivity to naturally occurring and modified environmental factors such as radiation, temperatures, water vapor, carbon dioxide, and air flow. Prerequisite: BIOL 314 or consent of instructor. Same as AGRO 533 and HORT 533.
- BIOL 534 - Advanced Human Evolution (3)**  
Advanced overview of human biological evolution from the emergence of Miocene apes to the modern human diaspora. Prerequisite: ANTH 355 or consent of instructor.
- BIOL 534 L - Advanced Human Evolution Laboratory (1)**  
Advanced laboratory in human evolution, includes exercises and activities to learn the human fossil record.
- BIOL 536 - Advanced Disease Vector Biology (3)**  
Fundamentals of disease vector biology with emphasis on molecular biology. Explores an overview of vector borne diseases, insect endocrinology, insect immunity, olfaction, vector genome projects and transgenic insect techniques. Includes student presentations and literature discussions. Prerequisite(s): BIOL 211G and BIOL 305. Taught with: BIOL 436.
- BIOL 540 - Science and Ethics (1-3)**  
Ethical concerns facing researchers in the basic and applied biological sciences. Coverage of responsible conduct in research including scientific integrity and research misconduct, mentor/trainee responsibilities, data management, authorship, publication practices, human subjects, animal welfare, intellectual property, conflicts of interest and effort and collaborative science. Emphasis on ethical reasoning skills. Discussion of ethical and societal implications of issues selected from a broad range of contemporary research areas (genetics, reproductive biology, environmental sciences, nanoscience, drug discovery, bioengineering, neuroscience). Subtitled. May be repeated for a maximum of 12 credits.
- BIOL 541 - Professional Development Seminar (1-3)**  
Practical aspects of career enhancement including job seeking, professional presentations, grant proposals, etc. Prerequisite: consent of instructor.
- BIOL 545 - Molecular and Biochemical Genetics (3)**  
Same as BCHE 545.
- BIOL 547 - Advanced Ornithology (so) (4)**  
Morphology, life histories, systematics, ecology, and behavior of birds. Independent project required.
- BIOL 550 - Special Topics (1-3)**  
Readings, discussions, and/or field and laboratory investigation of selected problems. Possible topics: human genetics, systematic entomology, or parasitism in animals. Prerequisite: consent of instructor, and designation of a specific topic before registration. May be repeated for unlimited credit.
- BIOL 557 - Principles of Phylogenetic Inference (3)**  
Foundation in the evolutionary and statistical concepts underlying the process of phylogenetic inference. Application of principles to practical problems derived from molecular biology, molecular evolution, ecology, conservation biology, evolution, and systematics.
- BIOL 560 - Seminar in Cell and Organismal Biology (1-3)**  
Oral presentation and discussion of journal articles and ongoing research project. May be repeated for a maximum of 6 credits.
- BIOL 562 - Advanced Genomics Technology (3)**  
This course covers current genomics techniques in genome sequencing, transcriptome analysis, detection of genetic variation, and metagenomics. Consent of Instructor required.
- BIOL 566 - Advanced Bioinformatics and NCBI Database (3)**  
The course discusses how to use NCBI database and bioinformatic tools for research with genomics approaches. The topics include nucleotide and protein sequence analysis, similarity search with blast algorithms, gene/genome annotation, protein structure analysis, gene expression analysis, and metagenomic study. Consent of Instructor required.
- BIOL 567 - Individuals and Populations (3)**  
Study of ecological systems at the levels of the individual and population. Topics include physiological responses of individuals to their environment, life history theory, and spatially-explicit models of population and metapopulation dynamics.
- BIOL 568 - Communities and Ecosystems (3)**  
Study of ecological systems at the levels of the community and ecosystem. Topics include species interactions, community structure and dynamics, and flow of material and energy through ecosystems.
- BIOL 570 - Ecological Biogeography (3)**  
Survey of modern theory incorporating ecological mechanisms governing distribution and abundance of species over space and time.
- BIOL 571 - Advanced Molecular and Cellular Mycology (3)**  
Exploration of the world of fungi with emphasis on fungal molecular biology and development, including discussion of fungal taxonomy and genomics, using current literature. Consent of instructor required.
- BIOL 572 - Advanced Primate Behavior and Ecology (3)**  
Advanced review of non-human primate social behavior and ecology.
- BIOL 573 - Fungal Biology (3)**

- Same as EPWS 572. Prerequisites: EPWS 310 or BIOL 311, or consent of instructor.
- BIOL 574 - Advanced Human Osteology (3)**  
Advanced human osteology surveying the functional, developmental and evolutionary biology of the human skeleton. Identifying bones and teeth from hands-on experience with skeletal and dental material. Provides a foundation for human evolutionary studies, bioarchaeology and forensic anthropology.
- BIOL 574 L - Human Osteology Laboratory (1)**  
Laboratory for BIOL 574 and ANTH 574. Experiences and activities related to identifying teeth and bones of the human skeleton.
- BIOL 577 - Advanced Topics in Environmental Microbiology (3)**  
Methods used in molecular ecology and the study of diverse microbial habitats such as the rhizosphere and animal rumen. Class participation expected. Prerequisite: BIOL 473, BIOL 477 or consent of instructor.
- BIOL 581 - Physiology of Animals (3)**  
Comprehensive treatment of integrative physiology of animals, emphasizing tissues, organ systems, and regulatory control, including neuroendocrine function, circulation, respiration, and excretion. Term paper required. Prerequisite: BIOL 211G, BIOL 111G, BIOL 377 recommended.
- BIOL 586 - Molecular Systematics (3)**  
Laboratory oriented course emphasizing the application of molecular biological techniques to traditional life, natural history, and evolutionary biology. Curriculum includes methods of DNA characterization as applied to pedigree analysis, phylogenetic estimation, and population genetics. Weekly discussion of assigned readings from primary literature. Prerequisite: consent of instructor.
- BIOL 587 - Behavioral and Evolutionary Ecology (3)**  
This course will investigate the causes and consequences of phenotypic variation and the adaptive value of phenotypic traits.
- BIOL 588 - Principles of Evolutionary Genetics (3)**  
Fundamentals of genetic properties of natural populations. Application of genetics to the study of evolutionary change.
- BIOL 589 - Speciation and Adaptation (3)**  
Examination of the two great themes of evolutionary biology from the perspectives of paleontology, developmental biology, and genetics. Begins with an historical overview of research on these evolutionary processes, but moves rapidly into contemporary issues. Emphasis on empirical studies and the primary literature.
- BIOL 590 - Advanced Neurobiology (1-3)**  
Detailed examination of the principles underlying nervous system organization and function. Emphasis on recent advances in multidisciplinary, integrated approaches to study the nervous system. Prerequisites: either BIOL 490, BIOL 520, or equivalent, and consent of instructor. May be repeated under different subtitles for a maximum of 9 credits.
- BIOL 598 - Special Research Programs (1-9)**  
Individual investigations either analytical or experimental.
- BIOL 599 - Master's Thesis (0-15)**  
Thesis.
- BIOL 600 - Doctoral Research (1-15)**  
Research.
- BIOL 610 - Seminar (1-3)**  
Reviews of significant contributions from the zoological, botanical, and microbiological sciences to the broader aspects of biology. May be repeated for a maximum of 6 credits.
- BIOL 612 - Microbiology Seminar (1)**  
Seminar to aid graduate students in assessment and presentation of classical and current topics in microbiology.
- BIOL 620 - Advanced Studies in Microbial Physiology (1-3)**  
Special topics, lectures, and/or laboratory work in various specialties within the field of microbial physiology.
- BIOL 621 - Advanced Studies in Plant Ecology (1-3)**  
Detailed appraisal of current theories and methods involving community and factorial plant ecology.
- BIOL 623 - Advanced Studies in Plant Morphology (1-3)**  
Comparative investigations of internal and external structures of vascular plants, including ultrastructures.
- BIOL 627 - Advanced Studies in Plant Physiology (1-3)**  
Seminars, lectures, and/or laboratory work in specialties in the field of plant physiology.
- BIOL 629 - Advanced Studies in Plant Biosystematics (1-3)**  
Critical study of selected taxa.
- BIOL 631 - Advanced Studies in Genetics (1-3)**  
Lectures, directed study, and discussions in current cytogenetic and cytotoxic research.
- BIOL 633 - Advanced Studies in Cell Biology (1-3)**  
Lectures, seminars, or laboratory research on eukaryotic cell biology or viruses.
- BIOL 634 - Advanced Studies in Medical Microbiology (1-3)**  
Lectures, seminars, discussions, or laboratory research dealing with disease-causing microorganisms. Prerequisites: BIOL 479 or equivalent and consent of instructor.
- BIOL 639 - Advanced Studies in Soil Microbiology (1-3)**  
Analysis of microbiological balances in natural soils as affected by physical factors of the soil, crop exudates and residues and other organisms.
- BIOL 640 - Advanced Studies in Animal Physiology (1-3)**  
Lectures, seminars, discussions, or laboratory research in animal physiology.
- BIOL 641 - Advanced Studies in Animal Ecology and Evolution (1-3)**  
Lectures, directed study, and discussions of such topics as population theory, species diversity, biosystematics, ethology, genetics of speciation, and other aspects of evolutionary biology.
- BIOL 645 - Advanced Studies in Ecosystem Analysis (1-3)**  
Lectures, directed study, discussion, and modeling of ecosystem structure and function.
- BIOL 648 - Advanced Studies in Arthropod Ecology (1-3)**  
Lectures, seminars, and/or laboratory work dealing with physiological, population, and/or community ecology of arthropods.
- BIOL 697 - University Teaching Experience (1-3)**  
Certain graduate students will be permitted to teach up to one-third of one of the biology courses. The student will prepare and deliver lectures and will prepare, administer, and grade at least one examination. The professor in charge of the course will attend and evaluate the student's lectures.
- BIOL 698 - Selected Topics (1-3)**  
Selected topics for doctoral students.
- BIOL 700 - Doctoral Dissertation (0-15)**  
Dissertation.
- BLAW - BUSINESS LAW**
- BLAW 490 - Selected Topics (1-3)**  
Prerequisites vary according to the seminar being offered.
- BLAW 498 - Independent Study (1-3)**  
Individual studies directed by consenting faculty with the prior approval of the department head. Prerequisites: junior or above standing and consent of instructor and department head.
- BLAW 502 - Legal Environment of Business (3)**  
Legal procedures and the judicial system as applied to business situations and a general coverage of the bodies of substantive law most commonly associated with business. Prerequisite: graduate students only.
- BLAW 518 - Uniform Commercial Code and Advanced Business Law Topics (3)**  
Property, advanced contract law, debtor-creditor relations, bankruptcy and Uniform Commercial Code topics including sales, negotiable instruments, secured transactions and documents of title. Students who have taken either BLAW 318 or BLAW 418 may not receive credit for BLAW 518. Prerequisites: BLAW 316 or BLAW 502.
- BLAW 527 - Negotiation and Business Dispute Resolution (3)**  
Focus on learning tactics related to conflict resolution skills and negotiation theory. Also the use of quantitative methods and their realistic application in resolving disputes. Students will participate in numerous role playing activities and simulated mediation games. Same as MGT 527.
- BLAW 530 - American Indian Law and Policy (3)**  
This course is divided into two major parts: an historical survey of federal Indian law and policy, and selected topics focusing on contemporary federal Indian law and policy issues and problems. This course assumes that the

students have not had any law courses and approaches the topic of the history of federal Indian law and policy from various multidisciplinary and interdisciplinary perspectives.

**BLAW 550 - Selected Topics (3)**

Seminars in selected topics related to business law or the legal environment of business. Prerequisite(s): Varies according to seminar being offered.

**BLAW 598 - Special Research Programs (1-3)**

Individual investigations either analytical or experimental with the prior consent of the instructor and department head. Prerequisite: consent of instructor and department head.

**CD - COMMUNICATION DISORDERS**

**CD 476 - American Sign Language III (3)**

Continuation of CD 375, ASL II. Focus on more complex grammatical features. Students will comprehend and generate medium length stories, narratives, and discussions including culturally significant topics. Prerequisite: CD 375.

**CD 490 - Training in Professional Teamwork (3)**

Team development including critical thinking, problem solving, and decision making. Prerequisites: C or better in CD 452, CD 456, and CD 481, and minimum 3.0 GPA, or consent of instructor.

**CD 491 - Selected Topics (1-6)**

Individual and/or group study of selected topics. To be identified by subtitle. Prerequisite: prior arrangement with faculty. May be repeated for a maximum of 12 credits.

**CD 501 - Phonetics (3)**

The science of phonetics, including work with the International Phonetic Alphabet. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. Restricted to majors. Same as CD 390 with differentiated assignments for graduate students.

**CD 502 - Anatomy and Physiology of Speech Mechanisms (3)**

Structure and function of systems underlying human speech sound production and processing including nervous, respiratory, and articulatory components. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. Restricted to majors. Same as CD 370 with differentiated assignments for graduate students.

**CD 503 - Speech Science (3)**

Basic concepts and theories in acoustics, speech production, and speech perception. Laboratory experience with instrumental measurement and analysis of speech systems. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. Restricted to majors. Same as CD 380 with differentiated assignments for graduate students.

**CD 504 - Language Disorders (3)**

Bases, symptoms, etiologies, and treatment of language disorders. Includes review of normal language acquisition. Prerequisite(s): C or better in CD 221, B or better in CD 301/C D 509, C D 302/C D 593, C D 321, C D 322/C D 502, C D 323/C D 501, and minimum 3.0 GPA. Taught with CD 325. Restricted to CD Level Graduate Students majors.

**CD 505 - Research Methods (3)**

Introduction to basic qualitative, quantitative, and single subject research methodology in speech-language pathology and audiology. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. Restricted to majors.

**CD 506 - Clinical Procedures (3)**

Guidelines and procedures associated with the clinical and supervisory processes. Provide opportunities to complete the supervised clinical observation requirement for participation in clinical practicum. Prerequisite(s): C or better in CD 221, B or better in CD 301/C D 509, C D 302/C D 593, C D 321, C D 322/C D 502, C D 323/C D 501, and minimum 3.0 GPA. Same as CD 326. Restricted to CD Level Graduate Students only majors.

**CD 509 - Language Acquisition (3)**

Normal development of communication across the age span. Includes language sampling and analysis. A minimum grade of B- in all graduate courses and a minimum overall GPA of 3.0 required. Taught with CD 360 with differentiated assignments for graduate students. Restricted to CD majors and LING majors.

**CD 521 - Professional Issues and Practices in Communication Disorders (2)**

This course includes a range of topics pertinent to students entering professional practice as speech-language pathologists including current legal, ethical, and clinical service provision issues. Prerequisite(s): Minimum of 3.0. Restricted to: C D, C DS majors.

**CD 522 - Interpreter Workplace Skills in Communication Studies (1)**

The purpose of this course is to identify principles and procedures necessary to be an effective interpreter and to use an interpreter in the field speech, language, hearing and swallowing disorders. Students will identify the history the use of interpreters, the interpreting process, bilingual vocabulary appropriate for the scope of practice in the field, bilingual assessment principles, second language learning principles and multicultural aspects to consider in the interview and interpreting process. The students will engage in several interpreter scenarios for interview, assessment and intervention cases. Prerequisite(s): Minimum of 3.0 GPA. Restricted to: CD majors.

**CD 523 - Assessment of Communication Disorders (2)**

Diagnostic theories and management of communication disorders using standardized and descriptive methodology. Includes the practice of interviewing, testing, and oral and written reporting. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. Restricted to majors.

**CD 525 - Pediatric Language and Disorders (3)**

Normal communication development of neonates, infants, toddlers, and preschoolers; etiologies, and treatment of cognitive, linguistic and social elements of communication problems in family systems. Prerequisites: minimum grade of B- and an overall GPA of 3.0 or higher. Restricted to majors.

**CD 530 - School Age Language and Disorders (3)**

Normal communication-learning development of elementary, secondary, and postsecondary students; etiologies, diagnosis, and treatment of interpersonal communication and language-based academic disorders. Prerequisites: a minimum grade of B- in all graduate courses and an overall GPA of 3.0 or higher. Restricted to majors.

**CD 535 - Aphasia (2)**

Etiologies, diagnosis, assessment, and treatment of adult aphasia. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. Restricted to majors.

**CD 542 - Articulation and Phonological Disorders (3)**

Advanced study of the symptoms, etiologies, assessment, and clinical management of articulation and phonological disorders. Prerequisites: a minimum grade of B- in all graduate courses and a minimum overall GPA of 3.0 is required. Restricted to majors.

**CD 545 - Developmental Disabilities/Augmentative and Alternative Communication (3)**

Assessment and intervention for children and adults with developmental disabilities; Alternative communication strategies and systems for individuals with severe speech and/or language impairments. Prerequisite: Graduate standing; overall GPA of 3.0 or higher.

**CD 547 - Cognitive-Linguistic Communication Disorders (2)**

Etiologies, diagnosis, assessment, and treatment of communication disorders associated with TBI, right-hemisphere syndrome, and dementia. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher.

**CD 548 - Best Practices in Bilingual/Multicultural Assessment for Practitioners (3)**

The purpose of this course is to provide future speech-language pathologists, educational diagnosticians and special educators with a foundation for evaluating the linguistic, cognitive and academic skills of students from any cultural linguistic background. The course covers a review of the literature on best practices for working with interpreters during assessments. Practitioners will be expected to gather qualitative information about cultural/linguistic and educational histories of school-age children and integrate those results with the results of standardized tests. Prerequisite(s): CD 594.

**CD 574 - American Sign Language III (3)**

Continuation of ASL II. Focus on more complex grammatical features. Students will comprehend and generate medium length stories, narratives, and discussions including culturally significant topics. Prerequisite: CD 375 or consent of instructor.

**CD 583 - Dysphagia (3)**

Study of the anatomy and physiology of swallowing and upper aerodigestive systems. Review of the bases and etiologies of child and adult swallowing disorders, including diagnosis, assessment, and treatment. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. Restricted to majors.

**C D 584 - Fluency Disorders (2)**

Speech fluency development and the disorders of stuttering, cluttering, and neurogenic dysfluency. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. Restricted to majors.

**C D 585 - Motor Speech Disorders (2)**

Advanced studies of dysfunction of the nervous system that affect speech. Includes evaluation, diagnosis, and treatment of speech apraxias and dysarthrias. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. Restricted to majors.

**C D 586 - Voice Disorders/Head and Neck Anomalies (2)**

Advanced studies of anatomy and physiology of the vocal tract with emphasis on diagnosis, assessment, and treatment of voice disorders, laryngectomy, cleft palate, and other oral-facial anomalies. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. Restricted to majors.

**C D 587 - Cleft Palate and Syndromes (2)**

An advanced study of etiology, assessment and treatment of craniofacial anomalies with a focus on the effects of clefts of the lip and/or palate on speech, resonance and velopharyngeal dysfunction. Review of the contribution of interdisciplinary cleft palate team care managing feeding, audiologic, surgical, orthodontic, and psychosocial aspects. General review of embryology and common syndromes with associated speech, language, and hearing disorders. Consent of instructor required. Prerequisite(s): A course grade of B or higher in all graduate courses and an overall GPA of 3.0 or higher. Restricted to CD majors.

**C D 589 - Practicum in Speech-Language Pathology (1-4)**

Supervised clinical practice in a variety of speech, language, and hearing disorders. Practicum includes diagnostic, treatment, and management work through direct patient/client contact. Attendance at weekly clinical staff meetings is required. Prerequisite: good standing in the graduate school; a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. May be repeated for a maximum of 15 credits. Restricted to majors.

**C D 591 - Special Topics (1-9)**

Individual and/or group study of special topics identified by subtitle. Prerequisite: prior arrangement with faculty; a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher. May be repeated for a maximum of 9 credits.

**C D 593 - Professional Reasoning and Scientific Thinking (3)**

Overview of constructive thinking, problem solving, and decision making theories and strategies associated with professional reasoning and scientific thinking that are to be used academically and clinically in the transition from student to scholar to professional. Restricted to majors. Same as C D 393 except for differentiated assignments for graduate students. Prerequisites: a course grade of B- or higher in all graduate courses and an overall GPA of 3.0 or higher.

**C D 594 - Cultural/Linguistic Identity and Second Language Acquisition for Practitioners (3)**

The focus of this course is on the relationship between an individual's cultural/linguistic identity and efficacy of acquiring a second language. Major theories of second language acquisition will be covered from a cultural perspective, as well as the individual's affective and emotional connections to his/her first language. Prerequisite(s): A grade of B- or higher in all graduate courses and a minimum overall GPA of 3.0.

**C D 598 - Special Research Programs (1-6)**

Individual investigations either analytical or experimental.

**C D 599 - Master's Thesis (0-15)**

Thesis.

**C D 640 - Internship in Communication Disorders (3-6)**

The dissertation credit will allow doctoral students to be placed in a variety of clinical and/or supervisory settings. Assignments will be made in conjunction with the student's advisor. Consent of instructor required. May be repeated up to 6 credits.

**C D 690 - Doctoral Seminar (1-4)**

The seminar will engage doctoral students in scholarly dialogue and production. It will assist in preparing them for future careers in leadership roles. Same as SPED 690.

**C D 700 - Dissertation (3-6)**

The dissertation credit will allow doctoral students to conduct studies that are relevant to the field of communication disorders. Consent of instructor required. May be repeated up to 18 credits. Restricted to CD majors.

**C E - CIVIL ENGINEERING****C E 450 - Engineering Economy and Law (3)**

Discounted cash flows, economics of engineering projects, contracts and specifications. Prerequisite: senior standing.

**C E 450 H - Engineering Economics Honors (3)**

Discounted cash flows, economics of engineering projects, contracts, and specifications. Prerequisite: senior standing and the University Honors Program.

**C E 452 - Geohydrology (3-4)**

Origin, occurrence, and movement of fluids in porous media and assessment of aquifer characteristics. Development and conservation of ground water resources, design of well fields. Crosslisted with: E S452 and GEOL452. Prerequisite(s): Junior or Senior.

**C E 454 - Wood Design (3)**

Theory and design of wood structural members and systems subjected to gravity and lateral loads. Taught every other year, alternates with CE 455, Masonry Design. Prerequisites: C E 301 and C E 315. Pre/Corequisites: C E 311 and C E 365.

**C E 455 - Masonry Design (3)**

Theory and design of masonry structural members and systems subjected to gravity and lateral loads. Taught every other year, alternates with C E 454, Wood Design. Prerequisites: C E 301 and C E 315. Corequisites: C E 311 and C E 365.

**C E 455 - Masonry Design (3)**

Theory and design of masonry structural members and systems subjected to gravity and lateral loads. Taught every other year, alternates with C E 454, Wood Design. Prerequisites: C E 301 and C E 315. Pre/Corequisites: C E 311 and C E 365.

**C E 457 - Foundation Design (3)**

Application of principles of classical soil mechanics to the design of shallow and deep foundations, and the fundamentals of geotechnical site investigation. Prerequisite(s): C E 357.

**C E 459 - Geomechanics and Rock Engineering (3)**

Application of rock mechanics principles to the design and construction of structures in and on rock, including design of rock support systems, rock slopes and blasting/excavation techniques. Prerequisite(s): C E 357. Pre/Corequisite(s): C E 457.

**C E 460 - Site Investigation (3)**

Investigation and characterization of surficial and subsurface geologic materials and ground water for civil engineering projects. Includes exploration program, drilling and sampling, rock and soil classification and logging, groundwater monitoring, profiles, and preparation of geotechnical reports. Prerequisite(s): C E 357. Pre/Corequisite(s): C E 457.

**C E 469 - Structural Systems (3)**

Design of structural systems for building and bridges. Prerequisite: C E 444. Pre/Corequisite: C E 445.

**C E 470 - Design of Municipal and Hazardous Waste Landfills (3)**

Solid waste and application of geotechnical engineering principles and methods to the site selection and design of municipal and hazardous waste landfills. Prerequisite(s): C E 357 and C E 452, or consent of instructor.

**C E 471 - Highway Engineering (3)**

Highway systems design and management. Prerequisite: C E 357, STAT 371, or consent of instructor.

**C E 477 - Construction Engineering (3)**

Construction planning, equipment, and methods. Prerequisites: C E 357 and C E 450.

**C E 479 - Pavement Analysis and Design (3)**

Covers stresses and deflections in pavement layers, material characterization, flexible and rigid pavement design by AASHTO, and rehabilitation concepts. Prerequisite(s): C E 357.

**C E 482 - Hydraulic Structures (3)**

Engineering design of water-regulating structures. Prerequisites: C E 301 and C E 382.

**C E 483 - Surface Water Hydrology (3)**

Hydrologic cycle and relationships between rainfall and surface water runoff. Prerequisite: C E 331 or consent of instructor.

**C E 485 - Design of Earth Dams (3)**

- Engineering design applied to site selection, foundation inspection and treatment, hydrology and hydraulics, stability, and seepage analysis. Economic and environmental factors. Prerequisite(s): C E 357.
- C E 497 - Senior Seminar (2)**  
Selected topics on the civil engineering profession and orientation for professional practice. Preparation for the FE exam. Corequisite: application for degree.
- C E 498 - Special Topics (1-3)**  
Prerequisite: consent of department head. May be repeated for a maximum of 9 credits.
- C E 501 - Advanced Mechanics of Materials (3)**  
Study of stress and strain in two and three dimensions, theories of failure, stress concentrations, unsymmetrical bending, curved beams, beams on elastic foundations, column theories, torsion, thick-wall cylinders. Prerequisites: C E 301, MATH 392. Same as M E 501.
- C E 502 - Advanced Mechanics of Steel Structures (3)**  
Advanced structural mechanics applicable to steel structures. Includes inelastic behavior, plastic analysis, column and frame stability and torsion. Prerequisite: C E 444.
- C E 503 - Special Design and Analysis Program (3-6)**  
Design and analysis covering subject matter of an approved 450 undergraduate departmental course plus an additional report or project. Course may be subtitled in the Schedule of Classes. Prerequisite: consent of instructor/committee. May be repeated once for a total of 6 credits.
- C E 504 - Advanced Engineering Design (3)**  
Advanced engineering design covering subject matter of a selected capstone undergraduate design course plus an additional report or project. May be subtitled. Prerequisite: consent of instructor/committee.
- C E 505 - Advanced Mechanics of Concrete (3)**  
Advanced structural mechanics applicable to concrete structures. Topics include: nonlinear-inelastic modeling and analysis of reinforced concrete structures, seismic behavior of reinforced concrete structures, and deformation of members under various loads. To be taught along with C E 605. Prerequisite(s): C E 445.
- C E 506 - Advanced Soil Mechanics (3)**  
Stress and strain analyses in soil, stress paths; drained and undrained shear strengths of granular soils and clays, consolidation, liquefaction, soil improvement. Prerequisite: C E 457 or consent of instructor.
- C E 507 - Design of Earth Retaining Structures (3)**  
Lateral earth pressure theory, soil-reinforcement interaction, and analysis and design of rigid and flexible earth retaining structures for support of fills and excavations, including retaining walls, mechanically stabilized earth (MSE) walls, sheet pile walls, anchored walls, tiebacks and soil nailing. Prerequisite(s): C E 357. Pre/Corequisite(s): C E 457.
- C E 508 - Advanced Soil Behavior (3)**  
The course covers particle-scale phenomena that govern the macro-scale behavior of soils. Topics covered in the class include classical concepts as well as contemporary advances in soil mechanics. The students will develop a fundamental understanding of soil-water interaction, theories of contact level deformation, and mass and energy transport through granular media. Consent of Instructor required. Prerequisite(s): CE 357 or Instructor Consent.
- C E 509 - Deep Foundations (3)**  
Behavior, analysis and design of pile and pier foundations subjected to axial and lateral loads. Prerequisite: C E 457 or consent of instructor.
- C E 515 - Finite Element Methods (3)**  
Introduces the finite element method. Topics may include beam, frame, plane stress, plane strain, axisymmetric, and 3-D stress elements. Includes static and dynamic analysis. Uses readily available finite-element software. Prerequisite: graduate standing or consent of instructor.
- C E 530 - Environmental Management Seminar I (1)**  
Survey of practical and new developments in hazardous and radioactive waste management provided through a series of guest lectures and reports of ongoing research.
- C E 531 - Open Channel Hydraulics (3)**  
Theoretical and applied hydraulics of open channels, with emphasis on nonuniform flow, rapidly varied flow, and wave formation. Prerequisite: C E 382 or consent of instructor.
- C E 543 - Advances in Concrete Technology (3)**  
Advanced topics related to concrete materials, including mixture proportioning with nontraditional admixtures, roles and side effects of concrete admixtures, durability of concrete, nondestructive testing of concrete, creep, and shrinkage. Prerequisites: C E 311 and C E 445.
- C E 544 - Advanced Design of Steel Structures (3)**  
Connection design; beam, column, and beam-column stability and design; and seismic frame design. Prerequisites: C E 444 and C E 468.
- C E 545 - Advanced Concrete Design (3)**  
Prestressed concrete, ultimate strength theory, design of shell structures. Prerequisites: C E 445 and C E 468.
- C E 547 - Bridge Engineering (3)**  
Topics related to prestressed concrete, reinforced concrete and steel bridge design according to the AASHTO specifications; bridge analysis and evaluation. Prerequisite: C E 469 or consent of instructor. May be repeated for a maximum of 6 credits.
- C E 550 - Environmental Management Seminar II (1)**  
Survey of practical and new developments in hazardous and radioactive waste management provided through a series of guest lectures and reports of ongoing research.
- C E 554 - Wood Design (3)**  
Theory and design of wood structural members and systems subjected to gravity and lateral loads. Design project required. Taught every other year, alternates with C E 555 - Masonry Design.
- C E 555 - Masonry Design (3)**  
Theory and design of masonry structural members and systems subject to gravity and lateral loads. Design project required. Taught every other year, alternates with C E 554 - Wood Design.
- C E 557 - Water Resources Development (3)**  
Students function as members of a consulting panel and prepare reports on major water resources development problems. Political, financial, and social aspects of water resources development are considered as well as scientific and technical details. Background: C E 450. Corequisite: C E 483, or C E 482.
- C E 571 - Structural Dynamics (3)**  
Response of elastic structure to dynamic loading. Moving load, earthquake and blast loading. Prerequisite: C E 468 or consent of instructor.
- C E 572 - Earthquake Engineering (3)**  
Earthquake characteristics; seismic loads; elastic and inelastic response; analysis and design of buildings for earthquakes. Prerequisites: graduate standing and consent of instructor.
- C E 575 - Plasticity Theory (3)**  
Introduce the basic theory of plasticity and its applications in design and modeling of engineering materials. Prerequisite: C E 301
- C E 576 - Continuum Mechanics (3)**  
An introduction to the main principles of continuum mechanics: the stress tensor, deformation, and flow, constitutive relations, and applications to common solids and fluids. Prerequisite: C E 301.
- C E 577 - Advanced Pavement Analysis (3)**  
Review of advanced constitutive models for pavement materials and their implementation in finite element analysis. Prerequisite(s): C E 479 and C E 515 or consent of instructor.
- C E 579 - Ground Improvement (3)**  
The objective of this course is to introduce common ground improvement techniques, including mechanical (compaction, soil reinforcement, preloading and accelerated consolidation) and chemical (cementing, ion-replacement, polymer bonding) stabilization methods, as well as seepage and dewatering. Emphasis will be placed on developing an understanding of the underlying physical and chemical processes involved in each case. Prerequisite(s): C E 357.
- C E 581 - Ground Water Hydrology (3)**  
Mathematical treatment of water flow in porous media. Emphasis on hydraulics of water movement, including pumping and recharge wells, drainage, and water quality. Prerequisites: MATH 392, G EN 452, and C E 382, or consent of instructor.
- C E 582 - Statistical Hydrology (3)**  
Application of statistical techniques to hydrologic data, including distributions, hypothesis testing, linear models, non-parametrics, and time-series and stochastic models.
- C E 585 - Slope Stability Analysis and Design (3)**

Design of earth slopes, causes of instability, limit equilibrium methods, slope reinforcement (geosynthetics soil nailing, tiebacks), seismic analysis, rock slope stability. Consent of instructor required.

**C E 586 - Geotechnical Earthquake Engineering (3)**

Earthquake origin and geology; wave propagation; dynamic soil properties; ground response analysis; local site effects; design ground motion; liquefaction assessment. Consent of Instructor required. Prerequisite(s): C E 506 or consent of instructor.

**C E 596 - Special Topics (1-3)**

May be repeated for a maximum of 6 credits. Prerequisite: consent of department head.

**C E 598 - Special Research Programs (1-3)**

Individual investigations either analytical or experimental. May be subtitled. Maximum of 3 credits per semester.

**C E 599 - Master's Thesis (0-15)**

Thesis.

**C E 600 - Doctoral Research (1-15)**

Research.

**C E 604 - Advanced Engineering Topics (3)**

In depth study of a topic at the forefront of environmental engineering science. Journal papers will be critically reviewed and students will be asked to write an analysis of the topic and present their thoughts orally.

**C E 615 - Advanced Finite Element Methods (3)**

Finite element method with emphasis on stress analysis. May include development and use of plane stress, plane strain, and 3-D and shell elements. Includes static, dynamic, and nonlinear analysis. Prerequisite: graduate standing.

**C E 645 - Prestressed Concrete (3)**

Behavior of prestressed concrete; design of statically determinate and indeterminate structures; estimation of prestress loss; flexure and shear strength; deflections and stress control; composite behavior and design. Prerequisites: graduate standing and consent of instructor.

**C E 682 - Topics in Hydrodynamics II (3)**

Selected topics in flow-in open channels, flow-through porous media, and transport of sediments and contaminants. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.

**C E 698 - Special Research Programs (1-3)**

May be subtitled. May be repeated for a maximum of 9 credits.

**C E 700 - Doctoral Dissertation (0-15)**

Dissertation.

## **C-EP-COUNSELING AND EDUCATIONAL PSYCHOLOGY**

**C EP 451V - Introduction to Counseling (3)**

Principles of counseling for nonmajors.

**C EP 455 - Addictions Prevention and Recovery (3)**

Understanding addictions process, prevention, and recovery, including biological, interpersonal and sociological influences, and intervention strategies. Taught with C EP 555.

**C EP 461 - Family Guidance (3)**

Systems based guidance procedures for enhancing family strengths and development, and application of family guidance procedures for prevention and remediation of problems. Taught with C EP 561.

**C EP 490 - The Art & Science of Mindfulness (1-3)**

In this course students will learn about contemplative practices by learning about and participating in various mindfulness practices for self-care and to increase well-being. Students will learn about psychological theories and research that support the use of mindfulness in helping others increase their well-being. Students will learn how to teach mindfulness to others.

**C EP 495 - Psychology, Multiculturalism and Counseling (3)**

Understanding social identities such as race, ethnicity, sexual orientation, age, social class and spirituality as it relates to psychosocial development, academic achievement and counseling.

**C EP 499 - Independent Study (1-6)**

Individual study directed by consenting faculty.

**C EP 503 - Introduction to Counseling (3)**

Overview of counseling theory, techniques, ethics, and professional issues. Same as C EP 451V.

**C EP 504 - Counseling Skills (3)**

Overview of counseling. Emphasis on developing listening skills and basic counseling strategies, and provision of psychoeducational services. Prerequisites: C EP 503 or consent of instructor.

**C EP 505 - Appraisal of Psychoeducational Achievement in a Diverse Society (3)**

Advanced theory and use of norm and criterion referenced instruments in the classroom: planning of prescriptive and educational programs.

**C EP 511 - Introduction to Inferential Statistics (3)**

An introduction to the theories and techniques of inferential statistics as applied to education and psychology. Includes sampling distributions, confidence intervals, t-test, correlation, and chi-square. Intended primarily for post-baccalaureate students. Both hand calculation and computer packages will be employed. Consent of Instructor required. Prerequisite(s): Consent of instructor.

**C EP 512 - Human Development (3)**

Theory and research regarding cognitive, social, and emotional development across the lifespan with emphasis on enhancing human development. Prerequisite: C EP major or consent of instructor. Same as C EP 612 except for advanced level materials and experiential activities.

**C EP 515 - Learning Theory (3)**

Survey and comparison of theory and research regarding human learning as they apply to development, education, and counseling. Prerequisite(s): C EP 512 or consent of instructor. Crosslisted with: C EP 615

**C EP 517 - The Psychology of Multiculturalism (3)**

Understanding age, gender, ethnicity, socioeconomic status and culture in relation to human development, education, and counseling. Prerequisite: C EP 512 or concurrent enrollment or consent of instructor. Restricted to majors. Same as C EP 617 except for advanced-level materials and experiential activities.

**C EP 519 - Psychology of Social Identities (3)**

Theory, research and practice from feminist and multicultural perspectives will examine the integration of social identities such as gender, sexual orientation, race, ethnicity, age, social class, spirituality, and ability in relation to counseling psychology. Prerequisite: C EP 512 or concurrent enrollment or consent of instructor. Same as C EP 619.

**C EP 520 - The Art & Science of Mindfulness (1-3)**

In this course students will learn about contemplative practices by learning about and participating in various mindfulness practices for self-care and to increase well-being. Students will learn about psychological theories and research that support the use of mindfulness in helping others increase their well-being. Students will learn how to teach mindfulness to others. Taught with CEP 490.

**C EP 522 - Organization and Administration of School Counseling Services (3)**

Procedures for establishing and maintaining counseling programs in the schools. Professional and ethical issues in school counseling and group laboratory experience to enhance self-awareness and interpersonal skills for effective professional relationships. Prerequisite: consent of instructor. Restricted to majors.

**C EP 524 - Professional Issues in Mental Health Counseling (3)**

History, roles, organizational structures, settings, ethics, standards, laws, and credentialing related to mental health counseling. Group laboratory experience to enhance self-awareness and interpersonal skills for effective professional relationships. Prerequisite: consent of instructor. Restricted to majors.

**C EP 529 - Indigenous Counseling Theory and Practice (3)**

Students will explore current uses of indigenous modes and methods of counseling and therapy that are theoretically consonant with Indigenous/Native traditions. They will examine the integration of such modes to ensure a progressive reconstruction of the counseling endeavor to include an indigenous epistemology in their work with clients. Taught with C EP 429. Consent of Instructor required.

**C EP 532 - Research Methods (3)**

Develop research and program evaluation including critical literature review, generating questions, quantitative and qualitative methodology, analysis, and writing proposals.

**C EP 542 - Appraisal Theory and Technique (3)**



- Selection, administration, and interpretation of tests and other assessment methods. Topics include reliability, validity, norms, cultural factors, and ethics related to appraisal. Prerequisites: C EP 512 and C EP 517, or consent of instructor. Restricted to majors.
- C EP 547 - Appraisal of Cognitive Functioning (3)**  
Selection, administration, scoring, interpretation, and report writing using individual tests of intelligence. Moderator variables, such as acculturation, ethnic identity development, and world view are also incorporated. Restricted to majors. Taught with C EP 647. Consent of instructor required. Prerequisite(s): C EP 542 and consent of instructor.
- C EP 550 - Counseling Theory and Technique (3)**  
Major theories of counseling with an emphasis on development of the ability to offer theory-based counseling and consultation. Prerequisite(s): C EP 512, C EP 517, or concurrent enrollment.
- C EP 551 - Diagnosis and Treatment Planning (3)**  
Appraisal and conceptualization of mental disorders and other problems through diagnostic interviewing using the DSM. Treatment planning for counseling with children, adolescents, and adults. Prerequisite: C EP 512 or concurrent enrollment, or consent of instructor. Restricted to majors. Same as C EP 651.
- C EP 552 - Career/Life Planning and Vocational Assessment (3)**  
Vocational choice theories, relationship between career choice and life style, sources of occupational and educational information, and approaches to decision making and values clarification. Laboratory involves supervised interpretation of vocational assessment. Prerequisite: consent of instructor. Restricted to majors. Same as C EP 652.
- C EP 554 - Counseling Theory and Techniques for School Psychologists (3)**  
Major theories of counseling with an emphasis on development of the ability to offer theory-based counseling and consultation. Prerequisite(s): C EP 512
- C EP 555 - Addictions Prevention and Recovery (3)**  
Understanding addictions process, prevention, and recovery, including biological, interpersonal and sociological influences, and intervention strategies. Taught with C EP 455.
- C EP 556 - Addictions Counseling (3)**  
Emphasis on alcohol and other psychoactive substance abuse. Also includes eating disorders, gambling, and other addictive behaviors. Covers review of psychopharmacology, assessment, and diagnosis with the major focus on treatment and professional issues. Prerequisite: C EP 550. Restricted to majors. Same as C EP 656.
- C EP 558 - Child and Adolescent Counseling Theory and Technique (3)**  
Counseling theory and technique applied to children and adolescents from a developmental perspective in school and mental health settings. Prerequisite: C EP 550 or consent of instructor. Restricted to majors. Same as C EP 658, except for advanced-level materials.
- C EP 561 - Family Guidance (3)**  
Systems based guidance procedures for enhancing family strengths and development, and application of family guidance procedures for prevention and remediation of problems. Taught with C EP 461.
- C EP 562 - Family Therapy Theory and Technique (3)**  
Major theories of family therapy and associated assessment, intervention and evaluation techniques. Restricted to majors. Taught with C EP 662 except for advanced-level materials and experiential activities. Consent of instructor required. Prerequisite(s): C EP 550.
- C EP 563 - Primary Care Psychology (3)**  
Didactic and experiential learning in primary care psychology issues. Through this course students will learn about the cultural necessity of the integration of mental and physical health issues and multidisciplinary collaboration. Restricted to majors. Consent of instructor required.
- C EP 566 - Group Work Theory and Technique (3)**  
Didactic and experiential learning in group theory and practice. Laboratory involves experiences in group participation and leadership. Prerequisite: C EP 550, C EP 562 or consent of instructor. Restricted to majors.
- C EP 572 - Counseling Practicum (1-6)**  
Supervised experience of counseling and consultation. Weekly individual and group supervision involves review of audio, video, and/or live sessions and case presentations. Prerequisites: C EP 550 and consent of instructor. Restricted to majors.
- C EP 578 - Advanced Counseling Practicum (3-6)**  
Supervised experience of appraisal and individual, family, and/or group counseling and consultation serving child, adolescent, and/or adult clients. Weekly individual and group supervision involves review of counseling sessions and case presentations. This course will carry a subtitle to reflect the practicum setting. Prerequisites: C EP 572, C EP 566, and consent of instructor. Restricted to majors.
- C EP 579 - Clinical Psychopharmacology for Health Care Professionals (3)**  
Basic principles of psychopharmacology, emphasizing applications to clinical populations and treatment implications. Prerequisite: consent of instructor. Restricted to M.A., Ph.D., and Ed.S. students.
- C EP 580 - Counseling Internship (3-12)**  
Supervised experience in a professional counselor role in a school or agency. Students perform all counselor functions including appraisal, individual/family/group counseling, consultation, administration, program development, research, and/or evaluation. Prerequisite(s): C EP 578.
- C EP 584 - School Counseling Internship (3-6)**  
Supervised experience in school counseling. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits. Restricted to majors.
- C EP 598 - Special Research Programs (1-6)**  
Individual investigations either analytical or experimental. Maximum of 6 credits per semester and total of 9 credits overall. Restricted to majors.
- C EP 599 - Master's Thesis (0-15)**  
Thesis. Restricted to majors.
- C EP 607 - Curriculum-Based Assessment and Intervention (3)**  
The study and practice of curriculum-based assessment and intervention for academic skills and problems among children and adolescents.
- C EP 608 - Diagnostic Class (3)**  
Emphasis on developing the knowledge, skills, and necessary application abilities related to diagnosis and associated interventions related to mental health and psychopathology issues that impact a student's ability to navigate the education setting.
- C EP 612 - Human Development (3)**  
Same as C EP 512 with differentiated assignments for Ph.D. students.
- C EP 616 - Spanish for Mental Health Professionals (3)**  
This course emphasizes the vocabulary for Mental Health Professionals to include academic, psychological and medical terminology. Students will incorporate Spanish terms in assessment and treatment plans through role plays. Further, the course will include an overview of the use of interpreters and translators in working with culturally and linguistically diverse clientele. Prerequisite(s): Enrolled in Bilingual School Psychology Training Grant with instructor consent.
- C EP 619 - Psychology of Social Identities (3)**  
Same as C EP 519 with differentiated assignments for Ph.D. students.
- C EP 622 - Ethical/Professional Issues in Counseling Psychology (3)**  
History of counseling psychology, scientist-practitioner model, American Psychological Association's Ethical Principles of Psychologists and Code of Conduct. Focus on current ethical, professional, and scientific issues. Prerequisite: consent of instructor. Restricted to majors.
- C EP 624 - Professional Issues in School Psychology (3)**  
History, philosophy, and orientation of school psychology. Roles, technology, credentialing, community resources, school system issues, educational and psychology delivery service models, and current professional issues.
- C EP 625 - Legal and Ethical Issues in School Psychology (3)**  
Overview of legal/ethical, and professional standards in school psychology. NASP and APA codes of ethics, NM Mental Health and Children's codes, and child abuse/neglect laws. Prerequisite(s): C EP 624.
- C EP 630 - School Psychology Research (3)**  
Survey and analysis of research and program evaluation procedures in school psychology. Critical review of literature, formulating questions, quantitative and qualitative methodology, and data analysis as foundations for reading research literature and generating research, program evaluation, and/or grant proposals. Prerequisite: school psychology major or consent of instructor. Restricted to majors.
- C EP 632 - Counseling Psychology Research (3)**  
Survey and analysis of research and program evaluation procedures in counseling psychology. Critical review of literature, formulating questions, quantitative and qualitative methodology, and data analysis are covered as a

- foundation for reading research literature and generating research, program evaluation, and/or grant proposals. Prerequisite: C EP major or consent of instructor.
- C EP 636 - Advanced Statistics (3)**  
An intermediate course focusing on more advanced theories and techniques of inferential statistics as applied to education and psychology. Includes ANOVA, planned contrasts, ANCOVA, simple regression, and non-parametrics. Both hand calculation and computer packages will be employed. Prerequisite(s): C EP 511 or equivalent course work.
- C EP 637 - Multivariate Statistics (3)**  
Theories and techniques of multivariate statistics as applied to education and psychology. Includes multiple regression, logistic regression, MANOVA, factor analysis, and structural equation modeling. Computer packages will be the primary tool for data analysis. Prerequisite(s): C EP 636 or equivalent course work.
- C EP 647 - Appraisal of Cognitive Functioning (3)**  
Taught with C EP 547 with differentiated assignments for doctoral students.
- C EP 648 - Appraisal of Personality (3)**  
Selection, administration, scoring, interpretation, and report writing using major objective and projective tests of personality.
- C EP 651 - Diagnosis and Treatment Planning (3)**  
Prerequisite: C EP 612 or consent of instructor. Restricted to majors. Same as C EP 551 with differentiated assignments for Ph.D. students.
- C EP 652 - Career/Life Planning and Vocational Assessment (3)**  
Restricted to majors. Same as C EP 552 but with differentiated assignments for Ph.D. students.
- C EP 658 - Child and Adolescent Counseling Theory and Technique (3)**  
Prerequisite: C EP 550 or consent of instructor. Restricted to majors. Same as C EP 558 with differentiated assignments for Ph.D. students.
- C EP 662 - Family Therapy Theory and Technique (3)**  
Restricted to majors. Taught with C EP 562 with differentiated assignments for Ph.D. students. Consent of instructor required. Prerequisite(s): C EP 550 and consent of instructor.
- C EP 670 - Behavioral Health Practicum (1-6)**  
An intensive supervised experience in providing behavioral health services at an on or off campus interdisciplinary health setting. Supervision provided by doctoral level psychologist faculty in collaboration with other team disciplines' supervising faculty involves audio, video, and/or live observation of counseling sessions and team interventions and case presentations. Graded: S/U.
- C EP 671 - Consultation (3)**  
Didactic and experimental trainings in theory-based consultation. Supervision provided by faculty involves audio, video, and/or live observation consultation activities and case presentations. Prerequisites: C EP 672, C EP 675, or C EP 678; and consent of instructor. Restricted to majors.
- C EP 672 - Practicum in School Psychology: Psychoeducational (1-6)**  
Supervised practicum in psychological and educational evaluation. Skill development in ecological assessment, including interviewing, observations micro-counseling, acculturation, world view, and ethnic identity formation. Graded: S/U. Prerequisite(s): C EP 647, C EP 505 and consent of instructor.
- C EP 673 - Counseling Psychology Theory/Practicum (1-6)**  
Theories of counseling and psychotherapy and their application during supervised counseling with clients. Supervision provided by doctoral psychologist faculty involves audio, video, and/or live observation of counseling sessions and case presentations. Prerequisite: consent of instructor. Restricted to majors.
- C EP 674 - Appraisal Practicum (1-6)**  
An intensive supervised experience in psychological assessment at a school or agency. Supervision provided by doctoral psychologist faculty involves audio, video, and/or live observation of appraisal procedures and case presentations. Restricted to majors. Consent of instructor required. Prerequisite(s): C EP 648 and consent of instructor.
- C EP 675 - Practicum in School Psychology: Psychological (1-6)**  
School-based supervised experience for the advanced student. Provides experiences in various roles and models of service delivery (group, multifactored, integrative, family assessments) expected of school psychologists. Restricted to majors. S/U grading option only. Prerequisites: C EP 672 and consent of instructor.
- C EP 676 - Field Experience in Educational Diagnostics (1-6)**  
C EP 676 is designed to provide students with supervised school-based experiences and practices. The goal of the course is for students to master the competencies required for the delivery of academic services in the educational diagnostician role. The specific emphases in this course are placed on a data-based decision-making skills, psychoeducational assessment activities, and academic interventions. Under faculty and school-system staff supervisions, students will assume service delivery responsibilities and with increasing independence will respond to the diagnostic and intervention needs of students. Prerequisite(s): C EP 647, C EP 608, C EP 505, C EP 672. Restricted to: C EP Masters, C EP Ph D majors. S/U Grading (S/U, Audit).
- C EP 677 - Group Work Theory/Practicum (1-6)**  
Application of theory in group work with clients and in supervising group leaders in training. Supervision provided by doctoral psychologist faculty involves audio, video, and/or live observation of counseling sessions and case presentations. Prerequisites: C EP 676 and consent of instructor. Restricted to majors.
- C EP 678 - Advanced Counseling Psychology Practicum (1-6)**  
Supervised counseling psychology experience including appraisal, diagnosis, case conceptualization, treatment planning, theory-based counseling and evaluation. Supervision provided by doctoral psychologist faculty involves audio, video, and/or live observation of counseling sessions and case presentations. Graded: S/U. Prerequisite(s): C EP 677.
- C EP 679 - Supervision Theory and Practicum (1-6)**  
Didactic and experimental training in theory-based supervision. Supervision provided by doctoral psychologist faculty involves audio, video, and/or live observation of supervision sessions and case presentations. May be repeated for a maximum of 6 credits. Prerequisites: C EP 675 or C EP 678; and consent of instructor. Restricted to majors.
- C EP 680 - Internship in Counseling Psychology I (1-18)**  
Full-time equivalent of one-half calendar year of internship preferably in an APA-approved or APA-equivalent site. Available to Ph.D. students who have successfully completed their comprehensive exams. May be repeated for a maximum of 18 credits.
- C EP 682 - Internship in Counseling Psychology II (1-18)**  
Full-time equivalent of one-half calendar year of internship preferably in an APA-approved or APA-equivalent site. Available to Ph.D. students who have successfully complete their comprehensive exams. Prerequisite: consent of instructor. May be repeated for a maximum of 18 credits. Restricted to majors.
- C EP 684 - Internship in School Psychology (1-12)**  
Supervised experience in school psychology. May be repeated for a maximum of 12 credits. Consent of instructor required. Graded: S/U. Prerequisite(s): C EP 672, C EP 675. Restricted to School Psychology (SPSY) majors.
- C EP 686 - Internship in Educational Psychology (3-12)**  
Internship in either counselor education or college teaching. Course subtitled. Prerequisite: consent of instructor. May be taken for a maximum of 12 credits. Restricted to majors.
- C EP 693 - Dissertation Seminar (3)**  
Same as EMD, EDUC, SPED 693.
- C EP 698 - Selected Topics (1-6)**  
Offered under various subtitles which indicate the subject matter covered. A maximum of 6 credits in any one semester and a total of 18 credits overall. Restricted to CEP majors.
- C EP 699 - Ed.S. Thesis (1-15)**  
Study and research at the Specialist in Education level. Each problem to be designated by a qualifying subtitle. Restricted to majors.
- C EP 700 - Doctoral Dissertation (0-15)**  
Dissertation. Restricted to majors.
- C EP 801 - Introduction to Psychopharmacology for Psychologists I (3)**  
This course is an introduction to physiology and an overview of gross and microanatomy, with a focus on gross, micro, and chemical anatomy of the nervous system. By the end of the course, psychologists will have an up-to-date understanding of human psychology, anatomy, and neuroanatomy. Prerequisites: Doctorate in psychology or consent of instructor.
- C EP 802 - Introduction to Psychopharmacology for Psychologists II (3)**  
Principles of organic chemistry and human biochemistry necessary for the understanding of psychopharmacology are discussed and related to the major transmitter systems and dynamics of transmission. By the end of the

course, students will have an up-to-date understanding of biochemistry on which to base further didactic study in psychopharmacology. Prerequisites: Doctorate in psychology or consent of instructor.

**C EP 803 - Clinical Psychopharmacology I (3)**

This course begins with an introduction to the scope of pharmacology; pharmacoepidemiology, ethical, and legal issues (informed consent, State and Federal regulation of drugs and prescribing, sources of drug information and computer aids) and continues with the principles of pharmacokinetics and pharmacodynamics as they relate to the use of psychotropic medications. It concludes with an introduction to the treatment of anxiety disorders from a biopsychosocial model of care with special emphasis on psychopharmacology for anxiety disorders. Prerequisites: Doctorate in psychology or consent of instructor.

**C EP 804 - Clinical Psychopharmacology II (3)**

This course is a thorough investigation of the diagnosis and treatment of affective disorders from a biopsychosocial model of care. Particular emphasis is given to psychopharmacological treatment of depressive disorders and bipolar disorders. Prerequisites: Doctorate in psychology or consent of instructor.

**C EP 805 - Clinical Psychopharmacology III (3)**

This course is an intensive study of the treatment of psychosis from a biopsychosocial model of care. Special consideration is given to: first, second, and third generation antipsychotic drugs and their pharmacology and clinical uses; neurological and metabolic disorders associated with antipsychotic use; and appropriate use of antipsychotics in children and the elderly. Special attention is then given to child and adolescent psychopharmacology, including drugs used in pregnancy and lactation, teratogenicity, embryotoxicity, developmental disorders, conduct disorders, ADHD, and special considerations in use of approved drugs in children. Prerequisites: Doctorate in psychology or consent of instructor.

**C EP 806 - Pathophysiology for Psychologists I (3)**

This course is an introduction to human clinical physical assessment, history taking, charting, and laboratory testing and neuroimaging. An important emphasis is in functional neuroanatomy and diagnosis and assessment of neurological disorders; role of different components of human nervous system in health and disease; stroke, seizures, and movement disorders (chorea, athetosis, dystonias, dyskinesias, Parkinsonism, akathisia, iatrogenic neurological disorders). Prerequisite: Doctorate in psychology or consent of instructor.

**C EP 807 - Pathophysiology for Psychologists II (3)**

Physical assessment and pathophysiology of the cardiovascular system is studied in depth: structure and function of the heart and major blood vessels; innervation of the heart and vessels; electrocardiogram; components of blood; lymphatics; and physical assessment of cardiac function. The physical assessment and pathophysiology of eyes, ears, nose, and the immune system are studied in depth; anatomy and physiology of special senses; assessment of cranial nerves and sensory function; immune function and psychoimmunology. The physical examination and pathophysiology of the chest and pulmonary system and its relationship to the cardiac system is also studied. Prerequisites: Doctorate in psychology or consent of instructor.

**C EP 808 - Pathophysiology for Psychologists III (3)**

This course continues with an in-depth study of the chest and pulmonary system: pulmonary function and assessment; respiratory exchange and respiratory involvement in acid: base regulation, disorders of respiratory function. The physical assessment of pathophysiology of the gastrointestinal system is discussed in depth: digestion, absorption and excretion of drugs and nutrients from the GI system; disorders of GI function; hepatic function; innervation of GI tract; endocrine and exocrine functions of GI system; physical assessment of GI function. The functions and pathophysiology of the male and female reproductive system, endocrine system, and renal system are discussed as they relate to psychopharmacology. Prerequisites: Doctorate in psychology or consent of instructor.

**C EP 809 - Psychopharmacological Treatment in Special Populations I (3)**

The psychopharmacology of several special populations are discussed in detail in this course. Geriatric psychopharmacology includes: geriatric physiology; cardiac, renal, hepatic changes with aging; pharmacokinetics/dynamics in the elderly; cognition enhancers in Alzheimer's and other dementias. Special treatment of personality disorders, eating disorders, the importance of racial, ethnic, and gender differences and culturally sensitive practice is presented with applications. Pain management psychopharmacology is over-viewed, including: pharmacology of opioid and non-opioid analgesics; pain syndromes; acute and chronic pain; headache; pharmacological and non-pharmacological approaches to pain management;

pharmacology and actions of abused substances: acute effects, withdrawal, biochemistry of tolerance and dependence, brain central reward pathways. Prerequisites: Doctorate in psychology or consent of instructor.

**C EP 810 - Psychopharmacological Treatment in Special Populations II (3)**

The pathophysiology and treatment of substance use disorders from a biopsychosocial model is presented. Issues of medical comorbidity are studied: psychopharmacological treatment in the medically compromised patient, including case studies and review of comprehensive treatment models; mental disorders due to a general medical condition and/or adverse drug reactions; and referral practices to specialists. Diagnostic rating scales and psychiatric instruments of use to the prescribing psychologist are presented. The course ends with an integration of psychotherapy and pharmacotherapy, including ethical issues such as the right to refuse treatment, treatment compliance/adherence, risk management, and the role of the medical psychologist in the modern, integrated healthcare system. Prerequisites: Doctorate in psychology or consent of instructor.

**C EP 811 - Supervised Experience in Psychopharmacology I (3)**

In this applied course, students employ their knowledge of psychopharmacology in treatment setting. Students will participate in the treatment of 50 patients for a minimum of 200 hours under the supervision of a physician. Restricted to Post Doctoral Masters Programs. Prerequisite: Doctorate in psychology or consent of instructor.

**C EP 812 - Supervised Experience in Psychopharmacology II (3)**

Continuation and completion of supervised experience in CEP 811. Students will participate in the treatment of 50 patients for a minimum of 200 hours under the supervision of a physician. Restricted to Post Doctoral Masters Program. Prerequisite: Doctorate in psychology or consent of instructor.

## **C J - CRIMINAL JUSTICE**

**C J 450 - Crime, Justice and Society (3)**

Critical analysis of dynamic relationship between the U.S. eco-politico-socio structure, its criminal justice system, and consequent policies and practices. Prerequisite(s): 60 credit hours.

**C J 451 - Border Violence and Justice (3)**

Critical analysis of violence and systems of justice along border regions. Examines causes and correlates of violence experienced by those living in border regions and the social responses to that violence.

**C J 452 - Upper World Crime (3)**

Corporate crime, white collar crime and political abuse and corruption; executive and corporate criminal behavior, and violations of the public trust by elected and appointed officials. Prerequisite: restricted to majors or consent of instructor.

**C J 453 - Women and Justice (3)**

Critical analysis of the impact of the criminal justice system, race and class upon the lives of women. Restricted to majors.

**C J 454 - Human Trafficking (3)**

Study of global human trafficking, its causes and costs, and mitigation strategies. Restricted to C J, GOVT, SOC, W S, S WK majors.

**C J 455 - Feminist Research Methods (3)**

Feminist research practices and methodologies utilized in various disciplines. Definitions of research, what constitutes valid inquiry, how research can be feminist, and what it means to do interdisciplinary work. Same as W S 455.

**C J 480 - Criminal Justice Planning and Crime Analysis (3)**

Basic working tools in gathering data for the purpose of developing criminal justice plans and programs. Planning criteria, program implementation strategies, and evaluation requirements. Prerequisite: restricted to majors or consent of instructor.

**C J 481 - Hate Crimes and Domestic Terrorism (3)**

Overview of religious and political extremism in the U.S., with a particular focus on the roots and practices of extremist groups and their doctrines. Prerequisite: C J 380 or consent of instructor.

**C J 482 - Transnational Terrorism (3)**

Overview of international terrorism and its sociological, political, historical, and religious causes, with a particular focus on current terrorism.

**C J 501 - Research Methods in Criminal Justice (3)**

Research design, methods of data collection and analysis, and preparation of research reports. Prerequisite: C J major or consent of instructor. Restricted to majors.

**C J 502 - Criminal Justice Statistics (3)**

- Intermediate level statistical techniques applied to criminal justice data. Prerequisite: C J major or consent of instructor. Restricted to majors.
- C J 510 - Advanced Criminal Justice Administrative Systems (3)  
Structure and operations of criminal justice agencies and institutions; relationships of structure and operations to practical police, courts, and corrections problems.
- C J 511 - Nature of Crime (3)  
Defining and measuring crime, crime causation, and criminal behavior systems. Prerequisite: C J major or consent of instructor. Restricted to majors.
- C J 512 - Seminar in Theories and Theory Construction (3)  
Major theories of crime, alternative approaches to an integration of the various perspectives, and the development of causal models. Topics announced in the Schedule of Classes. May be repeated under different subtitles for a maximum of 6 credits.
- C J 514 - Advanced Race, Crime, and Justice (3)  
Advanced analysis of the historical and contemporary relationship between race and crime in the United States with emphasis upon human equality and fairness. Overview of racial and ethnic social categorizations and how they impact law and order.
- C J 515 - A Course on Punishment (3)  
Exploration and analysis of the idea and practice of punishment through a variety of philosophical perspectives, seeking to understand its moral and practical viability as employed in contemporary society, including its application within the criminal justice system.
- C J 518 - Documentary Production Stories of Justice I (3)  
Introductory examination of documentary genre. Survey of documentary film making theory and history. Creation of proposal for student documentary project. Restricted to Main campus only. Crosslisted with C J 418 and CMI 318
- C J 519 - Documentary Production Stories of Justice II (3)  
Follow up to C J 518. Students shoot, edit, and publish work from proposal of C J 518. Prerequisite(s): C J 518. Restricted to C J, ANVE, and DFM majors. Taught with C J 419
- C J 520 - Advanced Girls, Women & Crime (3)  
Advanced critical social science analysis of concepts of violence and justice as experienced by women impacted by the criminal justice system. Restricted to C J, W S majors. Crosslisted with: W S 520
- C J 521 - Law and Social Control (3)  
The development and implementation of criminal law. Consideration of functionalist, conflict, and interpretive theories and research. Prerequisite: C J major or consent of instructor. Restricted to majors.
- C J 522 - Legal Issues in Criminal Justice (3)  
Major legal concerns in the formulation and implementation of criminal law.
- C J 523 - Seminar in Criminal Law (3)  
Major theoretical orientations, specific areas of research, and contemporary policy issues. Content will vary and will be listed in the Schedule of Classes. May be repeated under different subtitles for unlimited credit.
- C J 524 - Forensic Law (3)  
Rules and policy implications related to the use of scientific information in legal process. Prerequisite: C J major or consent of instructor. Restricted to majors.
- C J 525 - Issues in Ethics, Law, and Criminal Justice (3)  
Examination of the key ethical and decision-making dilemmas facing professionals working in the fields of law and criminal justice. Restricted to majors.
- C J 526 - Advanced Race & Environmental Justice (3)  
Advanced analysis of concepts of justice and social justice responses across the 20th and 21st centuries to environmental degradation affecting communities of differing racial and ethnic backgrounds.
- C J 527 - Advanced Race & Crime in Film (3)  
Advanced critical analysis of film where messages relating race and crime are present, with emphasis on how this imagery informs problem definition, policies, and practice within the criminal justice system.
- C J 532 - Advanced Issues in Criminal Justice (f, s, sum) (3)  
Seminar on problems and conflicts encountered in major criminal justice issues. Topics announced in the Schedule of Classes. May be repeated under different subtitles for unlimited credit.
- C J 533 - Seminar in Criminal Justice Administration (3)  
Organizational and administrative issues currently confronting criminal justice agencies. Different subtitles (police, courts, and corrections) to be announced in the Schedule of Classes. May be repeated under different subtitles for unlimited credit.
- C J 535 - Advanced Political Penology (3)  
Advanced comparative analysis of incarceration and sanctions as punishment for crimes of conscience, religious intolerance, and dissidence.
- C J 540 - World Criminal Justice Systems (3)  
Explores cross and trans-national nature of crime in the 21st century. Emphasize various philosophies, legal systems and justice responses to crime and criminals yielding a global view of criminal justice theories and practices. Restricted to majors.
- C J 541 - Seminar in Criminal Justice Policy Analysis and Planning (3)  
Seminar on policy development, planning and implementation processes in criminal justice. Links formal policy goals as they relate to theory and outcomes. Topics announced in the Schedule of Classes. Prerequisite: C J major or consent of instructor. Restricted to majors.
- C J 545 - Advanced Victimology (3)  
Study of risk factors in crime victimization, the impact of crimes upon victims, and the role of the victim in the criminal justice system. Consideration of the impact of criminal justice policy on victim outcomes. Same as W S 545.
- C J 547 - Advanced Sex Crimes (3)  
Advanced study of dynamics of sex crimes for victims and offenders plus consideration of the legal and correction systems' response to sex crimes. Restricted to C J, GOVT, SOC, W S, S WK majors.
- C J 554 - Advanced Human Trafficking (3)  
Advanced study of global human trafficking, its causes and costs, and mitigation strategies. Restricted to C J, GOVT, SOC, W S, S WK majors.
- C J 555 - Advanced Feminist Research Methods (3)  
Advanced feminist research practices and methodologies utilized in various disciplines. Definitions of research, what constitutes valid inquiry, how research can be feminist, and what it means to do interdisciplinary work. Same as W S 555.
- C J 560 - Juvenile Justice Systems (3)  
Policy development and operations in police, court, and correctional agencies in response to juveniles. Analysis of programs designed to identify, prevent and treat juvenile offenders. CJ 570. Probation and Parole 3 cr. Advanced analysis of goals, theories and practices of all forms of correction in the community, including probation, parole, plus other intermediate sanctions. Restricted to majors.
- C J 570 - Probation and Parole (3)  
Advanced analysis of goals, theories, and practices of all forms of correction in the community, including probation, parole, plus other intermediate sanctions. Restricted to majors.
- C J 581 - Community Policing (3)  
Overview and analysis of community policing issues from various perspectives. Analysis of strategies that facilitate police and community collaboration. Restricted to majors.
- C J 582 - Advanced International Terrorism (3)  
Advanced analysis of Islamic terrorism worldwide, tracing its development as a form asymmetric warfare from the seventh century through the present, and U.S. and International governmental responses.
- C J 591 - Directed Readings in Criminal Justice (3)  
Supervised review of literature in specialized areas of the nature of crime, law and social control, and criminal justice administration. Consent of instructor required.
- C J 592 - Independent Research (1-3)  
Design and execution of a criminal justice research project. Requires a written paper in standard format, including literature review, hypotheses, methodology, findings, and conclusions.
- C J 593 - Internship (3-6)  
Supervised placement in an applied or research setting in criminal justice. An in-depth written report of the project is required. Prerequisites: introductory graduate course in the area of the internship and consent of the internship supervisor. Restricted to C J majors. May be repeated for a maximum of 6 credits. Graded S/U.
- C J 599 - Master's Thesis (0-15)  
Thesis.

**C S - COMPUTER SCIENCE****C S 450 - C Programming (3)**

Programming in the C language. More advanced than C S 167. Recommended for nonmajors only. Prerequisite(s): Graduate standing. Restricted to: Main campus only.

**C S 451 - C++ Programming (3)**

Programming in the C language. More advanced than C S 177. Recommended for nonmajors only. Prerequisite(s): Graduate standing.

**C S 452 - Java Programming (3)**

Programming in the Java language. More advanced than C S 187. Recommended for nonmajors only. Prerequisite(s): Graduate standing.

**C S 457 - Topics in Software Programming and Applications (3)**

Current topics in computer programming and software applications. Topic announced in the Schedule of Classes. More advanced than C S 157. recommended for non-majors only. May be repeated if subtitle is different. Prerequisite(s): Graduate standing.

**C S 460 - Computer Science I Transition (3)**

Computational problem solving; problem analysis; implementation of algorithms. Recursive structures and algorithms. For C S graduate students only; cannot be used to meet a C S student's program of study. Taught with C S 172. Consent of Instructor required. Crosslisted with: C S 172.

**C S 462 - Object Oriented Programming Transition (3)**

Introduction to problem analysis and problem solving in the object-oriented paradigm. Practical introduction to implementing solutions in the C++ language. Hands-on experience with useful development tools. Cannot be used in a C S student's program of study. Consent of Instructor required. Prerequisite(s): At least a C- in CS 172 or CS 460 or consent of instructor.

**C S 463 - Introduction to Data Structures Transition (3)**

Design, implementation, use of fundamental abstract data types and their algorithms: lists, stacks, queues, deques, trees; imperative and declarative programming. Internal sorting; time and space efficiency of algorithms. Cannot be used in a C S student's program of study. Consent of Instructor required. Prerequisite(s): At least a C- in CS 172 or CS 460 or consent of instructor.

**C S 464 - Machine Programming and Organization Transition (3)**

Computer structure, instruction execution, addressing techniques; programming in machine and assembly languages. Cannot be used in a C S student's program of study. Consent of Instructor required. Prerequisite(s): At least a C- in CS 172 or CS 460 or consent of instructor.

**C S 465 - Discrete Math for Computer Science Transition (3)**

Logical connectives, sets, functions, relations, graphics, trees, proofs, induction, and application to computer science. Cannot be used in a C S student's program of study. Consent of Instructor required. Prerequisite(s): At least a C- in CS 172 or CS 460 or consent of instructor.

**C S 466 - Compilers and Automata Transition (3)**

Methods, principles, and tools for programming language processor design; basics of formal language theory (finite automata, regular expressions, context-free grammars); development of compiler components. For C S graduate students only; cannot be used in a students program of study. Consent of instructor required. Prerequisite(s): At least a C in C S 271 or C S 462, in C S 272 or C S 463, in C S 273 or C S 464, in C S 278 or C S 465, or consent of instructor.

**C S 468 - Software Development Transition (3)**

Software specification, design, testing, maintenance, documentation; informal proof methods; team implementation of a large project. Cannot be used in a C S student's program of study. Consent of Instructor required. Prerequisite(s): At least a C- in CS 271 or CS 462, in CS 272 or CS 463, or consent of instructor.

**C S 469 - Data Structure and Algorithms Transition (3)**

Introduction to efficient data structure and algorithm design. Order notation and asymptotic run-time of algorithms. Recurrence relations and solutions. Abstract data type dynamic set and red-black trees. Classic algorithm design paradigms: divide-and-conquer, dynamic programming, greedy algorithms. Cannot be used in a C S student's program of study. Consent of Instructor required. Prerequisite(s): At least a C- in CS 272 or CS 463, in CS 278 or CS 465, or consent of instructor. Restricted to: C S majors.

**C S 470 - Functional Programming (3)**

Applicative programming techniques: higher order functions, infinite data structures, lambda calculus, universal functions. Survey of functional languages including Miranda and ML. Prerequisite(s): At least a C- in C S 272 and C S 278.

**C S 471 - Programming Language Structure I (3)**

Syntax, semantics, implementation, and application of programming languages; abstract data types; concurrency. Not for C S graduate students. Prerequisite(s): C- or better in C S 370 and C S 371.

**C S 472 - Logic and Constraint Logic Programming (3)**

Declarative programming techniques; foundations of logic programming; programming in Prolog; constraint logic programming; applications of logic and constraint programming. Not for C S graduate students. Prerequisite(s): At least C- in C S 272 and C S 278.

**C S 473 - Architectural Concepts I (3)**

Comparison of architectures to illustrate concepts of computer organization; relationships between architectural and software features. Not for C S graduate students. Prerequisite(s): At least a C- in C S 273 and C S 370.

**C S 474 - Operating Systems I (3)**

Operating system principles and structures, and interactions with architectures. Not for C S graduate students. Prerequisite(s): At least a C- in C S 273, C S 371, and C S 372.

**C S 475 - Artificial Intelligence I (3)**

Fundamental principles and techniques in artificial intelligence systems. Intelligent Agents; solving problems by searching; local search techniques; game-playing agents; constraint satisfaction problems; knowledge representation and reasoning. Further selected topics may also be covered. Not for C S graduate students. Prerequisite(s): At least a C- in C S 272 and C S 278.

**C S 476 - Computer Graphics I (3)**

Languages, programming, devices, and data structures for representation and interactive display of complex objects. Not for C S graduate students. Prerequisite(s): At least C- in C S 370 or C S 371.

**C S 478 - Computer Security (3)**

Introduction to the art and science of computer security. Fundamentals of computer security including elementary cryptography, authentication and access control, security threats, attacks, detection and prevention in application software, operating systems, networks and databases. Prerequisite(s): At least a C- in CS 273 or consent of instructor.

**C S 479 - Special Topics (1-3)**

Topic announced in the Schedule of Classes. May be repeated if subtitle is different. Not for C S graduate students.

**C S 480 - Linux System Administration (3)**

Basic system administration for Linux environments. Topics include user managements, file systems, security, backups, system monitoring, kernel configuration and other relevant aspects of system administration. Not for Computer Science graduate students.

**C S 481 - Visual Programming (3)**

Design and implementation of programs using visual (i.e. dataflow or diagrammatic) programming techniques, with an emphasis on real-time data processing. Students will learn how to design visual programs, including how to handle cycles and state maintenance, and will learn to process audio, video, and other data using visual programs. Not for C S graduate students. Prerequisite(s): C- or better in C S 272 and C S 278.

**C S 482 - Database Management Systems I (3)**

Database design and implementation; models of database management systems; privacy, security, protection, recovery. Not for C S graduate students. Prerequisite(s): At least a C- in C S 272 and C S 278.

**C S 483 - Introduction to Robotics (3)**

Basic AI-based robotic architecture and concepts, with an emphasis on building and programming mobile robots. Not for C S graduate students. Consent of Instructor required. Prerequisite(s): At least a C- in C S 272 and C S 273.

**C S 484 - Computer Networks I (3)**

Fundamental concepts of computer communication networks: layered network architecture, network components, protocol stack and service. Example of application, transport, network and data link layers, protocols primarily drawn from the Internet (TCP, UDP, and IP) protocol multimedia networks; network management and security. Not for C S graduate students. Consent of Instructor required. Prerequisite(s): At least a C- in C S 272 and CS 273.

**C S 485 - User Interface Design (3)**

Interface design, conceptual models formed by users, computer aided instruction, natural and query languages, graphical representations. Not for C S graduate students. Prerequisite(s): At least C- in C S 371.

**C S 486 - Bioinformatics (3)**

- Introduction to bioinformatics and computational biology. Computational approaches to sequences analysis, protein structure prediction and analysis, and selected topics from current advances in bioinformatics. Not for C S graduate students. Prerequisite(s): At least a C- in C S 272 and C S 278.
- C S 491 - Parallel Programming (3)**  
Programming of shared memory and distributed memory machines; tools and languages for parallel programming; techniques for parallel programming; parallel programming environments. Not for C S graduate students. Prerequisite(s): C- or better in C S 370 or consent of instructor.
- C S 492 - Computer Systems Modeling and Simulation (3)**  
Basic concepts of modeling computer systems: continuous and discrete time models, states and transition, probabilistic models. Structure of simulation programs, time driven and event driven simulation on captured and synthetic traces, generation of random variables, queuing models, Markov chains, random walks, Poisson, Markov, renewal branching and Brownian motion processes, model validation and data analysis. Not for C S graduate students. Prerequisite(s): C- or better in C S 372.
- C S 501 - Functional Programming (3)**  
Applicative programming techniques: higher order functions, infinite data structures, lambda calculus, and universal functions. Survey of functional languages including Miranda and ML; requires more advanced graduate work than C S 470.
- C S 502 - Database Management Systems I (3)**  
Database design and implementation; models of database management systems; privacy, security, protection, recovery; requires more advanced graduate work than C S 482. Students are expected to have solid knowledge of data structures and discrete mathematics.
- C S 503 - Introduction to Robotics (3)**  
Basic AI-based robotic architectures and concepts, with an emphasis on building and programming mobile robots; requires more advanced graduate work than C S 483. Students are expected to have solid knowledge of data structures and machine-level programming. Consent of Instructor required.
- C S 504 - Computer Networks I (3)**  
Fundamental concepts of computer communication networks: layered network architecture, network components, protocol stack and service. Example of application, transport, network and data link layers, protocols primarily drawn from the Internet (TCP, UDP, and IP) protocol suite; local and wide area networks, wireless and mobile networks, multimedia networks; network management and security; requires more advanced graduate work than C S 484. Students are expected to have solid knowledge of data structures, machine-level programming. Knowledge of statistics (at the level of STAT 371 or 470) is recommended.
- C S 505 - Artificial Intelligence I (3)**  
Fundamental principles and techniques in artificial intelligence systems. Knowledge representation formalisms; heuristic problem solving techniques; automated logical deduction; robot planning methods; algorithmic techniques for natural language understanding, vision and learning; requires more advanced graduate work than CS 475. Students are expected to have strong knowledge of algorithms and data structures (at the level of CS 372).
- C S 506 - Computer Graphics I (3)**  
Languages, programming, devices, and data structures for representation and interactive display of complex objects. Requires more advanced graduate work than C S 476. Students are expected to have knowledge of compilers design and software engineering equivalent to CS 370 and CS 371.
- C S 508 - Introduction to Data Mining (3)**  
Techniques for exploring large data sets and discovering patterns in them. Data mining concepts, metrics to measure its effectiveness. Methods in classification, clustering, frequent pattern analysis. Selected topics from current advances in data mining. Students are expected to have a preparation in Discrete Mathematics and Data Structures equivalent to C S 272 and C S 278. Requires more advanced graduate work than C S 488. Crosslisted with: C S 488.
- C S 510 - Automata, Languages, Computability (3)**  
Regular and context-free languages, pushdown and finite-slate automata, Turing machines, models of computation, halting problems. Students are expected to have knowledge of compilers design and algorithms equivalent to CS 370 and CS 372.
- C S 511 - Logic and Constraint Logic Programming (3)**  
Declarative programming techniques; foundations of logic programming; programming in Prolog; constraint logic programming; application of logic and constraint programming; requires more advanced graduate work than C S
472. Students are expected to have knowledge of data structures and discrete mathematics equivalent to CS 272 and CS 278.
- C S 512 - Computer Systems Modeling and Simulation (3)**  
Basic concepts of modeling computer systems: continuous and discrete time models, states and transition, probabilistic models. Structures of simulation programs, time driven and event driven simulation, simulation on captured and synthetic traces, generation of random variables, queuing models, Markov chains, random walks, Poisson, Markov, renewal branching and Brownian motion processes, model validation and data analysis; requires more advanced graduate work than C S 492. Students are expected to have knowledge of algorithms and data structures equivalent to CS 372.
- C S 515 - User Interface Design (3)**  
Interface design, conceptual models formed by users, computer-aided instruction, natural and query languages, graphical representations; requires more advanced graduate work than C S 485. Students are expected to have knowledge of software engineering equivalent to CS 371.
- C S 516 - Bioinformatics (3)**  
Introduction to bioinformatics and computational biology. Computational approaches to sequences analysis, protein structure prediction and analysis, and selected topics from current advances in bioinformatics; requires more advanced graduate work than C S 486. Students are expected to have a knowledge of algorithms and data structures equivalent to CS 372 or exposure to Biology (equivalent to BIOL 221 or BIOL 311).
- C S 521 - Parallel Programming (3)**  
Programming of shared memory and distributed memory machines; tools and languages for parallel programming; parallelizing compilers; parallel programming environments; requires more advanced graduate work than C S 491. Students are expected to have knowledge of programming and machine organization equivalent to CS 271 and CS 273.
- C S 550 - Complexity Theory (3)**  
Polynomially bounded, NP-complete, exponentially hard, and undecidable problems; reducibility. Prerequisite: C S 510.
- C S 552 - Introduction to Computational Science and Engineering (3)**  
Modeling of scientific and engineering problems; computational methods for solving such problems including data structure design and relevant discrete and numerical algorithms. Prerequisite: consent of instructor.
- C S 560 - Graph Theory (3)**  
Graph theoretic models in all areas of computer science including computer architectures, computation geometry, fault tolerance, databases. Includes connectivity, colorability, factorization, topological embeddings in surfaces, reconstruction, groups and matrices associated with graphs. Prerequisite: consent of instructor.
- C S 570 - Analysis of Algorithms (3)**  
Techniques for design and analysis of algorithms; time and space complexity; proving correctness of programs. Particular algorithms such as sorting, searching, dynamic programming. NP complete problems. Students are expected to have knowledge of algorithms and data structures equivalent to CS 372.
- C S 571 - Programming Language Structure II (3)**  
Formal semantics of programming languages. Students are expected to have knowledge of algorithms and data structures equivalent to CS 372, and knowledge of principles of programming languages equivalent to CS 471.
- C S 572 - Advanced Algorithms (3)**  
Design, analysis, and use of important algorithms and data structures. Prerequisite: C S 570 or consent of instructor.
- C S 573 - Architectural Concepts II (3)**  
Advanced topics related to computer architecture, guided by the current literature. Students are expected to have knowledge of computer architectures equivalent to CS 473 and of operating systems equivalent to CS 474. Crosslisted with: E 564.
- C S 574 - Operating Systems II (3)**  
Advanced topics related to operating system principles, guided by the current literature. Students are expected to have knowledge of computer architectures and operating systems equivalent to CS 473 and CS 474.
- C S 575 - Artificial Intelligence II (3)**  
Covers advanced theory and application of artificial intelligence. Concentration on several specific research areas, such as knowledge representation, problem solving, common-sense reasoning, natural language

understanding, automated tutoring systems, learning systems. Students are expected to have knowledge of artificial intelligence equivalent to CS 475.

**C S 579 - Special Topics (1-6)**

Topic announced in the Schedule of Classes.

**C S 580 - Compiler Construction (3)**

Current methods in the design and implementation of compilers; construction of components of an actual compiler as a term project. Students are expected to have knowledge of programming languages equivalent to CS 471 and of compilers design equivalent to CS 370.

**C S 581 - Advanced Software Engineering (3)**

Advanced tools and methods for developing large software systems. Topics include object-oriented modeling and design, component architectures, templates and generic programming, software configuration and revision control, static and dynamic analysis tools, model, checking, advanced testing, and verification. Students are expected to have knowledge of software engineering equivalent to CS 371.

**C S 582 - Database Management Systems II (3)**

Advanced data models and abstractions, dependencies, implementations, languages, database machines, and other advanced topics. Students are expected to have knowledge of data base management systems equivalent to C S 482.

**C S 584 - Computer Networks II (3)**

Advanced topics in computer networks. Covers advanced topics in networking, with emphasis on wireless, and IP networks. Students are expected to have knowledge of computer networks equivalent to CS 484, and of statistics equivalent to STAT 371 or STAT 470.

**C S 586 - Algorithms in Systems Biology (3)**

The course will introduce important algorithms and computational models used in systems biology to study molecular mechanisms for cellular dynamics, processes, and systems. Cellular processes, such as metabolism and signal transduction, are studied as systems and networks quantitatively from high throughput molecular measurements. The topics include molecular biological systems, network alignment, model simulation, network inference, model optimization, and hybrid models. Students will be able to construct models and analyze their properties in the context of molecular biological systems. Students are expected to have knowledge of algorithms and data structures equivalent to CS 372.

**C S 589 - Special Research Problems (1-6)**

Faculty-supervised investigation, to culminate in a written report. Prerequisite: written agreement with faculty supervisor. May be repeated; maximum of 6 credits may be applied toward M.S. degree. Restricted to majors.

**C S 598 - Master's Project (1-6)**

Project-oriented capstone course to be completed by M.S. students under supervision of their advisor. Maximum of 6 credits may be applied toward M.S. degree. Prerequisite: written *agreement* with instructor. Restricted to C S majors.

**C S 599 - Master's Thesis (1-6)**

Thesis to be developed by M.S. Students under supervision of their advisor. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits. Restricted to majors.

**C S 600 - Pre-dissertation Research (1-15)**

Pre-dissertation research.

**C S 629 - Selected Topics in Computer Science (1-3)**

Topics of current interest designated by subtitle. May be repeated.

**C S 700 - Doctoral Dissertation (0-15)**

Dissertation.

**CEL - ONLINE TEACHING LEARNING**

**CEL 485 - Service Learning Experience (3)**

Course instructional method integrates academic learning through guided reflection on civic responsibility and meaningful community service. Areas of focus include critical thinking and problem solving, clarification of values, career exploration, social and personal development. Consent of Instructor required. Prerequisite(s): Senior standing. Restricted to: Individualized Studies Applied Studies majors.

**CEL 495 - Directed Studies (1-6)**

Individual study directed by consenting faculty. Consent of instructor required. Restricted to BAS and BIS majors.

**CEL 498 - Degree Capstone (3)**

A final academic project reflecting BAS and BIS career, study plans and reflections on degree completion experience. Consent of instructor required. Restricted to BAS and BIS majors.

**CEL 499 - Internship (1-6)**

Placement experience for BAS and BIS majors to participate in career oriented academic and professional level opportunities. Consent of instructor required. Restricted to BAS and BIS majors.

**CH E - CHEMICAL ENGINEERING**

**CH E 451 - Engineering Economy (3)**

Discounted cash flows, economics of project, contract and specifications as related to engineering design. Same as I E 451.

**CH E 452 - Chemical Process Design & Economic Evaluation (3)**

Concepts in chemical engineering process design, including: capital and manufacture cost estimation; discounted cash flows; interest; taxes; depreciation; profitability analysis; project specifications. Prerequisite(s): CH E 307 and CH E 441.

**CH E 452 L - Chemical Process Simulation (1)**

Construction and convergence of chemical processes in a process simulator. Students will understand how to access variables, define and converge design specifications and converge tear/recycle streams. Prerequisite(s): ChE 352L. Corequisite(s): ChE 452.

**CH E 455 - Chemical Plant Design (3)**

Design and analysis of integrated process plants. Consideration given to optimizing performance, operability, reliability, safety, control, energy integration, and cost effectiveness. Requires written report covering solution of a capstone design problem. Prerequisite(s): CH E 452.

**CH E 455 L - Chemical Plant Simulation (1)**

Construction, convergence, and optimization of chemical processes in a process simulator. Dynamic process simulation and control. Prerequisite(s): Ch E 412, Ch E 452L. Corequisite(s): ChE 455.

**CH E 456 - Advanced Chemical Process Simulation (3)**

Advanced techniques in computational simulation of chemical processes using process simulation software. Restricted to CH E majors. Prerequisite: CH E 452L or consent of instructor.

**CH E 464 - Polymer Science (3)**

Synthesis, structure, property relationships of synthetic polymers. Prerequisite: CH E 361.

**CH E 466 - Fuel Cell and Hydrogen Technology (3)**

Introduction to fundamentals and applications. Includes the thermodynamics; electrochemical kinetics and fuel cell electrode catalyst; systems and design and reforming; hydrogen production, storage, and safety; applications of fuel cells in stationary power generation, portable power, and automobiles. Prerequisites: CHEM 111G and PHYS 215G.

**CH E 467 - Nanoscience and Nanotechnology (3)**

This is a lecture/laboratory course designed to present the basic concepts, the techniques and the tools to synthesize and characterize nanometer scale materials, and the latest achievements in current and future nanotechnology applications in engineering, materials, physics, chemistry, biology, electronics and energy. It is intended for a multidisciplinary audience with a variety of backgrounds. This course should be suitable for graduate students as well as advanced undergraduates. Topics covered will include: nanoscience and nanotechnology, nanofabrication, self-assembly, colloidal chemistry, sol-gel, carbon nanotubes, graphene, thin film, lithography, physical vapor deposition, chemical vapor deposition, quantum dots, lithium batteries, X-ray diffraction, scanning electron microscopy, transmission electron microscopy, nanoelectronics, nanophotonics and nanomagnetism, etc. Crosslisted with: PHYS450 and PHYS520. Prerequisite(s): CHEM 112 AND (PHYS 211 or PHYS 215) AND (EHS Safety training to include the courses: (1) Employee & Hazard Communication Safety (HazCom); (2) Hazardous Waste Management; and (3) Laboratory Standard.).

**CH E 470 - Introduction to Nuclear Energy (3)**

Atomic and nuclear structure, nuclear stability and radioactivity, nuclear reactions, detection and measurement of radiation, interaction of radiation with matter, radiation doses and hazard assessment, principles of nuclear reactors, and applications of nuclear technology. Prerequisite(s): CHEM 111, MATH 192.

**CH E 471 - Health Physics (3)**

- Introduction to radiation protection, radiation/radioactivity, radioactive decay/fission, interactions of radiation and matter, biological effects of radiation, radiation measurement and statistics, sampling for radiation protection, radiation dosimetry, environmental transport, radiation protection guidance, external and internal radiation protection, and hazards analysis. Crosslisted with: WERC471. Prerequisite(s): MATH 192, CH E 470.
- CH E 473 - Nuclear Regulations and Compliance Practices (3)**  
Introduction, through the use of case studies, to the best technical compliance practices for regulations governing the siting, licensing, constructing, operating and decommissioning of nuclear fuel cycle facilities. Consent of instructor required. Prerequisite(s): MATH 191G and (CHEM 111G or CHEM 115). Crosslisted with: WERC 473
- CH E 474 - Power Plant Design (3)**  
Principles of electric power generation. Review of DC and AC systems, energy sources, and prime movers. Analysis of hydroelectric, fossil fuel, nuclear, and alternative power systems. Environmental and economic considerations. Prerequisite(s): MATH 191, CHEM 111.
- CH E 475 - Nuclear Reactor Theory (3)**  
An overview of the properties of nuclei, nuclear structure, radioactivity, nuclear reactions, fission, resonance reactions, moderation of neutrons, will be followed by mathematical treatment of the neutronics behavior of fission reactors, primarily from a theoretical, one-speed perspective. Criticality, fission product poisoning, reactivity control, reactor stability and introductory concepts in fuel management, slowing down and one-speed diffusion theory. Corequisites: MATH 392. Prerequisites: CHEM 112G, PHYS 215G, MATH 291G.
- CH E 476 - Nuclear Fuel Cycles (3)**  
Physical and chemical processes in the conventional nuclear fuel cycle: uranium mining and milling, conversion, enrichment, fuel fabrication, reactor operations, interim storage, reprocessing and recycling, waste treatment and disposal. Alternative fuel cycles and future prospects. Prerequisite(s): CH E 470.
- CH E 477 - Introduction to Bioengineering (3)**  
Introductory course includes both biomedical and biochemical engineering topics; tissue engineering, biomedical systems, artificial organs, biology from an engineering viewpoint, engineering principles of bioprocesses, biochemical engineering, physiologic systems modeling and introduction to applications for recombinant DNA technology. Prerequisites: CH E 201.
- CH E 481 - Biomedical Engineering and Engineering Healthcare (3)**  
Orientation to solving human and world health issues with biological engineering systems, tools, and analysis methods. Introduces general concepts including applied biology for engineers, biophotonics, biosensing, bioinstrumentation, tissue and biomaterials engineering, biomedical engineering research practices, and physical bioanalytical methods. Prerequisite(s): CHEM 116 AND CH E 201.
- CH E 486 - Biofuels (3)**  
Introduction to the fundamentals and applications of biofuels and bioenergy produced from biomass; renewable feedstocks, their production, availability and attributes for biofuel/bioenergy production; types of biomass-derived fuels and energy; thermochemical conversion of biomass to heat, power, and fuel; biochemical conversion of biomass to fuel; biodiesel production; environmental impacts of biofuel production; economics and life-cycle analysis of biofuel; value-added processing of biofuel residues; term paper of selected topics relevant to biofuels. Prerequisite(s): CHEM 115 or CHEM 111.
- CH E 490 - Senior Seminar (1)**  
Orientation to professional practice. Oral presentations by invited speakers, faculty, and students. Prerequisite: senior standing. Restricted to CH E majors.
- CH E 491 - Special Topics (1-4)**  
Lecture and/or laboratory instruction on special topics in chemical engineering. May be repeated to a maximum of 6 credits under different subtitles listed in the Schedule of Classes. Restricted to majors.
- CH E 498 - Undergraduate Research (1-3)**  
Provides an opportunity for undergraduate students to work in research or areas of special interest such as design problems and economic studies under the direction of a faculty member. Written report and oral presentation in CH E 490, Senior Seminar, covering work required. Prerequisite: consent of instructor and department head. Approval of written application. Maximum of 3 credits per semester. May be repeated for a maximum of 6 credits.
- CH E 501 - Graduate Thermodynamics for Chemical Engineers (3)**  
Advanced applications of the first and second law to chemical process systems. The calculus of thermodynamics, equilibrium and stability criteria. Properties relationships for real fluids, both pure materials and mixtures. An introduction to molecular thermodynamics and statistical mechanics. Chemical Engineering graduate students must make B or better. Restricted to: CH E majors.
- CH E 506 - Graduate Transport Phenomena(s) (3)**  
Covers the analysis of simultaneous momentum, energy, and mass transport. Development of integral and local balance equations in vector-tensor form. Application of vector-tensor analysis to transport equations. Boundary layer theory and turbulence. Chemical engineering graduate majors must make B or better.
- CH E 513 - Intermediate Chemical Engineering Data Analysis (s) (3)**  
Intermediate topics in the design and analysis of typical chemical engineering experiments. Topics covered include: linear models, constrained experimental space, non-linear models, model discrimination, and response surface methodologies. Consent of instructor required.
- CH E 516 - Numerical Methods in Chemical Engineering (3)**  
Survey of numerical methods for solving problems commonly encountered in heat and mass transfer, fluid mechanics, and chemical reaction engineering.
- CH E 530 - Environmental Management Seminar I (1)**  
Survey of practical and new developments in hazardous and radioactive waste management provided through a series of guest lectures and reports of ongoing research. Crosslisted with: C E 330, E E 330, I E 330.
- CH E 539 - Intermediate Environmental Modeling (3)**  
Same as CH E 436 with differentiated assignments for graduate students. Prerequisite(s): MATH 392 or CH E 201.
- CH E 541 - Chemical Kinetics and Reactor Engineering (s) (3)**  
Same as Ch E 441 with differentiated assignments for graduate students. Prerequisite: Consent of Instructor
- CH E 542 - Graduate Reactor Analysis and Design (s) (3)**  
Application and analysis of equations of continuity to multicomponent reaction systems. Introduction to homogeneous and heterogeneous catalysis, single-phase combustion, and shock reaction systems. Chemical engineering majors must earn B or better.
- CH E 566 - Fuel Cell and Hydrogen Technology (3)**  
Same as Ch E 466 with differentiated assignments for graduate students.
- CH E 568 - Intermediate Adsorption (3)**  
Same as CH E 468, with differentiated assignments for graduate students.
- CH E 577 - Intermediate Biochemical Engineering (3)**  
Introductory course includes both biomedical and biochemical engineering topics; tissue engineering, biomedical systems, artificial organs, biology from an engineering viewpoint, engineering principles of bioprocesses, biochemical engineering, physiologic systems modeling and introduction to applications for recombinant DNA technology. Taught with Ch E 477 with differentiated assignments for graduate students.
- CH E 590 - Graduate Seminar (1)**  
Presentations on topics of professional interest in chemical engineering. Includes seminars by faculty, graduate students, and invited speakers from academia, government, and industry. Required each semester for every M.S. student. All graduate degree candidates required to give seminar. May be repeated for a total of 6 credits. Restricted to majors.
- CH E 592 - Intermediate Selected Topics (1-4)**  
Lecture and/or laboratory instruction on selected topics of current research interest. Subtitled in the Schedule of Classes. Prerequisites: consent of instructor and department head. May be repeated for a total of 6 credits. Restricted to majors.
- CH E 598 - Special Research Programs (1-3)**  
Individual investigations either analytical or experimental. May be repeated for a maximum of 6 credits.
- CH E 599 - Master's Thesis (0-15)**  
Thesis.
- CH E 621 - Advanced Topics in Unit Operations, Equipment Design, and Operation (3)**  
Selected topics of current interest in analysis of unit operations, equipment design and operation, and/or closely related areas. May be subtitled in the Schedule of Classes. Prerequisite: consent of instructor.
- CH E 690 - Graduate Seminar (1)**  
Presentations on topics of professional interest in chemical engineering. Includes seminars by faculty, graduate students, and invited speakers from academia, government, and industry. Required each semester for every Ph.D.



student. All candidates for graduate degrees required to give seminar. May be repeated for a maximum of 8 credits. Restricted to majors.

**CH E 698 - Special Research programs (1-9)**

Advanced topics for current research. Course subtitled in the Schedule of Classes. May be repeated up to 9 credits. Prerequisite(s): Consent of instructor.

**CH E 700 - Doctoral Dissertation (0-15)**

Individual research in selected topics of current interest in chemical engineering. Prerequisite: must be doctoral student or have consent of department head.

**CHEM - CHEMISTRY**

**CHEM 451 - Special Topics (1-3)**

Specific subjects to be announced in the Schedule of Classes. Prerequisite: consent of instructor. May be repeated for a maximum of 12 credits.

**CHEM 455 - Independent Studies (1-3)**

Independent studies directed by consulting faculty. Prerequisite: consent of instructor.

**CHEM 456 - Inorganic Structure and Bonding (3)**

Theoretical principles and a systematic study of the periodic table. Prerequisite: CHEM 356 or CHEM 431 or CHEM 433.

**CHEM 466 - Advanced Organic Chemistry (3)**

Recent developments in synthesis and theoretical principles of organic chemistry. Prerequisite: CHEM 314.

**CHEM 466 H - Advanced Organic Chemistry Honors (3)**

Same as CHEM 466. Additional work to be arranged.

**CHEM 471 - Instrumental Methods of Analysis (4)**

Analytical techniques, including optical and procedures. Prerequisites: CHEM 371 and either PHYS 212G or PHYS 216G.

**CHEM 472 - Analytical Methods for Toxic Organics and Metal Ions in the Environment (3)**

Laboratory course with lectures on principles of analytical techniques related to environmental monitoring of pollutants and waste management. Prerequisite: CHEM 371 or C E 462 or consent of instructor.

**CHEM 500 - Seminar in Inorganic Chemistry (1)**

Current topics. May be repeated.

**CHEM 506 - Atomic and Molecular Structure in Inorganic Chemistry (3)**

Theories of ionic and molecular bonding.

**CHEM 507 - Chemistry of the Elements (3)**

Discussion of the reactions and structures of inorganic compounds.

**CHEM 508 - Main Group Chemistry (3)**

Chemistry, structure and bonding of main group elements are covered along with some spectroscopy.

**CHEM 509 - Transition Metal Chemistry (3)**

The chemistry, bonding theory, spectroscopy and industrial applications of the transition metals will be covered.

**CHEM 510 - Seminar in Organic Chemistry (1)**

Current topics. May be repeated.

**CHEM 514 - Organic Structure Determination (3)**

Modern spectroscopic techniques for characterization of organic compounds.

**CHEM 515 - Modern Organic Chemistry (3)**

Recent developments in synthesis and theoretical principles of organic chemistry.

**CHEM 516 - Physical Organic Chemistry (3)**

Physical organic chemistry.

**CHEM 517 - Synthetic Organic Chemistry (3)**

Synthetic methods in organic chemistry.

**CHEM 518 - Chemistry for Educators (3)**

This is a course for Graduate Masters of Arts in teaching.

**CHEM 520 - Seminar in Analytical Chemistry (1)**

Current topics. May be repeated.

**CHEM 521 - Chemical Instrumentation (3)**

Theory and application of electronic devices to chemical analysis.

**CHEM 526 - Advanced Analytical Chemistry (3)**

Equilibria, and the theories of gravimetric, volumetric, and instrumental analysis.

**CHEM 527 - Separations (3)**

Covers the fundamentals of separation methods and relationships to modern analytical techniques such as gas chromatography and liquid chromatography.

**CHEM 528 - Electroanalytical Techniques (3)**

Theory and application of modern electrochemical methods of analysis including voltammetry, amperometry, modern cyclic and pulse methods, and stripping analysis.

**CHEM 529 - Spectrochemical Analysis (3)**

Fundamentals, instrumentation, and applications of spectrochemical analysis.

**CHEM 530 - Seminar in Physical Chemistry (1)**

Current topics. May be repeated.

**CHEM 536 - Chemical Thermodynamics (3)**

First, second, and third laws of thermodynamics, and the concepts, interrelations, and applications of thermodynamic state functions.

**CHEM 537 - Quantum Chemistry (3)**

Fundamentals of quantum mechanics. Prerequisite: consent of instructor.

**CHEM 538 - Chemical Kinetics (3)**

Empirical analysis of rate measurements, collision theory, transition state theory, and chain reactions.

**CHEM 539 - Spectroscopy (3)**

Molecular spectroscopy for physical chemistry. Quantum mechanics applied to spectroscopy of polyatomic molecules: UV-VIs, IR, magnetic resonance. CHEM 537 desired but not required. Prerequisite: consent of instructor.

**CHEM 550 - Discussions in Inorganic Chemistry (1)**

Current research problems in inorganic chemistry. May be repeated. Graded S/U.

**CHEM 560 - Discussions in Organic Chemistry (1)**

Current research problems in organic chemistry. May be repeated. Graded S/U.

**CHEM 570 - Discussions in Analytical Chemistry (1)**

Current research problems in analytical chemistry. May be repeated. Graded S/U.

**CHEM 580 - Discussions in Physical Chemistry (1)**

Current research problems in physical chemistry. May be repeated. Graded S/U.

**CHEM 598 - Special Research Programs (1-3)**

Individual investigations, either analytical or experimental. Graded S/U.

**CHEM 599 - Master's Thesis (0-15)**

Thesis preparation.

**CHEM 600 - Research (1-15)**

Course used for assigning credit for research performed prior to successful completion of the doctoral qualifying examination.

**CHEM 609 - Topics in Inorganic Chemistry (1-3)**

Selected topics of current interest designated by subtitle.

**CHEM 619 - Topics in Organic Chemistry (1-3)**

Selected topics of current interest designated by subtitle.

**CHEM 629 - Advanced Topics in Analytical Chemistry (3)**

Discussion of advanced topics in the field of analytical chemistry. May be repeated with different subtitles. Consent of instructor required.

**CHEM 639 - Topics in Physical Chemistry (1-3)**

Selected topics of current interest designated by subtitle.

**CHEM 650 - Advanced Seminar (1)**

Intended for students who have earned a master's degree or the equivalent. A discussion of current topics of interest in chemistry. May be repeated.

**CHEM 700 - Doctoral Dissertation (0-17)**

Dissertation preparation.

**CHSS - COMMUNITY HEALTH AND SOCIAL SCIENCES**

**CHSS 460 - Health Disparities and Health Interventions (3)**

Exploration of culturally adapted health intervention strategies designed to address health disparities.

**CMI-CINEMA & FILM/VIDEO PRODUCTION****CMI 450 - Advanced 2-D Animation (3)**

Advanced techniques in two dimensional animation including motion graphics and integration of live action. Prerequisite(s): CMI 350. Restricted to: ANVE,DFM majors.

**CMI 451 - Effects Animation & Dynamic Simulation (3)**

Overview of 3D dynamic simulations and effects. Creative projects and practical examples including fluids, particles, fields, soft body, and rigid body techniques. Consent of instructor required. Prerequisite(s): CMI 260, CMI 280, CMI 290 or permission of instructor. Restricted to ANVE, DFM majors.

**CMI 460 - Technical Direction for Animation (3)**

Principles and practices of current animation technical development. Preliminary and detailed technical design, including advanced rigging, UI customization, Mel scripting, expressions, rendering systems, and pipeline development. Prerequisite(s): CMI 260 and CMI 280, CMI 270, CMI 290 or consent of instructor. Restricted to ANVE, DFM majors.

**CMI 470 - Short 2-D Animation Production (3)**

This is a full-scale animation production class where students will be divided into teams according to the animation skills they have demonstrated in the beginning, intermediate, and advanced classes. Each team member will specialize in one important facet of the production process: character animation, background painting, technical direction, coloring, or story development and storyboarding. 4 to 8 minute animated shorts will be produced. Prerequisite(s): CMI 450, CMI 361. Restricted to: ANVE,DFM majors.

**CMI 480 - Screenwriting II (3)**

Students will write 2 short scripts, 10-15 pages each throughout the semester. Focus will be on learning how to take notes and rewrite. Script analysis will be in a workshop format. Scripts will be read and discussed, scenes performed and reactions analyzed to consider effect of dialogue, character development, etc. Prerequisite(s): ENGL 309 or CMI 309 or THTR 306 or consent of instructor. Restricted to ENGL, DFM, ANVE majors. Crosslisted with: ENGL 480

**CMI 490 - Advanced Screenwriting (3)**

Students will prepare a 30-60 page screenplay. Script analysis will be in an advanced workshop format. Scripts will be read and discussed, scenes performed and reactions analyzed to consider effect of dialogue, character development, etc. This course is aimed at preparing writers for the professional market. Consent of instructor required. Restricted to ENGL, DFM, ANVE majors. Crosslisted with: ENGL 491

**CMI 495 - Internship (1-12)**

Placement in a production facility and supervised experience required. With CMI advisor approval only. May be repeated up to 18 credits. Consent of Instructor required. Restricted to: ANVE,DFM majors. S/U Grading (S/U, Audit).

**CMI 496 - Media Law/Ethics (3)**

Overview of legal & ethical issues in creative media elements of business and commercial law. This class will focus on the fundamentals of entertainment law by exploring the business and legal relationships within film industries, and animation. Learn to anticipate and avoid legal problems prior to production. Key issues in the area of copyright law, sources of financing, distribution agreements; insurance and union consideration will be discussed. Restricted to ANVE, DFM majors.

**CMI 497 - Portfolio Design and Development (3)**

Advanced graphic design projects with an emphasis on conceptual development, portfolio preparation, and professional practices. Refine general marketing strategies, personal portfolio, and resumes. Define, target, and penetrate personal target markets. Students develop individual promotional/demo packages. Prerequisite(s): Consent of instructor. Restricted to: ANVE,DFM majors.

**CMI 498 - Final Year Senior Project I: Production and Post Production (3-6)**

Senior Project I is the first half of a year long concentration on a pre-approved creative project guided by a faculty member. Projects are narrative-driven and have an end product: screen-play, short film, documentary, 2-D or 3-D animated short, or pilot with treatment for television. Consent of Instructor required. Prerequisite(s): Consent of instructor. Restricted to: ANVE,DFM majors.

**CMI 499 - Final Year Senior Project II: Production and Post Production (3-6)**

Senior Project II is the second half of a year long concentration on a pre-approved project, guided by a faculty member. Projects are narrative driven and have an end product: short film, documentary, 2-D or 3-D animated short, or pilot and treatment for television. May be repeated up to 9 credits.

Prerequisite(s): CMI 498 and Consent of Instructor. Restricted to: ANVE,DFM majors.

**COMM - COMMUNICATION****COMM 450 - Technologies of Human Communication (3)**

Development and evolution of human communication technologies from prehistory through the future of computer-mediated communication networks. Examines behavioral, cognitive, social, cultural, and political issues of new communication technologies and their use and management. Prerequisite: junior or senior standing.

**COMM 455 - Fundamentals of Communication and National Security (3)**

This course addresses communication perspectives informing national security, strategic intelligence, and the intelligence process. Students will examine U.S. national security history, policy, the development of the Intelligence Community, and intelligence as processes of communication. This course serves as an introduction to national security studies.

**COMM 456 - Communication and the Intelligence Cycle (3)**

The course addresses communication requirements and the technical, cognitive, and cultural complexity of the collaborative research environment. Students participate in novel, team-based problem scenarios that provide the foundation for acquiring advanced cognitive analytic methods and strategies. Students will engage in interdisciplinary information science processes and will develop and present analytic products responding to national security requirements.

**COMM 457 - Strategic Communication and Public Diplomacy (3)**

This course covers history, theory, and research related to the use of communication to change attitudes in favor of U.S. national security interests. Students will examine the use of strategic communication and influence in diplomacy, intelligence, and military communities in terms of specific strategies, effects, and issues. Students will learn to distinguish public diplomacy, information operations, public affairs, and other forms of political communication that are used by the U.S. government to persuade target populations about American interests and goals. Topics include soft power, intelligence-based negotiation processes, and research methods used to identify influence techniques or groups that threaten U.S. national security.

**COMM 458 - Intercultural Communication and National Security (3)**

This course provides a concentration on cultural factors in international affairs and conflicts, how culture affects perceptions of national interests, and the relationship of U.S. national security to understand the general and political cultures of other nations. Students will integrate cultural and intercultural communication theory and behavior, with an emphasis on the development of specific communication skills to facilitate developing cultural knowledge in government and political contexts. Students will learn how to study the cultural factors that affect international conflicts and how strategic communication should address such cultural factors.

**COMM 460 - Deception and Communication (3)**

Deceptive communication including nonverbal indicators of lies, types of lies, and influence of relationships on lying behavior and interpretation.

**COMM 462 - Family Communication (3)**

A communication perspective on traditional and nontraditional family configurations, roles, interaction patterns, and conflict. Includes an examination of media depictions of families and family interaction, as well as current social and political issues related to the family.

**COMM 463 - Communication and Gender (3)**

Study of communication, gender and culture, including theoretical approaches to gender development, the implications of gender identity, gendered patterns of verbal and nonverbal communication, and the rhetorical dimensions of gender. Discussion of gendered communication in the workplace, as well as the influence of media on gender.

**COMM 465 - Nonverbal Communication (3)**

Study of and experimentation with nonverbal aspects of human communication as vital components of the total communication process.

**COMM 470 - Leadership Communication (3)**

Examination of traditional theories and concepts of leader-follower dynamics; presentation of cognitive, systems, and symbolic interpretative views of leadership with an emphasis on persuasion and motivation in leader-follower interactions.

**COMM 475 - International Communication (3)**

Exploration of the forms and channels of communication substantially influenced by international cultural and political factors. Covers: global

communication technology; news, information and entertainment flows; international diplomacy and negotiation, communication in war and peace.

**COMM 477 - Environmental Communication (3)**

Examines the link between communication and environment within the context of communication scholarship. Topics include sense of place, cultural approaches to interacting with environment as well as exploring current themes surrounding environment.

**COMM 480 - Health Communication (3)**

Examination of central issues in communication theory and practice as applied to health care. Includes communication in health care organizations, media dissemination of health information, role of communication in disease prevention and health promotion, and symbolic meaning of illness within cultures.

**COMM 483 - Communication in Friendships and Romantic Relationships (3)**

Examines communication in adult friendships and romantic relationships that do not have legal commitments. Includes trends in friendships, benefits and problems within cross and same-sex friendships and romances, gender differences in communication within adult friendships and romances and the communication of friendship and romance on the Internet. Prerequisite: COMM majors or consent of instructor.

**COMM 484 - Verbal Communication (3)**

Examination of rules governing conversational structures such as speech acts, action sequences, topics and topic shifts. Also covers humor in conversation and conversational control.

**COMM 485 - International Teaching Assistant Development (3)**

International teaching assistants will receive instruction in communicative skills to enable them to meet their responsibilities at NMSU. Course includes lectures, seminars, video-taped presentations, and tutorial sessions emphasizing pedagogic and presentation skills and styles. Prerequisite: consent of instructor.

**COMM 490 - Independent Study (1-3)**

Individualized, self-paced projects for advanced students. Prerequisites: COMM 265G and junior standing with consent of participating instructor. May be repeated for a maximum of 6 credits.

**COMM 491 - Selected Topics (1-6)**

Individual and/or group study of selected topics. To be identified by subtitle. Prerequisite: prior arrangement with faculty supervisor(s). May be repeated for a maximum of 12 credits.

**COMM 495 - Communication Internship (3)**

Internship opportunity to apply what has been learned to a real-world situation. Prerequisite: junior standing and 3.0 GPA in major. May be repeated for a maximum of 6 credits. Restricted to majors.

**COMM 505 - Research Methods (3)**

Seminar in the quantitative study of human communication phenomena, research design, and statistical analysis.

**COMM 506 - Qualitative Research Methods in Communication (3)**

Survey of qualitative research methods in the study of human communication, including historical and critical approaches, interviewing, participant-observation, and communication ethnography. Students apply methods to their own research.

**COMM 535 - Seminar in Psychology of Human Communication (3)**

Advanced study of psychological processes involved in interpersonal communication. Covers person perception and message production.

**COMM 540 - Seminar in Political communication (3)**

Political communication theory, research, and issues. Empirical studies of campaigns, movements, news media, voter decision-making, political participation, socialization, and knowledge. Political theory, field research, communication science findings and research methods.

**COMM 545 - Seminar in Ethicism, Racism, and Communication (3)**

Course focuses on theories and research concerning the social, cognitive, and communication aspects of ethnic and racial prejudice. Specific psychological and communication processes of person and group categorization are explored along with findings about the effects of ethnic prejudice on everyday communication (and vice versa).

**COMM 550 - Seminar in Communication Technologies (3)**

Seminar on design, usage, and social impact of electronic mail, communication through computer networks, and new technologies of organizational communication such as group decision support systems

(GDSS). Each student will study an actual application of a major communication technology in an organization.

**COMM 551 - Seminar in Persuasion (3)**

Work with an actual persuasion campaign, such as public information, political, or commercial marketing campaigns. Includes case studies of large-scale persuasion efforts, current theoretical models of persuasion processes, and methods for studying, evaluating, and refining messages for optimal effects. Prerequisite: COMM 351 or consent of instructor.

**COMM 555 - Seminar Fundamentals of Communication and National Security (3)**

This seminar course addresses communication perspectives informing national security, strategic intelligence, and the intelligence process. Students will examine U.S. national security history, policy, the development of the Intelligence Community, and intelligence as processes of communication. This course serves as an introduction to national security studies. Graduate students are required to fulfill advanced research and presentation requirements.

**COMM 556 - Seminar Communication and the Intelligence Cycle (3)**

This seminar course addresses communication requirements and the technical, cognitive, and cultural complexity of the collaborative research environment. Students participate in novel, team-based problem scenarios that provide the foundation for acquiring advanced cognitive analytic methods and strategies. Students will engage in interdisciplinary information science processes and will develop and present analytic products responding to national security requirements. Graduate students will be required to fulfill advanced research and presentation requirements.

**COMM 557 - Seminar Strategic Communication and Public Diplomacy (3)**

The seminar course covers history, theory, and research related to the use of communication to change attitudes in favor of U.S. security interests. Students will examine the use of strategic communication and influence in diplomacy, intelligence, and military communities in terms of specific strategies, effects, and issues. Students will learn to distinguish public diplomacy, information operations, public affairs, and other forms of political communication that are by the U.S. government to persuade target populations about American interests and goals. Topics include soft power, intelligence-based negotiation processes, and research methods used to identify influence techniques of groups that threaten U.S. national security. Graduate students will be required to fulfill advanced research and presentation requirements.

**COMM 558 - Seminar Intercultural Communication and National Security (3)**

The seminar course provides a concentration on cultural factors in international affairs and conflicts, how culture affects perceptions of national interests, and the relationship of U.S. national security to understand the general and political cultures of other nations. Students will integrate cultural and intercultural communication theory and behavior, with an emphasis on the development of specific communication skills to facilitate developing cultural knowledge in government and political contexts. Students will learn how to study the cultural factors that affect international conflicts and how strategic communication should address such cultural factors. Graduate students will be required to fulfill advanced research and presentation requirements.

**COMM 562 - Seminar in Family Communication (3)**

A graduate seminar exploring traditional theories and concepts of leader-follower dynamics; presentation of cognitive, systems, and symbolic interpretative views of leadership with an emphasis on persuasion and motivation in leader-follower interactions.

**COMM 565 - Seminar in Nonverbal Communication (3)**

Graduate seminar concerning the study of and experimentation with nonverbal aspects of human communication as vital components of the total communication process.

**COMM 570 - Seminar in Organizational Communication (3)**

Communication strategies and patterns of private and governmental organizations, including research on communication systems.

**COMM 576 - Seminar on Communication and Culture (3)**

Cultural and intercultural communication theory and research. Focuses on discovering and describing distinctive ways of speaking within and between cultures.

**COMM 577 - Seminar in Conflict Management (3)**

Advanced examination of communication strategies to manage and negotiate conflict in intrapersonal, interpersonal, group, and organizational settings.

**COMM 583 - Seminar in Theories of Communication (3)**

Communication systems, symbolic processes, analysis of messages.

**COMM 584 - Seminar in Interpersonal Communication (3)**

Theories of interpersonal communication and communication within a relationship, including study of relevant models, contexts, and constructs.

**COMM 590 - Independent Study (1-6)**

Individualized, self-paced projects. Prerequisite: consent of instructor.

**COMM 591 - Special Topics (1-9)**

Individual and/or group study of special topics. To be identified by subtitle. Prerequisite: prior arrangement with faculty supervisor(s).

**COMM 595 - Communication Internship for Graduate Students (3)**

Internship opportunity to apply what students have learned to the real world. Prerequisite: 9 credits of M.A. degree. Restricted to majors.

**COMM 599 - Master's Thesis (0-15)**

Thesis.

**CTFM - CLOTHING, TEXTILES, AND FASHION MERCHANDISING****CTFM 460 - Cultural Perspectives in Dress (3)**

Explores the social, psychological and cultural aspects of dress and appearance which includes the relationship of dress to physical and social environments, aesthetic and personal expression and cultural ideas and values. Prerequisite(s): CTFM 255 and CTFM 366.

**CTFM 470 - Global Fashion Industry Trends (3)**

Exploration of fashion industry trends in a global setting. Current consumer patterns and future trends will be analyzed. Prerequisite(s): Junior, senior, graduate standing, or consent of instructor.

**CTFM 474 - Fashion Promotion (3)**

This class focuses on the comprehensive nature of promotion in the merchandising environment of fashion related goods. Consent of instructor required. Prerequisite: CTFM 255 and CTFM 372. Restricted to: CTFM majors.

**CTFM 475 - Fashion Buying (3)**

Fundamental principles and procedures for successful merchandising of fashion goods, responsibilities of buyers, fashion trends, consumer demands, and merchandising arithmetic. Prerequisites: ACCT 251, CTFM 372, and CTFM 474.

**CTFM 476 - Apparel Design by Draping and Pattern Drafting (3)**

Theory and application of draping and drafting garment patterns (requires lab). Consent of Instructor required. Prerequisite(s): CTFM 255, CTFM 270, CTFM 273, and CTFM 373. Restricted to CTFM majors.

**CTFM 478 - Apparel Design Through Flat Pattern (3)**

This course builds upon concepts introduced in Apparel Design by Draping. Examines the process of flat-pattern design and includes an expanded section on design analysis. Consent of instructor required. Prerequisite(s): CTFM 273, CTFM 373, CTFM 476. Restricted to CTFM majors.

**CTFM 492 - Special Problems (1-4)**

Individual research study in a selected subject area of family and consumer sciences. Maximum of 4 credits per semester and a total of 6 credits toward a degree.

**CTFM 571 - Textile Science (3)**

Fabrics used for modern clothing, furnishings, and miscellaneous end uses. Explores textiles testing procedures. Students enrolling in the 500-level class will be required to complete additional assignments beyond what is required for CTFM 371. Prerequisite: CHEM 110G or consent of instructor.

**CTFM 572 - Fashion Merchandising (3)**

Covers the apparel industry from designing through manufacturing and distribution to retailers. Students enrolling in the 500-level class will be required to complete additional assignments beyond what is required for CTFM 372. Prerequisites: CTFM 178 and CTFM 255 or consent of instructor.

**CTFM 584 - Graduate Study in Clothing for Special Needs (3)**

Graduate study in the selection, adaptation, and design of clothing that is functional and attractive for special needs populations such as active sportswear, handicapped, elderly, and various specialty populations. Prerequisites: CTFM 472 and CTFM 476.

**CTFM 598 - Special Research Programs (1-4)**

Individual investigations, either analytical or experimental. May be repeated for a maximum of 4 credits per semester and no more than 6 credits toward a degree.

**DANC - DANCE****DANC 450 - Special Topics (1-3)**

Specific subjects to be announced in the Schedule of Classes. May be repeated up to 3 credits. Consent of Instructor required. Prerequisite(s): Consent of instructor.

**DANC 451V - World Dance (3)**

Examination of dance forms from a cross-cultural perspective, focusing on the role of dance in different cultures around the globe. Same as HON 347V.

**DANC 460 - Dance History (3)**

History and development of dance forms from ancient cultures to today.

**DANC 462 - Flamenco Dance History (3)**

An in depth study of the cross section of Flamenco and Spanish Dance traditions and genres from Spain with the influence of her colonies and the modern world from the early 1400s to Present.

**DANC 465 - Senior Culminating Experience (1-6)**

Exit course for graduating seniors. Students will apply comprehensive knowledge of performance and production and/or pedagogy experience, to culminate in a dance production and/or teaching project. Restricted to majors and minors. A minimum of 2 credit hours required for graduation.

**DANC 466 - Dance Pedagogy: Dance Technique (3)**

Students will learn to develop a curriculum design, apply teaching methods, and structure lesson plans for teaching specific dance styles. Course must be passed with a grade of C or higher. Consent of Instructor required. Prerequisite(s): DANC 300 or consent of instructor.

**DANC 489 - Advanced Choreographic Project (3)**

Individual directed studies in choreography with a culminating performance. Consent of instructor required. Restricted to Grad Dance Students majors.

**DANC 499 - Problems (1-6)**

Problems in dance education, dance pedagogy, dance performance and independent work in their solutions. May be repeated up to 6 credits. Consent of Instructor required. Prerequisite(s): Consent of instructor. Restricted to: DANC majors.

**DANC 501 - Directed Studies (1-6)**

Supervised projects and/or research in theoretical studies, inclusive of community service projects. May be repeated up to 6 credits. Consent of Instructor required.

**DANC 505 - Dance Ensemble III (1-3)**

Rehearsal and performance of dance repertory with emphasis on advanced understanding of musicality, dynamic phrasing, artistic expression, and athletic versatility within a broad range of styles. May be repeated up to 6 credits. Consent of Instructor required.

**DANC 550 - Special Topics (1-6)**

Specific subjects offered in addition to standard academic curriculum. Course title to be announced in the Schedule of Classes. May be repeated up to 6 credits. Consent of Instructor required.

**DANC 551 - Movement as Social Text (3)**

Investigation of the meaning of movement and dance in different cultural, social, and historical contexts in both Western and non-Western dance forms. Emphasis will be placed on the nature of movement, its unique properties, the ways in which it conveys meaning, and its relationship to culture and society. Consent of instructor required.

**DANC 566 - Advanced Theory of Dance Pedagogy (1-6)**

Advanced study of dance pedagogy theory and practice. May be repeated up to 6 credits.

**DANC 567 - Dance Internship I (3)**

Internship opportunities in either dance education, dance performance/production, or dance administration. Internship site determined by both Director of Dance Program and graduate student.

**DANC 568 - Advanced Theory of Dance Technique (1-6)**

Advanced study of dance pedagogy, theory and practice of dance technique in one of the following styles of dance: ballet, modern, jazz, ballroom, Latin, tap, flamenco, ballet folklorico, or Spanish dance. May be repeated up to 6 credits.

**DANC 570 - Dance Administration and Leadership (3)**

The study and investigation of both management and leadership theories and how to apply these theories in practice.

**DANC 599 - Master's Thesis (3)**

This course is for graduate dance students who choose to write a thesis instead of a performance or teaching project.

**DANC 600 - Dance Research (3)**

Literature review and development of research in the field of dance.

**DANC 670 - Dance Internship II (3)**

Internship opportunities in either dance education, dance performance/production, or dance administration. Internship site determined by both Director of Dance Program and graduate student.

**DANC 700 - Doctoral Dissertation (3)**

This course is for graduate dance students working toward their EdD or PhD in dance. A dissertation is required. Topic and format to be determined by dissertation committee chair and graduate student. Consent of instructor required. Restricted to Graduate Dance majors.

**E E - ELECTRICAL ENGINEERING**

**E E 452 - Introduction to Radar (3)**

Basic concepts of radar. Radar equation; detection theory. AM, FM, and CW radars. Analysis of tracking, search, MTI, and imaging radar. Taught with E E 548. Restricted to undergraduate students. Prerequisite(s): C or better in E E 210 and E E 351. Pre/Corequisite(s): E E 496.

**E E 453 - Microwave Engineering (3)**

Techniques for microwave measurements and communication system design, including transmissions lines, waveguides, and components. Microwave network analysis and active device design. Taught with E E 521. Restricted to undergraduate students. Prerequisite(s): C or better in E E 351. Restricted to: Main campus only.

**E E 454 - Antennas and Radiation (3)**

Basic antenna analysis and design. Fundamental antenna concepts and radiation integrals. Study of wire antennas, aperture antennas, arrays, reflectors, and broadband antennas. Taught with E E 541. Restricted to undergraduate students. Prerequisite(s): C or better in E E 351. Restricted to: Main campus only.

**E E 460 - Space System Mission Design and Analysis (3)**

Satellite system design, including development, fabrication, launch, and operations. A systems engineering approach to concepts, methodologies, models, and tools for space systems. Prerequisite: junior standing.

**E E 461 - Systems Engineering and Program Management (3)**

Modern technical management of complex systems using satellites as models. Team projects demonstrate systems engineering disciplines required to configure satellite components. Prerequisite(s): Junior standing.

**E E 469 - Communications Networks (3)**

Introduction to the design and performance analysis of communications networks with major emphasis on the Internet and different types of wireless networks. Covers network architectures, protocols, standards and technologies; design and implementation of networks; networks applications for data, audio and video; performance analysis. Taught with E E 569. Prerequisite(s): C or better in E E 162 and (E E 210 or STAT 371).

**E E 473 - Introduction to Optics (3)**

The nature of light, geometrical optics, basic optical instruments, wave optics, aberrations, polarization, and diffraction. Elements of optical radiometry, lasers and fiber optics. Prerequisite(s): PHYS 216G or PHYS 217. Crosslisted with: PHYS 473

**E E 475 - Automatic Control Systems (3)**

Design and synthesis of control systems using state variable and frequency domain techniques. Compensation, optimization, multi-variable system design techniques. Prerequisite(s): C or better in E E 314.

**E E 476 - Computer Control Systems (3)**

Representation, analysis and design of discrete-time systems using time-domain and z-domain techniques. Microprocessor control systems. Prerequisite: C or better in E E 314.

**E E 477 - Fiber Optic Communication Systems (4)**

Fundamental characteristics of individual elements (transmitters, detectors, and fibers) of fiber optic communication systems. Design and characterization of high-speed, multichannel fiber optic communication links. Introduction to fiber optic distribution. Taught with E E 527. Prerequisite(s): C or better in E E 351 or PHYS 461. Crosslisted with: PHYS 477.

**E E 478 - Fundamentals of Photonics (4)**

Ray, wave and guided optics, lasers and thermal sources, radiometry, photon detection and signal-to-noise ratio. Elements of photonic crystals, polarization,

acousto-optics, electro-optics, and optical nanostructures. Taught with E E 528. Recommended foundation: E E/PHYS 473. Crosslisted with: PHYS478. Prerequisite(s): PHYS 216 or PHYS 217.

**E E 479 - Lasers and Applications (4)**

Laser operating principles, characteristics, construction and applications. Beam propagation in free space and fibers. Laser diode construction and characteristics. Hands-on laboratory. Taught with E E 529. Prerequisite(s): C or better in E E 351 or PHYS 461. Crosslisted with: PHYS 479

**E E 480 - Introduction to VLSI (4)**

Introduction to analog and digital VLSI circuits implemented in CMOS technology. Design of differential amplifiers, opamps, CMOS logic, flip-flops, and adders. Introduction to VLSI fabrication process and CAD tools. Prerequisite(s): C or better in E E 260 and E E 380.

**E E 482 - Electronics II (3)**

Feedback analysis, application of operational amplifiers, introduction to data converters, analog filters, oscillator circuits.. Prerequisite: C or better in E E 380.

**E E 483 - RF Microelectronics (3)**

Analysis, design and implementation of RF integrated circuits in CMOS/BJT technologies. Low noise amplifiers and mixers, power amplifiers, wideband amplifiers, oscillators, phase-locked frequency synthesizers. Taught with E E 519. Restricted to undergraduate students. Prerequisite(s): C or better in E E 480 and E E 351. Restricted to: Main campus only.

**E E 485 - Analog VLSI Design (3)**

Analysis, design, simulation, layout and verification of CMOS analog building blocks, including references, opamps, switches and comparators. Teams implement a complex analog IC. Taught with E E 523. Restricted to undergraduate students. Prerequisite(s): C or better in E E 312 and E E 480. Restricted to: Main campus only.

**E E 486 - Digital VLSI Design (3)**

An introduction to VLSI layers. Static and dynamic logic design, memory circuits, arithmetic operators, and digital phase-locked loops. Taught with E E 524. Restricted to undergraduate students. Prerequisite(s): C or better in E E 260 and E E 380.

**E E 486 L - Digital VLSI Design Laboratory (1)**

Simulation, schematic capture, layout, and verification using software tools of material presented in E E 486. An introduction to measurement of digital VLSI circuits. Taught with E E 524L. Prerequisite(s): C or better in E E 260 and E E 380. Pre/Corequisite(s): E E 486.

**E E 490 - Selected Topics (1-3)**

Prerequisite: consent of instructor. May be repeated for a maximum of 9 credits. Graduate students may not use credits of E E 490 toward an M.S. or Ph.D. in electrical engineering.

**E E 493 - Power Systems III (3)**

Analysis of a power system under abnormal operating conditions. Topics include symmetrical three-phase faults, theory of symmetrical components, unsymmetrical faults, system protection, and power system stability. Taught with E E 543. Restricted to undergraduate students. Prerequisite(s): C or better in E E 391. Pre/Corequisite(s): E E 431.

**E E 494 - Distribution Systems (3)**

Concepts and techniques associated with the design and operation of electrical distribution systems. Taught with E E 544. Restricted to undergraduate students. Prerequisite(s): C or better in E E 431. Pre/Corequisite(s): E E 493. Restricted to: Main campus only.

**E E 496 - Introduction to Communication Systems (4)**

Introduction to the analysis of signals in the frequency and time domains. A study of baseband digital transmission systems and digital/analog RF transmission systems. Introduction to telecom systems as well as satellite systems. Prerequisite(s): C or better in E E 314.

**E E 497 - Digital Communication Systems I (3)**

Techniques for transmitting digital data over commercial networks. Topics include baseband and bandpass data transmission and synchronization techniques. Taught with E E 581. Recommended foundation: E E 496. Prerequisite(s): E E 210 and E E 314.

**E E 500 - Special Problems (1-9)**

Individual investigation in a particular field of electrical engineering. May be repeated for a maximum of 9 credits.

**E E 501 - Research Topics in Electrical and Computer Engineering (1)**

Ethics and methods of engineering research; contemporary research topics in electrical and computer engineering.

**E E 514 - Biosensor Electronics (3)**

Course provides students with knowledge of basic integrated analog and RF blocks and how to combine these circuits into sensory systems for biomedical applications. Target areas are in physiology, brain-machine interfaces, neural recording and stimulation. Lecture includes details on amplifiers, current-mode circuits, A/D converters, low-power radio transmitters and receivers, and simulation and layout of VLSI circuits. Lectures are in the form of recent paper reviews and discussion. Includes teamwork, written and oral communication, and realistic technical requirements. Prerequisite(s): E E 486 OR E E 524. Pre/Corequisite(s): E E 485 OR E E 523.

**E E 515 - Electromagnetic Theory I (3)**

Electromagnetic theory of time-harmonic fields in rectangular, cylindrical and spherical coordinates with applications to guided waves and radiated waves. Induction and equivalence theorems, perturbational and variational principles applied to engineering problems in electromagnetics. Recommended preparation is E E 351 or equivalent. Restricted to: Main campus only.

**E E 516 - Electromagnetic Theory II (3)**

Continuation of E E 515.

**E E 518 - Integrated Power Management Circuits (3)**

Design and analysis of power management integrated circuits, including linear voltage regulators, voltage references, buck, boost, and buck-boost DC-DC converters, and charge pumps. Extensive use of CAD tools are used to simulate these circuits. Prerequisite(s): E E 486 or E E 524. Pre/Corequisite(s): E E 485 or E E 523.

**E E 519 - RF Microelectronics (3)**

Analysis, design and implementation of RF integrated circuits in CMOS/BJT technologies. Low noise amplifiers and mixers, power amplifiers, wideband amplifiers, oscillators, phase-locked frequency synthesizers. Recommended preparation is E E 351 and E E 480 or equivalent. Taught with E E 483 with differentiated assignments for graduate students. Restricted to: Main campus only.

**E E 520 - A/D and D/A Converter Design (3)**

Practical design of integrated data converters in CMOS/BJT technologies, OP-AMPS, comparators, sample and holds, MOS switches, element mismatches. Nyquist rate converter architectures: flash, successive approximation, charge redistribution, algorithmic, two step, folding, interpolating, pipelined, delta-sigma converters. Prerequisite(s): E E 523. Restricted to: Main campus only.

**E E 521 - Microwave Engineering (3)**

Techniques for microwave measurements and communication system design, including transmission lines, waveguides, and components. Microwave network analysis and active device design. Recommended preparation is E E 351 or equivalent. Taught with E E 453 with differentiated assignments for graduate students. Restricted to: Main campus only.

**E E 522 - Advanced Analog VLSI Design (3)**

Design of high-performance operational amplifiers; class-AB, rail-to-rail, low-voltage, high-bandwidth, fully-differential. Design of linear operational transconductance amplifiers, high-frequency integrated filters, four-quadrant multipliers, and switched-capacitor circuits. Prerequisite(s): E E 523.

**E E 523 - Analog VLSI Design (3)**

Analysis, design, simulation, layout and verification of CMOS analog building blocks, including references, opamps, switches and comparators. Teams implement a complex analog IC. Recommended preparation is E E 312 and E E 480 or equivalent. Taught with E E 485 with differentiated assignments for graduate students. Restricted to: Main campus only.

**E E 524 - Digital VLSI Design (3)**

An introduction to VLSI layers. Static and dynamic logic design, memory circuits, arithmetic operators, and digital phase-locked loops. Taught with E E 486 with differentiated assignments for graduate students. Recommended foundation: E E 260 and E E 380.

**E E 524 L - Digital VLSI Design Laboratory (1)**

Simulation, schematic capture, layout, and verification using software tools of material presented in E E 524. An introduction to measurement of digital VLSI circuits. Taught with E E 486L with differentiated assignments for graduate students.

**E E 525 - Introduction to Semiconductor Devices (3)**

Energy bands, carriers in semiconductors, junctions, transistors, and optoelectronic devices, including light-emitting diodes, laser diodes, photodetectors, and solar cells. Recommended preparation is E E 380 and E E 351. Taught with: E E 425 with differentiated assignments for graduate students.

**E E 526 - CMOS Image Sensors (3)**

Design, simulation, layout and testing of CMOS image sensors. Covers passive-pixel, active-pixel, and logarithmic photo-sensors, readout circuitry, and timing circuits for automatic frame generation. Includes teamwork, written and oral communication, and realistic technical requirements. Prerequisite(s): E E 486 or E E 524. Pre/Corequisite(s): E E 485 or E E 523.

**E E 527 - Fiber Optic Communication Systems (4)**

Fundamental characteristics of individual elements (transmitters, detectors, and fibers) of fiber optic communication systems. Design and characterization of high-speed, multichannel fiber optic communication links. Introduction to fiber optic distribution. Recommended foundation: E E 351 or PHYS 461. Taught with: EE 477 with differentiated assignments for graduate students. Crosslisted with: PHYS 527

**E E 528 - Fundamentals of Photonics (4)**

Ray, wave and guided optics, lasers and thermal sources, radiometry, photon detection and signal-to-noise ratio. Elements of photonic crystals, polarization, acousto-optics, electro-optics, and optical nanostructures. Taught with E E 478 with differentiated assignments for graduate students. Recommended foundation: (PHYS 216 or PHYS 217) and E E/PHYS 473. Crosslisted with: PHYS528.

**E E 529 - Lasers and Applications (4)**

Laser operating principles, characteristics, construction and applications. Beam propagation in free space and fibers. Laser diode construction and characteristics. Hands-on laboratory. Recommended foundation: E E 351 or PHYS 461. Taught with: EE 479 with differentiated assignments for graduate students. Crosslisted with: PHYS 529

**E E 530 - Environmental Management Seminar I (1)**

Same as CH E 530, C E 530, I E 530.

**E E 531 - Power System Modeling and Computational Methods (3)**

Development and analysis of fast computational methods for efficient solution of large scale power-system problems. Algorithms for constructing the bus impedance matrix; sparse matrix techniques; partial-inverse methods; compensation of mutual coupling. Pre/Corequisite(s): E E 543. Restricted to: Main campus only.

**E E 532 - Dynamics of Power Systems (3)**

Transient and dynamic stability of power systems; synchronous machine modeling and dynamics; prediction and stabilization of system oscillations. Recommended preparation is E E 493 or equivalent. Restricted to: Main campus only.

**E E 533 - Power System Operation (3)**

AGC, economic dispatch, unit commitment, operations planning, power flow analysis and network control, system control centers. Recommended preparation is E E 493 or equivalent. Restricted to: Main campus only.

**E E 534 - Power System Relaying (3)**

Fundamental relay operating principles and characteristics. Current, voltage, directional, differential relays; distance relays; pilot relaying schemes. Standard protective schemes for system protection. Operating principles and overview of digital relays. Recommended preparation is E E 493 or equivalent.

**E E 535 - Power System Reliability and Risk Assessment (3)**

Probability applications in power systems; stochastic modeling of power system components and networks. Reliability modeling and analysis of generation systems, composite (generation and transmission) systems, interconnected systems, distribution systems, industrial and commercial systems. Analysis of risk in power systems; understanding of causes and remedial measures. Prerequisite: consent of instructor.

**E E 536 - Power System Overvoltage Transients (3)**

Introduction of the origin and analysis of overvoltage and other transients in power systems. Basic principles of design to control and protect against overvoltages and to provide an overview of applicable standards and testing methods. Use of the electromagnetic transients program (EMTP). Recommended preparation is E E 493 or equivalent. Restricted to: Main campus only.

**E E 537 - Power Electronics (3)**

Basic principles of power electronics and its applications to power supplies, electric machine control, and power systems. Recommended preparation is E E 314, E E 380, and E E 391. Taught with E E 432 with differentiated assignments for graduate students.

**E E 538 - Advanced Distribution Systems (3)**

Continuation of E E 494 and E E 544. Emphasis is directed toward the overall coordinated protection of distribution feeders. Distribution system reliability,

- performance indexes and economics are presented. Recommended preparation is E E 494 or equivalent. Restricted to: Main campus only.
- E E 539 - Electric Power Quality (3)**  
Power quality, harmonics, and related problems in electric power systems, their causes, and effects. Applicable standards, instrumentation, analysis procedures, and mitigation. Recommended preparation is E E 493 or equivalent. Restricted to: Main campus only.
- E E 541 - Antennas and Radiation (3)**  
Basic antenna analysis and design. Fundamental antenna concepts and radiation integrals. Study of wire antennas, aperture antennas, arrays, reflectors, and broadband antennas. Recommended preparation is E E 351 or equivalent. Taught with E E 454 with differentiated assignments for graduate students. Restricted to: Main campus only.
- E E 542 - Power Systems II (3)**  
Analysis of a power system in the steady-state. Includes the development of models and analysis procedures for major power system components and for power networks. Recommended preparation is E E 391 or equivalent. Taught with E E 431 with differentiated assignments for graduate students. Restricted to: Main campus only.
- E E 543 - Power Systems III (3)**  
Analysis of a power system under abnormal operating conditions. Topics include symmetrical three-phase faults, theory of symmetrical components, unsymmetrical faults, system protection, and power system stability. Recommended preparation is E E 431 or equivalent. Taught with E E 493 with differentiated assignments for graduate students. Restricted to: Main campus only.
- E E 544 - Distribution Systems (3)**  
Concepts and techniques associated with the design and operation of electrical distribution systems. Recommended preparation is E E 542 and E E 543. Taught with E E 494 with differentiated assignments for graduate students.
- E E 545 - Digital Signal Processing II (3)**  
Non-ideal sampling and reconstruction, oversampling and noise shaping in A/D and D/A, finite word length effects, random signals, spectral analysis, multirate filter banks and wavelets, and applications. Recommended preparation is E E 395 or equivalent. Restricted to: Main campus only.
- E E 548 - Introduction to Radar (3)**  
Basic concepts of radar. Radar equation; detection theory, AM, FM, and CW radars. Analysis of tracking, search, MTI, and image radar. Recommended preparation is E E 310, E E 351, and E E 496 or equivalent. Taught with E E 452 with differentiated assignments for graduate students. Restricted to: Main campus only.
- E E 549 - Smart Antennas (3)**  
Smart antenna and adaptive array concepts and fundamentals, uniform and planar arrays, optimum array processing. Adaptive beamforming algorithms and architectures: gradient-based algorithms, sample matrix inversion, least mean square, recursive least mean square, sidelobes cancellers, direction of arrival estimations, effects of mutual coupling and its mitigation. Taught with E E 449. Recommended foundation is E E 314 and E E 351.
- E E 551 - Control System Synthesis I (3)**  
An advanced perspective of linear modern control system analysis and design, including the essential algebraic, structural, and numerical properties of linear dynamical systems.
- E E 552 - Control System Synthesis II (3)**  
An overview of optimal controls for linear dynamical systems, analysis and design of control systems using Lyapunov techniques, control system design using semidefinite programming. An introduction to stochastic filtering and control.
- E E 555 - Advanced Linear Systems (3)**  
Advanced level study of linear systems and associated mathematical tools including linear equations, spectral theory, normal matrices, projections, quadratic forms, discrete and continuous time dynamical systems. Recommended preparation is MATH 480 or equivalent. Restricted to: Main campus only.
- E E 560 - Computer Network Security (3)**  
An introduction to computer network security, addressing security protocols, cryptology, and information assurance. Recommended preparation is E E 469 or equivalent and C programming skills. Restricted to: Main campus only.
- E E 561 - Sequential Machines I (3)**  
Fault detection of combinational circuits. Representation, equivalents, reduction, decomposition and fault detection of sequential machines. Recommended preparation is E E 363 or equivalent. Restricted to: Main campus only.
- E E 563 - Computer Performance Analysis I (3)**  
Issues involved and techniques used to analyze performance of a computer system. Topics covered include computer system workloads; statistical analysis techniques such as principal component analysis, confidence interval, and linear regression; design and analysis of experiments; queuing system analysis; computer system simulation; and random number generation. Recommended foundation: E E 210 and E E 363.
- E E 564 - Advanced Computer Architecture I (3)**  
Multiprocessor and distributed computer architectures; models of parallel computation; processing element and interconnection network structures, and nontraditional architectures. Recommended preparation is E E 363 or equivalent. Crosslisted with: C S 573.
- E E 565 - Pattern Recognition (3)**  
Statistical pattern classification, supervised and unsupervised learning, feature selection and extraction, clustering, image classification and syntactical pattern recognition. Prerequisite: E E 571 or equivalent.
- E E 566 - Parallel Computer Architecture I (3)**  
Parallel computer architectures primarily focused on message-passing architectures, but including shared-memory architectures. Scalable multiprocessors, directory-based cache coherence, synchronization, programming models, the parallelization process, workload-driven analysis and evaluation. Recommended preparation is E E 363 or C S 473.
- E E 568 - Wireless Networks (3)**  
Challenges of node mobility and wireless channels. Protocols and architectures for wireless data communications. Modeling and simulation of wireless networks. Advanced topics in wireless networks from current literature. Recommended preparation is E E 469 or equivalent. Restricted to: Main campus only.
- E E 569 - Communications Network (3)**  
Introduction to the design and performance analysis of communications networks with major emphasis on the Internet and different types of wireless networks. Covers network architectures, protocols, standards and technologies; design and implementation of networks; networks applications for data, audio and video; performance analysis. Taught with E E 469. Recommended foundation is E E 162 and (E E 210 or STAT 371).
- E E 571 - Random Signal Analysis (3)**  
Application of probability and random variables to problems in communication systems, analysis of random signal and noise in linear and nonlinear systems.
- E E 572 - Modern Coding Theory (3)**  
Error control techniques for digital transmission and storage systems. Introduction to basic coding bounds, linear and cyclic block codes, Reed-Solomon codes, convolutional codes, maximum likelihood decoding, maximum a posteriori probability decoding, factor graphs, low density parity check codes, turbo codes, iterative decoding. Applications to data networks, space and satellite transmission, and data modems. Recommended foundation is E E 210 and E E 496.
- E E 573 - Signal Compression (3)**  
Fundamentals of information source encoding and decoding. Includes information theory bounds on source coding, lossless coding algorithms, scalar quantizing and vector quantizing. Prerequisite: E E 571.
- E E 577 - Fourier Methods in Electro-Optics (3)**  
Linear systems theory, convolution and Fourier transformation are applied to one-dimensional and two dimensional signals encountered in electro-optical systems. Applications in diffraction, coherent and incoherent imaging, and optical signal processing. Recommended foundation: E E 312 and E E 528. Crosslisted with: PHYS 577
- E E 578 - Optical System Design (3)**  
Optical design software is used to study optical systems involving lenses, mirrors, windows and relay optics. Systems considered include camera lenses, microscopes and telescopes. Recommended foundation: E E/PHYS 473, E E/PHYS 528 and E E/PHYS 577. Crosslisted with: PHYS 578.
- E E 581 - Digital Communication Systems I (3)**  
Techniques for transmitting digital data over commercial networks. Topics include baseband and bandpass data transmission and synchronization techniques. Recommended foundation is E E 210, E E 314, and E E 496. Taught with E E 497.

**E E 583 - Personal Communications Systems (3)**

Cellular systems, propagation, modulation, multiple access, and spread spectrum techniques for mobile radio, as well as smart antennas, networking, and standards for wireless systems. Prerequisite: E E 571.

**E E 584 - Mathematical Methods for Communications and Signal Processing (3)**

Applications of mathematical techniques from estimation theory, optimization principles and numerical analysis to the problems in communications and signal processing. Prerequisites: E E 571 and E E 555 or knowledge of linear algebra.

**E E 585 - Telemetry Systems (3)**

Covers the integration of components into a command and telemetry system. Topics include analog and digital modulation formats, synchronization, link effects, and applicable standards. Recommended preparation is E E 395, E E 496, and E E 497, or equivalent. Restricted to: Main campus only.

**E E 586 - Information Theory (3)**

This class is a study of Shannon's measure of information and discusses mutual information, entropy, and channel capacity, the noiseless source coding theorem, the noisy channel coding theorem, channel coding and random coding bounds, rate-distortion theory, and data compression. Prerequisite(s): E E 571 or STAT 515. Restricted to: Main campus only. Crosslisted with: MATH 509

**E E 589 - Digital Speech Processing (3)**

Speech signals analysis, coding, enhancement, recognition, and synthesis; introduction to linguistics and the human auditory and production systems. Prerequisite: E E 545.

**E E 590 - Selected Topics (1-9)**

May be repeated for a maximum of 18 credits.

**E E 591 - Advanced Experimental Optics (2)**

See PHYS 571. Crosslisted with: PHYS 571

**E E 593 - Mobile Application Development (3)**

Introduction to mobile application development. Students will develop applications for iOS devices including iPhone and iPad. Topics include object-oriented programming using the Objective-C language, model-view-controller (MVC) pattern, memory management, view controllers, graphical user interface design, callbacks, and web services. Taught with E E 443 with differentiated assignments for graduate students. Recommended foundation is C, C++, or Java programming course.

**E E 594 - Adaptive Signal Processing (s) (3)**

Wiener filters, linear prediction, least-mean-square algorithms, and recursive-least-squares algorithms with applications to prediction, system identification, equalization, and interference canceling. Prerequisites: E E 545 and E E 571.

**E E 595 - Multirate Digital Signal Processing and Wavelets (3)**

This class introduces material on multirate systems, multirate filter banks, wavelets, lapped orthogonal transformations, and lifting for fast implementations. Recommended preparation is E E 395.

**E E 596 - Digital Image Processing (3)**

Two-dimensional transform theory, color images, image enhancement, restoration, registration, segmentation, compression and understanding. Recommended foundation is E E 571. Taught with E E 446.

**E E 598 - Master's Technical Report (0-9)**

Individual investigation, either analytical or experimental, culminating in a technical report. May be repeated for a maximum of 18 credits. Graded PR/S/U.

**E E 599 - Master's Thesis (0-15)**

Thesis.

**E E 600 - Doctoral Research (1-15)**

Research.

**E E 615 - Computational Electromagnetics (3)**

The numerical solution of electromagnetics problems. Topics include differential equation techniques, integral equation methods, hybrid techniques, algorithm development and implementation, and error analysis. Particular algorithms, including FEM, finite differences, direct solvers, and iterative solvers, are studied.

**E E 671 - Signal Detection and Estimation Theory (3)**

Statistical decision theory with applications to optimum detection and estimation of signals in communications systems. Prerequisite: E E 571 or consent of instructor.

**E E 690 - Selected Topics (1-9)**

May be repeated for a maximum of 9 credits.

**E E 700 - Doctoral Dissertation (0-15)**

Dissertation.

**ES - ENVIRONMENTAL SCIENCE****E S 452 - Geohydrology (4)**

Origin, occurrence, and movement of fluids in porous media and assessment of aquifer characteristics. Development and conservation of ground water resources, design of well fields. Crosslisted with: C E 452 and GEOL452. Prerequisite(s): Junior or Senior.

**E S 459 - Aquatic Ecology (4)**

Ecological functions of plant and animal communities in aquatic ecosystems with emphasis on chemical and physical properties, productivity, species interactions, population dynamics, and concepts for diagnosing problems and restoring aquatic ecosystems. Prerequisite(s): (E S, WLSC or BIOL 301), CHEM 112G, (MATH 142G or MATH 191G). Crosslisted with: WLSC 459

**E S 460 - Introduction to Air Pollution (3)**

An introduction to the physics and chemistry of tropospheric air pollution including sources of air pollution, local and long-range transport, instrumentation, regulatory requirements, control technology. Prerequisite(s): PHYS 215, CHEM 112, MATH 191.

**E S 462 - Sampling and Analysis of Environmental Contaminants (3)**

Theory, application, methodology, and instrumentation used in the sampling and analysis of environmental contaminants. Prerequisites: E S 256. Same as ENVE 462.

**E S 470 - Environmental Impacts of Land Use (3)**

Capstone course for the environmental science major. Case studies of environmental problems impacting land. Prerequisites: E S 256, E S 462, E S 370.

**E S 599 - Master's Thesis (1-15)**

Thesis Graded: Thesis/Dissertation.

**E S 700 - Doctoral Dissertation (1-15)**

Dissertation Graded: Thesis/Dissertation.

**ECDV - ECONOMIC DEVELOPMENT****ECDV 550 - Introduction to Local and Regional Development (3)**

Serves as the introductory course in the Doctor of Economic Development program. Overview of the economic development field.

**ECDV 590 - Special Topics (1-3)**

Selected topics in the area of Economic Development. Subtitle reflects content. May be repeated up to 9 credits. Consent of instructor required.

**ECDV 596 - Individual Study (1-3)**

Individual studies directed by consenting faculty with the prior approval of the Department Head. May be repeated up to 6 credits.

**ECDV 624 - Seminar in Economic Development and the Public Sector (3)**

Explores specific examples of the interaction of public finance and economic development. Students examine actual cases and examples of the use of public finance policy to influence economic development. Prerequisites: AEEC 522 and AEEC 523.

**ECDV 651 - Economic Development Theory (3)**

Builds upon a general understanding of microeconomic and macroeconomic theory to focus specifically on theories of economic development at all levels. Prerequisites: AEEC 501 and 502

**ECDV 661 - Regional Economic Modeling I (3)**

Provides an introduction to the basic tools and methods of regional economic development analysis. Prerequisite(s): AEEC 501, AEEC 502, and AEEC 540.

**ECDV 662 - Regional Economic Modeling II (3)**

Continuation of ECDV 661 with focus on more advanced tools and methods of regional economic development analysis.

**ECDV 664 - Population Economics (3)**

Examines the causes and consequences of demographic change. Examines theories of basic demographic processes, population projection and estimation. Consent of instructor required.

**ECDV 666 - Economics of Transportation (3)**



Regional implications of the economics of transportation systems. Explores the role of transportation in economic development. Consent of instructor required.

**ECDV 668 - Economic Development Finance (3)**

Focuses on the tools and methods of economic development finance.

**ECDV 670 - Research in Economic Development (3)**

Intense examination of the academic literature on economic development at all levels. Prerequisites: ECDV 651, ECDV 661 and ECDV 662.

**ECDV 671 - Sustainable Economic Development (3)**

Focuses on the interconnections between economic development and the environment. Provides a broad set of tools and ideas related to the impacts of human activities on the environment. Prerequisites: AEEC 501, AEEC 502 and AEEC 540.

**ECDV 673 - Research Methods (3)**

An overview of alternative research methods and tools. Students explore quantitative and qualitative research methods as alternatives and complements to statistical methods. Research design, ethics, and presentation are emphasized. Prerequisites: AEEC 501, AEEC 502 and AEEC 540.

**ECDV 681 - Urban Economic Development (3)**

Examines causes and consequences of economic change in urban and metropolitan areas. Covers both theory and tools for analysis. Prerequisites: ECDV 651, ECDV 661 and ECDV 662.

**ECDV 682 - Rural Development (3)**

Examines causes and consequences of economic change in rural areas, communities and small, open economies. Covers both theory and tools for analysis. Prerequisites: ECDV 651, ECDV 661 and ECDV 662.

**ECDV 683 - Seminar in National Economic Development (3)**

Explores specific examples and cases of rural and urban economic development. Involves applied analysis of specific rural and/or urban economic issues/projects. Prerequisites: ECDV 681 and ECDV 682.

**ECDV 685 - Seminar in International Economic Development (3)**

Explores specific examples and cases of economic development in an international context. Focuses on the application of theories and methods in prerequisite courses to the problems of nations lagging in economic development. Prerequisites: AEEC 528, AEEC 520 or ECON 581.

**ECDV 692 - Seminar in Economic Development (3)**

Seminars in selected topics in economic development. Subtitle reflects content. May be repeated up to 9 credits. Prerequisite: Completion of at least nine semester hours of ECDV courses.

**ECDV 694 - Internship (1-9)**

Internship in Economic Development. May be repeated up to 9 credits. Prerequisite: Completion of core requirements of Doctor of Economic Development.

**ECDV 699 - Doctoral Project (1-9)**

Doctoral Project. May be repeated up to 9 credits. Completion of all DED coursework and successful completion of comprehensive exams.

## **ECED - EARLY CHILDHOOD EDUCATION**

**ECED 451 - Play in the Early Childhood Curriculum (3)**

Development of curriculum based on children's play; a means of exploring and learning the patterns of human living, communications, and experiences congruous with their developing interests and capacities.

**ECED 452 - Teaching Language Minority Children in Early Childhood Settings (3)**

Framework and strategies for the educational development of young language-minority children.

**ECED 455 - Teaching and Learning Social Studies, Fine Arts and Movement (3)**

The course focuses on the aims, scope, and integration of methods of teaching social studies, the fine arts and movement across the curriculum. This course emphasizes an integrated approach to teaching the what and why of social studies; assessing student learning; planning units, lessons, and activities; effective instructional strategies; and knowledge of social studies content. Concepts of expressive art include the visual arts, music, movement and drama. Corequisite(s): ECED 440, ECED 329, RDG 350.

**ECED 458 - Field Experience (Infants Pre-K) (1)**

Supervised field experiences in early childhood settings: infants, toddlers, and pre-K programs. Graded S/U.

**ECED 459 - Field Experience (K-3) (1)**

Supervised field experiences in early childhood settings: public school programs K-3. Graded S/U.

**ECED 465 - Advanced Caregiving for Infants and Toddlers (3)**

The advanced field-based course is intended to assist students to define and implement advanced elements of quality programming for all infants, toddlers in safe, healthy, responsive caring environments. The experiences in the approved setting will support strong nurturing relationships, cultural competence, diverse learning needs and styles of every child, appropriate guidance techniques and partnership with the families, cultures, and community represented. Students are assisted through the course in advancing their ability to observe, discuss, and implement elements of quality programming for infants and toddlers in home, small-group or whole-group care situations. Crosslisted with: SPED 465

**ECED 470 - Student Teaching/Seminar (6)**

Provides student teaching experience in a variety of settings with young children ages birth-8.

**ECED 479 - Curriculum in Early Childhood Education (3)**

Development and implementation of curriculum and materials for teaching young children.

**ECED 489 - Topics (3)**

Offered under various subtitles which indicate the subject matter to be covered. May be repeated three times for a maximum of 9 credits.

**ECED 505 - The Bilingual Preschool Child (3)**

Same as BIL 505.

**ECED 510 - Issues in Early Childhood Education (3)**

Examines current trends and problems through readings of theoretical, empirical, and applied literature.

**ECED 515 - Working with Parents of Young Children (3)**

Techniques for setting up home and classroom visitations, communicating with parents, and establishing special programs.

**ECED 520 - Seminar on Cognitive and Social Development (3)**

In-depth study of developmental theories: Piaget, Kohlberg, Bruner, and Erikson. Implications for development of preschool programs and teaching techniques.

**ECED 570 - Play in the Early Childhood Curriculum (3)**

Advanced exploration of the development of curriculum based on children's play. A means of exploring and learning the patterns of human living, communications, and experiences congruous with developing interests and capacities. Restricted to majors. Same as ECED 451 with differentiated assignments for graduate students.

**ECED 605 - Independent Study Topics in Early Childhood Education (1-3)**

A problem and seminar course for those pursuing an advanced graduate degree. Prerequisite: EDUC 535. May be repeated for a maximum of 6 credits. Restricted to doctoral-level students of any major.

**ECED 606 - Inquiry in Early Childhood Education (3)**

A complete research review and examination of practices in early childhood education. Restricted to doctoral-level students of any major.

**ECED 612 - History and Philosophy of Early Childhood Education (3)**

Critical analysis of the historical development and philosophical underpinnings of the field of early childhood education as it relates to current practice. Restricted to doctoral-level students of any major.

**ECED 614 - Early Childhood, Communities, and Social Policy (3)**

Early childhood politics and policy taken from a global, national, state, and community context. Restricted to doctoral-level students of any major.

**ECED 633 - Praxis and Reflexivity (3)**

Same as BIL 633, EDUC 633, RDG 633, EDLT 633.

**ECED 698 - Selected Topics in Early Childhood Education (1-6)**

Offered under various subtitles. May be repeated for a maximum of 6 credits. Restricted to doctoral-level students of any major.

## **ECON - ECONOMICS**

**ECON 450 - International Economics (3)**

Trade and capital flows between countries, international payments, government policy in balance-of-payments and tariff matters, international organizations. Prerequisite(s): ECON 251G and ECON 252G. Crosslisted with: IB 450

**ECON 453 - Introduction to Health Services Policy (3)**

The economics of health care policy in the United States with concern for U.S. Mexico border health issues and international comparisons. Same as MGT 462.

**ECON 455 - Public Utilities Regulation (3)**

Procedures of utility regulation; regulatory theory applied to specific industries; commission regulation compared to public ownership and deregulation. Prerequisite(s): ECON 252G, FIN 306, or consent of instructor. Same as MGT 455.

**ECON 457 - Mathematical Economics (3)**

Application of mathematical tools, especially the calculus, to economic theory. Prerequisite: one upper-division economics course.

**ECON 460 - Intelligence Research and Analysis (3)**

This course explores the organization, functions, and processes of the U.S. Intelligence Community (IC), with focus on practical intelligence research and analytical methods. Students will learn in-depth research techniques that will be valuable to any course of study. Critical thinking skills will be enhanced through the practice of analytical methods that can be applied toward national security and/or commercial interests. Unclassified and declassified data, including human intelligence, imagery, and other sources of evidence will be used in class projects and assignments. Intelligence successes and failures will be examined, as well as the politicization of intelligence and the relationship of intelligence activities to policy and policymakers. Prerequisite: Junior status or above.

**ECON 465 - Economics of Human Resources (3)**

Measurement, allocation, and utilization of human resources; labor supply, value of education and training, labor market dynamics, unemployment, government manpower programming.

**ECON 489 - Senior Economics Seminar (3)**

Seminar primarily for economics majors in their final semester. Provides an opportunity to apply economic theory to a broad variety of topics. Prerequisite: ECON 371 or ECON 372.

**ECON 490 - Selected Topics (1-3)**

Current topics in economics. Subject matter to be designated for each semester.

**ECON 498 - Independent Study (1-3)**

Individual studies directed by consenting faculty with the prior approval of the department head. May be repeated for a maximum of 3 credits. Prerequisite: junior or above standing and consent of instructor.

**ECON 503 - Managerial Economics (3)**

Theory and application of microeconomics to the management of organizations. Prerequisite(s): A ST 251 or 311 or equivalent with B or better.

**ECON 545 - Econometrics II (3)**

Application of statistical techniques to estimation of economic relationships: demand functions, production and cost functions, and macroeconomic equations. Prerequisites: ECON 251, 252, STAT 251G or A ST 311, and AECC 540.

**ECON 550 - Special Topics (1-3)**

Seminars in selected current topics in the various areas of economics. Prerequisites vary according to the topic being offered.

**ECON 571 - Regulatory Policy and Industry Analysis: Electricity I (3)**

Regulatory policy and economic analysis related to the Electric Industry. Topics include: characteristics of a utility and legal justification for regulation; characteristics and functions of a regulatory commission; history and structure of the industry; technology and network design; revenue requirements; cost allocation; and basic retail rate design. Prerequisite(s): ECON 252, FIN 306, or consent of instructor.

**ECON 572 - Regulatory Policy and Industrial Analysis: Water and Natural Gas (3)**

Regulatory policy and economic analysis related to the Natural Gas and Water industries. Topics include: history and structure of the industry; technology and network design; revenue requirements; cost allocation; and retail rate design.

**ECON 573 - Regulatory Policy and Industry Analysis: Electricity II (3)**

Regulatory policy and economic analysis related to the Electric industry. Topics include: optimal generation mix; ancillary services; environmental policies; rate case procedures and strategies for effective testimony; advanced retail rate design; wholesale exchanges; unbundled transmission tariffs; market institutions and how different markets function; state and federal deregulation policies; Federal Energy Regulatory Commission orders and policies; demand-side management; and regulatory treatment of non-traditional retail services. Consent of instructor required. Prerequisite(s): ECON 571 or consent of instructor.

**ECON 574 - Advanced Seminar Regulatory Policy and Industry Analysis (3)**

Advanced seminar and writing course specializing in regulatory policy and regulatory casework. Topics Include: special policy & regulatory issues in telecommunications, electricity, natural gas, and water; preparation of written testimony; expert witness effectiveness including cross-examination; and contested case management. This course involves extensive reading and writing assignments. Consent of instructor required. Prerequisite(s): ECON 571 or consent of instructor.

**ECON 581 - International Economics (3)**

Trade and capital flows between countries, international payments, government policy in balance-of-payments and tariff matters, international organizations. Recommended preparation, ECON 371 and 372. Prerequisite(s): ECON 251 and 252.

**ECON 582 - Economics of Health Care (3)**

Analysis of the allocation of resources in the field of health and medical care. Taught with ECON 432V with differentiated assignments for graduate students.

**ECON 596 - Independent Study (3)**

Individual study program. Each offering will cover a subtitle. Maximum of 3 credits in a semester and 6 credits in a program. Consent of instructor required.

**EDLT - EDUCATIONAL LEARNING TECHNOLOGIES**

**EDLT 520 - Multimedia, Authoring and Curriculum Design (3)**

Explore, evaluate and use a variety of multimedia authoring tools including website, video, audio, image editing and apps (iOS/Android) for educational applications. Pre/Corequisite(s): EDUC 518 or consent of instructor.

**EDLT 522 - Technology and Language Learning (3)**

Use of technology to enhance second language and dual language programs. Organized around technology enhanced communicative and interactive language learning environments. Corequisite: EDUC 587 or consent of instructor.

**EDLT 528 - Designing Educational Resources for the Internet (3)**

This course covers how to access, use, design, and evaluate instructional resources on the Internet, for blended and online learning environments. Pre/Corequisite(s): EDUC 518 or consent of instructor.

**EDLT 529 - Developing and Managing Educational Networks (3)**

For educators who plan to manage technology resources in schools. Focus on operating systems, network capabilities and management, connections and transfer of files between different computer platforms and managing peripheral devices. Prerequisite(s)/ Corequisite(s): EDUC 518 or consent of instructor.

**EDLT 560 - Fostering Online Learning Communities (3)**

Examines theoretical and practical aspects of communication and collaboration and their impact on the formation of online learning communities for those teaching adults in higher education, business, or government settings.

**EDLT 561 - Social Media in Blended and Online Learning Environments (3)**

This course will explore the role of social media in online and blended learning environments through practical hands-on activities, critical dialogue, and collaborative projects which will prepare you to utilize social media personally and pedagogically.

**EDLT 570 - Advanced Instructional Strategies (3)**

Applies instructional strategy development supported by technology for classroom curriculum. Prerequisite(s): EDUC 518. Restricted to: Main campus only.

**EDLT 573 - Technology and Critical Thinking (3)**

Use of inquiry and problem-based learning supported by computer-based applications. Critical analysis of multiple forms of electronic media. Prerequisite(s)/Corequisite(s): EDUC 518 or consent of instructor.

**EDLT 574 - Technology Planning and Grant Writing (3)**

Application of principles of curriculum development to the integration of technology to improve educational programs. How to develop technology plans, assess current uses of technology, write grants to acquire technology, improve the management of existing and future learning resources, and develop staff development strategies in technology.

**EDLT 575 - Designing and Organizing Online Learning Environments (3)**

Explores the theories, models, approaches, technologies, and methods of online teaching and adult learning. Provides a foundation for examining the roles and characteristics of the online teacher and learner for those teaching adults in higher education, business, or government settings.

**EDLT 578 - Design and Delivery of Webconferences and Webinars (3)**

This course provides hands-on experiences with web conferencing and examines the theory and research of web conferencing's impact on teaching and learning. Consent of Instructor required.

**EDLT 579 - Universal Design in Online Course Design (3)**

Examines theory, practical application of strategies, and global and policy implications of universal design (UD) in online learning environments. Consent of Instructor required. Prerequisite(s): CEL 570 with a "B" or higher.

**EDLT 580 - Tools and Techniques for Online Teaching (3)**

Examines the theoretical and practical implications of various asynchronous and synchronous tools and their impact on teaching and learning through research and hands-on experience.

**EDLT 592 - Directed Studies (3)**

Supervised academic work. Consent of Instructor required.

**EDLT 607 - Current Research in Learning and Technology (3)**

Explores models and methods for examining and researching the impact of technology on learning and education.

**EDLT 610 - Technology, Society, and Education (3)**

Same as EDUC 610.

**EDLT 612 - Advanced Fieldwork (3)**

Fieldwork in learning technologies provides opportunities to integrate theory and practice through research, teaching and/or development.

**EDLT 615 - Application of Computer Tools for Research (3)**

A seminar for doctoral students emphasizing research (data collection and data analysis) tools that use computer applications.

**EDLT 620 - Multimedia, Authoring and Curriculum Design (3)**

Explore, evaluate and use a variety of multimedia authoring tools including website, video, audio, image editing and apps (iOS/Android) for educational applications. Includes additional theoretical research component for doctoral students.

**EDLT 628 - Designing Educational Resources for the Internet (3)**

This course covers how to access, use, design, and evaluate instructional resources on the Internet, for blended and online learning environments. Includes a theoretical and research component for doctoral students.

**EDLT 633 - Praxis and Reflexivity (3)**

Same as BIL 633, ECED 633, EDUC 633, RDG, 633. Consent of Instructor required.

**EDLT 672 - Advanced Curriculum Development (3)**

Integration of technology into content areas. Prerequisite(s): EDUC 518. Restricted to: Main campus only.

**EDLT 673 - Literacy and Technology (3)**

Same as RDG 673, BIL 673.

**EDUC - EDUCATION****EDUC 450 - Methods of Teaching Early Childhood Education (3)**

Characteristics of the young child, play, guidance, communication, methods, materials, models, issues.

**EDUC 451 - Methods of Teaching Elementary School Science (3)**

Methods and materials for teaching elementary school science. Includes components of lessons and the use of multimedia. Prerequisites: 9 hours of science from biology, chemistry, physics, and earth sciences, with no more than 3 hours from any one department. Corequisites: ECED 450, EDUC 452, and RDG 360 (Block A courses). Same as EDUC 551 with differentiated assignments for graduate students.

**EDUC 452 - Methods of Teaching Elementary School Mathematics (3)**

Content, theories of cognition, and instructional approaches for the teaching of mathematics in the elementary grades. Prerequisite: MATH 111. Corequisites: ECED 450, EDUC 451, and RDG 360 (Block A courses). Same as EDUC 552 with differentiated assignments for graduate students.

**EDUC 453 - Methods of Teaching Elementary School Language Arts (3)**

Implications of language acquisition and development for instructional practices. Focus on student-centered response to literature, writing process, whole language learning, based on socio-psycholinguistic theory and research. Corequisites: RDG 361, EDUC 454, and EDUC 455 (Block B courses). Same as EDUC 553 with differentiated assignments for graduate students.

**EDUC 454 - Methods of Teaching Elementary School Social Studies (3)**

Focus on social studies curriculum and instruction including student-centered approaches, active learning, educational technology, nontextual curriculum, integration, multicultural education, authentic assessment, and practical applications. Corequisites: RDG 361, EDUC 453, and EDUC 455 (Block B courses). Same as EDUC 554 with differentiated assignments for graduate students.

**EDUC 460 - Teaching Language Arts at the Middle and High School Level (3)**

Implications of cognition and language development for appropriate secondary instructional practices. Focus on construction of meaning, student-centered response to literature, writing process, print and oral language development, based on socio-psycholinguistic research and theory. Practicum required. Same as EDUC 560.

**EDUC 461 - Teaching Social Studies at the Middle and High School Level (3)**

Integrating content knowledge and pedagogy for the middle and high school teacher in social studies. The focus will be on a variety of instructional strategies and pedagogical skills that will enhance the learning of social studies. Practicum required. Same as EDUC 561.

**EDUC 462 - Teaching Mathematics at the Middle and High School Level (3)**

Integrating content knowledge and pedagogy for the middle and high school teacher in mathematics. The focus will be on a variety of instructional strategies and pedagogical skills that will enhance the learning of mathematics. Practicum required. Same as EDUC 562.

**EDUC 463 - Teaching Science at the Middle and High School Level (3)**

Integrating content knowledge and pedagogy for the middle and high school teacher in science. The focus will be on a variety of instructional strategies and pedagogical skills that will enhance the learning of science for students in grades 6-12. Practicum required. Same as EDUC 563.

**EDUC 464 - Teaching Foreign Language at the Middle and High School Level (3)**

Integrating content knowledge and pedagogy for the middle and high school teacher in foreign language. The focus will be on a variety of instructional strategies and pedagogical skills that will enhance the learning of foreign language for students in grades 6-12. Practicum required. Same as EDUC 564.

**EDUC 467 - Teaching Business Education at the Middle and High School Level (3)**

Integrating content knowledge and pedagogy for the middle and high school teacher in business education. The focus will be on a variety of instructional strategies and pedagogical skills that will enhance the learning of business education for students in grades 6-12. Practicum required. Same as EDUC 567.

**EDUC 470 - Elementary Student Teaching (9)**

Synthesis of knowledge and skills appropriate to teaching in elementary schools. Graded S/U.

**EDUC 471 - Secondary Student Teaching (9)**

Synthesis of knowledge and skills appropriate to teaching in secondary schools. Graded S/U.

**EDUC 475 - Contemporary Issues in Education (3)**

Discussion of contemporary issues including: classroom management, motivation, conferences, professional organizations, professional ethics, community influences, cultural pluralism, reform movements, instructional influences, and educational technology. Requires field experience component in a school or community setting. Same as EDUC 575.

**EDUC 480 - International Student Teaching Seminar (1)**

Preparation for students planning to teach in an international setting. Prerequisite: Must be scheduled one semester before graduation.

**EDUC 481 - Elementary Student Teaching Seminar (3)**

Discussion of elementary school issues related to student teaching. Taken concurrently with EDUC 470. Graded S/U.

**EDUC 482 - Middle and High School Student Teaching Seminar (3)**

Discussion of secondary school issues related to student teaching. Taken concurrently with EDUC 471. Graded S/U.

**EDUC 483 - Second Language Acquisition (3)**

Exploring affective, cultural, linguistic, cognitive factors that influence the second-language-acquisition process with application to classroom practice. Same as EDUC 583.

**EDUC 487 - Methods of TESOL (3)**

Effective second language teaching approaches that provide for interactive learning situations, meaningful input language models, varied language use materials, adaptive teacher response strategies, and assessments of student processing needs.

**EDUC 489 - Topics (1-3)**

- Offered under various subtitles which indicate the subject matter to be covered. A maximum of 3 credits in any one semester and a grand total of 3 credits.
- EDUC 495 - Directed Study Courses in Education (1-3)**  
Each course shall be identified by a qualifying subtitle. Maximum of 3 credits in any one semester and a grand total of 6 credits.
- EDUC 501 - Special Topics (1-3)**  
Course subtitled in the Schedule of Classes. A maximum of 3 credits per semester and a total of 6 credits overall.
- EDUC 502 - Special Problems (1-3)**  
Course subtitled in the Schedule of Classes. A maximum of 3 credits per semester and a total of 6 credits overall.
- EDUC 504 - Adult and Family Literacy in TESOL (3)**  
An exploration of the theoretical, programmatic, and curricular frameworks for English language learners and their families. Focus on the development of culturally responsive and pedagogically sound literacy programs. Same as RDG 504.
- EDUC 505 - Classroom Management (3)**  
Strategies for managing classroom settings and determining appropriate modification of instructional approaches to meet changing classroom situations.
- EDUC 506 - Adult and Family Literacy (3)**  
Principles, practices, and instructional materials for adult and family literacy. Same as RDG 510.
- EDUC 509 - Teaching Methods Laboratory (3)**  
Practical application of previously learned content. Prerequisites: bachelor's degree and admission to the Graduate School and departmental special program. Elementary or secondary. Graded S/U.
- EDUC 510 - Internship/Student Teaching (6)**  
Integrated with EDUC 509. Student is assigned to an elementary or secondary classroom for 14-16 weeks. Elementary or secondary. Prerequisite: EDUC 509. Graded S/U.
- EDUC 512 - Equity Education for Mathematics Teachers (3)**  
This course is designed to increase teacher awareness and ability to address diverse students' learning needs leading to success in mathematics. Prerequisites: Have access to teach in a mathematics classroom with a diverse student population. Same as EDUC 615.
- EDUC 515 - Multicultural Education (3)**  
Conceptual manifestations of culture, race, and ethnicity, class, gender, exceptionalities, language and bilingualism within the schooling process. Same as EDUC 315 with differentiated assignments for graduate students.
- EDUC 516 - Curriculum and Pedagogy I (3)**  
Introduction, reconstruction, and other connections among historical, philosophical, sociocultural, psychological, and theoretical foundations of curriculum and pedagogy and their application to culturally and linguistically diverse teaching and learning settings.
- EDUC 518 - Technology and Pedagogy (3)**  
Critical analysis, design, and evaluation of computer-based technologies in teaching and learning for diverse communities.
- EDUC 519 - Research in Curriculum and Pedagogy (3)**  
An introduction to qualitative and quantitative designs for research in curriculum and instruction, with emphasis on action research.
- EDUC 520 - Action Research Projects (3)**  
Deeper explorations and connections among foundations of curriculum and pedagogy and their application to culturally and linguistically diverse teaching and learning settings through action research projects, approaches to assessment, and agency. Prerequisite(s): EDUC 515, 516, 518, 519.
- EDUC 530 - Exploration in Education (3)**  
Overview of elementary and secondary schooling. Includes opportunities to gain teaching experience in diverse settings.
- EDUC 536 - Special Studies: Bilingual Education, Curriculum and Instruction, Early Childhood Education, or Read (3)**  
Each study will be designated by a qualifying subtitle.
- EDUC 537 - Independent Readings (1-3)**  
Each project will be designated by a qualifying subtitle.
- EDUC 550 - Methods of Teaching Early Childhood Education (3)**  
Characteristics of the young child, play, guidance, communication, methods, materials, models, issues. Same as EDUC 450 with differentiated assignments for graduate students.
- EDUC 551 - Methods of Teaching Elementary School Science (3)**  
Methods and materials for teaching elementary school science. Includes components of lessons, planning and teaching lessons in schools, and multimedia. Prerequisites: 9 hours of science from biology, chemistry, physics, and earth science with no more than 3 hours from any one department. Corequisites: ECED 550, EDUC 552, and RDG 560 (block A course). Same as EDUC 451 with differentiated assignments for graduate students.
- EDUC 552 - Methods of Teaching Elementary School Mathematics (3)**  
Content, theories of cognition, and instructional approaches for the teaching of mathematics in the elementary grades. Prerequisite: MATH 111. Corequisites: ECED 550, EDUC 551, and RDG 560 (block A course). Same as EDUC 452 with differentiated assignments for graduate students.
- EDUC 553 - Methods of Teaching Elementary School Language Arts (3)**  
Implications of language acquisition and development for instructional practices. Focus on student-centered response to literature, writing process, whole language learning, based on socio-psycholinguistic theory and research. Corequisites: EDUC 554, EDUC 555, and RDG 561 (block B course). Same as EDUC 453 with differentiated assignments for graduate students.
- EDUC 554 - Methods of Teaching Elementary School Social Studies (3)**  
Focus on social studies curriculum and instruction including student-centered approaches, active learning, educational technology, nontextual curriculum, integration, multicultural education, authentic assessment, and practical applications. Corequisites: EDUC 553, EDUC 555, and RDG 561 (block B course). Same as EDUC 454 with differentiated assignments for graduate students.
- EDUC 557 - Science and Math Methods: Internship (3)**  
Elementary alternative licensure process course designed to introduce intern licensed teachers to methods of instruction for mathematics and science. University supervision provided simultaneously with EDUC 557. Restricted to CI and HSS non-degree students.
- EDUC 558 - Social Studies/Language Arts Methods Internship (3)**  
Elementary alternative licensure process course designed to introduce intern licensed teachers to methods of instruction of social studies and language arts. University supervision provided simultaneously with EDUC 558. Restricted to CI and HSS non-degree students.
- EDUC 560 - Teaching Language Arts at the Middle and High School Level (3)**  
Implications of cognition and language development for appropriate secondary instructional practices. Focus on construction of meaning, student-centered response to literature, writing process, print and oral language development, based on socio-psycholinguistic research and theory. Practicum required. Same as EDUC 460 with differentiated assignments for graduate students. Prerequisite(s): TEP required EDUC 515, EDUC 530.
- EDUC 561 - Teaching Social Studies at the Middle and High School Level (3)**  
Integrating content knowledge and pedagogy for the middle and high school teacher in social studies. The focus will be on a variety of instructional strategies and pedagogical skills that will enhance the learning of social studies for student in grades 6-12. Practicum required. Same as EDUC 461 with differentiated assignments for graduate students. Prerequisite(s): TEP required EDUC 515, EDUC 530.
- EDUC 562 - Teaching Mathematics at the Middle and High School Level (3)**  
Integrating content knowledge and pedagogy for the middle and high school teacher in mathematics. The focus will be on a variety of instructional strategies and pedagogical skills that will enhance the learning of students in 6-12 setting settings for mathematics. Same as 462 with differentiated assignments for graduate students. Prerequisite(s): TEP required EDUC 515, EDUC 530.
- EDUC 563 - Teaching Science at the Middle and High School Level (3)**  
Integrating content knowledge and pedagogy for the middle and high school teacher in science. The focus will be on a variety of instructional strategies and pedagogical skills that will enhance the learning of science for student in grades 6-12. Practicum required. Same as EDUC 463 with differentiated assignments for graduate students. Prerequisite(s): TEP required EDUC 515, EDUC 530.
- EDUC 564 - Teaching Foreign Language and the Middle and High School Level (3)**  
Integrating content knowledge and pedagogy for the middle and high school teacher in foreign language. The focus will be on a variety of instructional strategies and pedagogical skills that will enhance the learning of foreign language for student in grades 6-12. Practicum required. Same as EDUC 464

- with differentiated assignments for graduate students. Prerequisite(s): TEP required EDUC 515 EDUC 530.
- EDUC 567 - Teaching Business Education at the Middle and High School Level (3)**  
Integrating content knowledge and pedagogy for the middle and high school teacher in business education. The focus will be on a variety of instructional strategies and pedagogical skills that will enhance the learning of business education for student in grades 6-12. Practicum required. Same as EDUC 467 with differentiated assignments for graduate students. Prerequisite(s): TEP required EDUC 515 EDUC 530.
- EDUC 570 - Classroom Research I (3)**  
Introduction to action research techniques for classroom teachers. For interns only.
- EDUC 575 - Contemporary Issues in Education (3)**  
Discussion of contemporary issues including: classroom management, motivation, conferences, professional organizations, professional ethics, community influences, cultural pluralism, reform movements, instructional influences, and educational technology. The class will require a field experience component in a school or community setting. Taught with EDUC 475 with differentiated assignments for graduate students.
- EDUC 576 - Qualitative Research (3)**  
Introduction to qualitative research methodologies from problem formulation to interpretation of results.
- EDUC 583 - Second Language Acquisition (3)**  
Exploring affective, cultural, linguistic, cognitive factors that influence the second-language-acquisition process with application to classroom practice. Appropriate for public school and adult educators. Same as EDUC 483.
- EDUC 587 - Pedagogy of TESOL (3)**  
Overview of approaches that provide for interactive, culturally responsive pedagogy for students acquiring English. Emphasis on development of ESL literacy. Appropriate for public school and adult educators. Same as RDG 587.
- EDUC 590 - TESOL Practicum (3)**  
Classroom applications of ESL literacy development through supervised teaching experiences accompanied by a seminar. Same as RDG 590.
- EDUC 595 - Directed Study Courses in Education (1-3)**  
Each course will be identified by a qualifying subtitle. Maximum of 3 credits in any one semester and a total of 6 credits overall.
- EDUC 598 - Special Research Programs (1-3)**  
Individual investigations either analytical or experimental. Maximum of 3 credits per semester and a total of 6 credits overall.
- EDUC 599 - Master's Thesis (0-15)**  
Thesis.
- EDUC 600 - Doctoral Research (1-15)**  
Research.
- EDUC 601 - Contemporary Curriculum/Instruction Practices (1-3)**  
Course subtitled in the Schedule of Classes. A maximum of 3 credits per semester and a total of 6 credits overall.
- EDUC 602 - Internship in Curriculum and Instruction (3-6)**  
For those pursuing an advanced graduate degree to meet the requirement for field work. Each course to bear an appropriate subtitle.
- EDUC 603 - Curriculum for a Diverse Society (3)**  
Builds upon knowledge of the foundations of curriculum and professional experience in an educational setting. Focus on the role of the curriculum leader in understanding curriculum theory, designing curriculum, and implementing curriculum in various settings.
- EDUC 604 - Pedagogy of Learning in a Diverse Society (3)**  
Builds upon knowledge of the foundations of instruction and professional experience in teaching and learning. Focus on diverse theories of instruction with relevant practices in pluralistic settings and multicultural interactions of teaching and learning.
- EDUC 605 - Independent Study Topics (1-3)**  
A problem and seminar course for those pursuing an advanced graduate degree. Course subtitled in the Schedule of Classes. Prerequisite: EDUC 535.
- EDUC 606 - In-depth Interviewing: A Qualitative Research Method (3)**  
Use of pilot research project to introduce students to in-depth interviewing techniques.
- EDUC 607 - Current Research in Educational Practice (3)**  
A seminar for doctoral and education specialist students emphasizing current research and educational practices. Same as BIL 607, ECED 607, RDG 607, and SPED 607.
- EDUC 608 - Issues in Multicultural Curriculum and Instruction and Teacher Education (3)**  
Builds upon multicultural theories and practices of teacher education. Restricted to doctoral-level students of any major.
- EDUC 610 - Technology, Society, and Education (3)**  
Investigates models of the change process, examines speculations related to the directions and dynamics of change in an era of electronic technologies, explores shifts in the cultural and personal activities and relations of humans, and speculates on concomitant educational implications. Same as EDLT 610.
- EDUC 613 - Evaluation of Quantitative Research in Education (3)**  
A doctoral-level exploration of a broad range of quantitative research designs and methodologies for collection and analysis of data as applied to critical review of the literature. Prerequisite: EDUC 513 or the equivalent.
- EDUC 614 - Schooling for a Democratic Society (3)**  
Examines the foundations of the U.S. public school with special attention to the struggle for equity and access in education. Restricted to doctoral-level students of any major.
- EDUC 623 - Curricular Mediation for Democratic Communities (3)**  
Problematicization of the various relationships, roles, and leadership considerations which emerge within educational institutions, their structures, and their culturally democratic practices in the classroom, community, and society. Restricted to doctoral-level students of any major. Same as BIL 623, ECED 623.
- EDUC 630 - Critical Race Theory & Storytelling in Educational Spaces (3)**  
An upper-level doctoral course focusing on the philosophical, theoretical, and methodological origins and practices of CRT and the sister frameworks that emerged from CRT, i.e., AsianCrit, BlackCrit, FemCrit, LatCrit, QueerCrit, TribalCrit, and WhiteCrit within educational spaces.
- EDUC 632 - Multicultural Education Curricular and Pedagogical Trends (3)**  
Study and critique of historical constructs, philosophical considerations, paradigm orientations, theories, and pedagogical practices foundational to multi-perspective understanding of multicultural education. Restricted to doctoral-level students of any major.
- EDUC 633 - Praxis and Reflexivity (3)**  
Same as BIL 633, ECED 633, EDLT 633, RDG 633.
- EDUC 634 - Research as Praxis (3)**  
Alternative community-or-school-based research aimed at investigating and transforming educational realities, with the participants for their own benefit. Students will experience the dynamic between research theory and practice in education. Prerequisite(s): EDUC 576 and 613. Crosslisted with: BIL 634, EDLT 634 and RDG 634
- EDUC 635 - Critical Theory and Pedagogy (3)**  
Covers the various schools of thought on pedagogy, the historical and philosophical foundations embedded in these schools, and their impact on educational settings. Restricted to doctoral-level students of any major. Same as BIL 635.
- EDUC 637 - Social Justice Issues in Education (3)**  
Covers the systems of oppression located within the constructs of power and hegemony and their impact on schooling. Restricted to doctoral-level students of any major. Same as BIL 637.
- EDUC 685 - Practicum (2-6)**  
Provision for field inquiries and experiences designed to prepare the doctoral student for assuming responsibilities in the areas of curriculum and instruction. Prerequisite: post-master standing.
- EDUC 694 - Dissertation Seminar: Qualitative Research Designs (1-6)**  
Dissertation seminar course for doctoral students utilizing a qualitative research design. Prerequisite: consent of instructor. Restricted to College of Education students.
- EDUC 698 - Selected Topics (1-6)**  
Offered under various subtitles which indicate the subject matter to be covered. A maximum of 6 credits per semester and a total of 6 credits overall.
- EDUC 699 - Ed.S. Thesis (1-15)**  
Offered primarily for those pursuing the research requirements for the Ed.S. degree. Course may be repeated up to a maximum allowed for this degree. Each research project will be designated by a qualifying subtitle.

EDUC 700 - Doctoral Dissertation (0-15)  
Dissertation.

## EMD - EDUCATIONAL MANAGEMENT AND DEVELOPMENT

EMD 450 - Principles of Education Law and Policy (3)

Overview of the use of law and policy in schools and higher education. Restricted to: EMD majors.

EMD 455 - Principles of Education Budgeting and Finance (3)

Analysis of budget and finance practices in education. Restricted to: EMD majors.

EMD 502 - Special Problems. (1-3)

Offered under various subtitles which indicate the subject matter covered. May be taken for a maximum of 3 credits per semester and a total of 6 credits overall.

EMD 511 - Foundation for School Library Specialists (3)

Elements of librarianship. Introduction to the history, purpose, and role of the school library. Overview of current issues and legislation affecting school libraries. Same as EMD 411.

EMD 512 - Administration of the School Library (3)

Principles and practices related to the function, structure, and management of school libraries. Same as EMD 412.

EMD 513 - Curriculum Role of the School Library Specialist (3)

Introduction to the integration of curriculum in school library programs. Current trends in collaborative planning and teaching between school librarians and teachers. Same as EMD 413.

EMD 514 - Collection Management and Development in School Libraries (3)

Principles of identifying, selecting, acquiring, managing, and evaluating information for school libraries. Same as EMD 414.

EMD 530 - Management of Educational Change (3)

Leadership in implementing innovations in education.

EMD 531 - Special Education Administration (3)

Competencies for the administration of special education programs with an emphasis upon New Mexico public school standards.

EMD 532 - Human Relations in Educational Administration (3)

Administrative skills necessary to promote quality relationships among staff, students, and parents; also skills needed to open communication and work with various individuals and groups in educational settings.

EMD 540 - Management of Student Services in Higher Education (3)

History and overview of student services (e.g., admissions, counseling, registration, financial aid, housing, food services, student organizations) and a review of management components used in student services.

EMD 550 - Higher Education Law (3)

This course is designed to review the impact of the legal process and the judiciary on higher education.

EMD 555 - Higher Education Finance and Funding (3)

This course examines the impact and process of financing and funding higher education.

EMD 563 - Higher Education Administration (3)

This course provides an overview of higher education in the United States including history, mission, and governance, in the context of organizational theory.

EMD 564 - Internship Public Schools Part I (3)

First half of a practical internship in Pk-12 schools under supervision of school administrator. Prerequisites: 18 cr. of EMD coursework, 3 years of Pk-12 teaching experience and consent of instructor. Restricted to majors.

EMD 565 - Internship: Public Schools Part II (3)

Second half of a practical internship in Pk-12 administrative setting under supervision of experienced higher education administrator. Consent of instructor required. Prerequisite(s): EMD 564. Restricted to EMD majors.

EMD 566 - Internship: Higher Education Part I (3)

First half of practical internship in administrative setting under supervision of experienced higher education administrator. Prerequisites: 15 credits of EMD and consent of instructor. Restricted to majors.

EMD 567 - Internship: Higher Education Part II (3)

Second half of a practical internship in an administrative setting under supervision of an experienced higher education administrator. Consent of instructor required. Prerequisite(s): EMD 566.

EMD 568 - Topics in School Administration (1-3)

Designated by subtitle.

EMD 569 - Basing Decision on Data: Higher Education. (3)

Analysis of accountability data and other evidence to support educational decision making. Disaggregating and interpreting assessment data to guide improvement of instruction. Moving from evidence to plans for action.

EMD 570 - Educational Leadership, Supervision, and Evaluation (3)

Leadership, supervision, and evaluation in Pk-12 and post secondary education.

EMD 572 - History and Philosophy of Education (3)

An overview of the historical development of the American school system and the relation of various philosophies to American education.

EMD 575 - The Principalship (3)

Key issues surrounding the role of school-site leaders.

EMD 576 - Educational Financial Management (3)

Educational finance and business applications.

EMD 578 - Leadership and Administration of Bilingual Education (3)

Concepts and practical approaches to improving the education of English languages learners through higher education. Restricted to majors.

EMD 579 - Public School Law (3)

Legal processes of education, major court decisions, and the legislative process will be studied.

EMD 580 - Administration of Adult and Continuing Education (3)

Administration of programs in public schools, higher education, community and nontraditional educational settings.

EMD 581 - Design, Development, and Administration of Distance Education Programs (3)

Quality distance education programs require skills in new policy development, program administration, and faculty training to reconfigure existing courses for delivery via voice, video, and data.

EMD 582 - Community College Administration (3)

An overview of the history, role, objectives and patterns governing the effectiveness of the community college.

EMD 585 - Elements of Research (3)

Survey and analysis of research methods and designs focusing on sound educational research and its presentation.

EMD 586 - Multicultural Leadership in Education (3)

Examine cultural diversity and how appropriate understanding, leadership and instructional strategies can be used to reach all learners. Enhances understanding of what it means to be an educator in culturally diverse contexts. Restricted to majors.

EMD 587 - Educational Politics and Community Relations (3)

Politics, policies, and community relations impacting Pk-12 and postsecondary education.

EMD 589 - Evaluation Design in Education (3)

This course focuses on evaluation and accountability models; application to educational programs.

EMD 590 - Basing Decision on Data: Pk-12 (3)

Analysis of accountability data and other evidence to support educational decision making. Disaggregating and interpreting assessment data to guide improvement of instruction. Moving from evidence to plans for action. Prerequisite: EMD 569.

EMD 595 - Current Topics (1-6)

Offered under various subtitles which indicate the subject matter covered. May be taken for a maximum of 6 credits.

EMD 598 - Independent Studies (1-3)

Individual investigation in special topic areas. Requires prior approval of project advisor.

EMD 599 - Master's Thesis (0-15)

Thesis.

EMD 600 - Doctoral Research (1-15)

Research. S/U to traditional grade options.

**EMD 620 - Doctoral Seminar (1-3)**

A study of current issues in educational administration at the national, state, and local levels.

**EMD 622 - Quantitative Research I (3)**

Explores quantitative research methods, the rationale and assumptions that guide statistical decisions, beginning level statistical analyses, and how all of these are applied in the field of educational leadership. Consent of Instructor required. Prerequisite(s): Consent of instructor. Restricted to: E AD majors.

**EMD 623 - Qualitative Research I (3)**

Explores qualitative research methods and models and their application in the field of educational leadership. Prerequisite: consent of instructor. Restricted to majors.

**EMD 630 - Concepts of Leadership in Education (3)**

Survey of concepts of leadership in general and educational leadership in particular. Consideration of implications for practice. Restricted to majors.

**EMD 640 - Management of Student Services in Higher Education (3)**

History and overview of student services (e.g., admissions, counseling, registration, financial aid, housing, food services, student organizations) and a review of management components used in student services. Restricted to Doctoral EMD majors.

**EMD 650 - Higher Education Law (3)**

This advanced course is designed to review the impact of the judiciary on higher education. The legal standing of institutions of higher education on issues of staff rights, student rights, and tort liability will be addressed. In addition, the impact of local ordinances, state and federal laws and regulations will be examined. This course is restricted to doctoral students.

**EMD 655 - Higher Education Finance and Funding (3)**

This advanced course examines the impact and process of financing and funding higher education. The course is an examination of higher education finance as it relates to operational budgets, capital budgets, and policy issues which impact the financing of higher education. This course is restricted to doctoral students.

**EMD 660 - Educational Leadership, Supervision and Evaluation (3)**

This advanced course will cover leadership, supervision, and evaluation in PK-12 and post secondary education. This course is restricted to doctoral students.

**EMD 665 - Higher Education Administration (3)**

This is an advanced course that provides an overview of higher education in the United States including history, mission, and governance in the context of organizational theory. This course is restricted to doctoral students.

**EMD 670 - Advanced Internship (1-6)**

For those pursuing an advanced degree to meet the field work requirement. To bear an appropriate subtitle. Graded S/U.

**EMD 671 - Foundations of Educational Administration (3)**

Advanced course about the political, economic, and social forces on policy making and governance of PK-12 and postsecondary education. Restricted to Doctoral EMD majors.

**EMD 672 - Community College Administration (3)**

This advanced course will provide an overview of the history, role, objectives, and patterns governing the effectiveness of the community college. This course is restricted to doctoral students.

**EMD 675 - The Principalship (3)**

This advanced course will address key issues surrounding the role of school-site leaders. This course is restricted to doctoral students.

**EMD 676 - Educational Financial Management (3)**

This advanced course offers an overview of economic and financial concerns relating to the public school system of the United States. This course is restricted to doctoral students.

**EMD 679 - Public School Law (3)**

Advanced course in which the legal processes of education, major court decisions, and the legislative process will be studied. This course is restricted to doctoral students.

**EMD 682 - Quantitative Research II (3)**

Intermediate quantitative methods of research, statistical analyses, and their application in the field of educational leadership. Consent of Instructor

required. Prerequisite(s): EMD 622 and consent of instructor. Restricted to Doctoral students only.

**EMD 683 - Qualitative Research II (3)**

Advanced qualitative methods of research and implementation in the field of educational leadership. Prerequisite: EMD 623 and consent of instructor. Restricted to majors.

**EMD 685 - Elements of Research (3)**

Advanced survey and analysis of research methods and designs focusing on sound educational research and its presentation. This course is restricted to doctoral students.

**EMD 689 - Evaluation Design in Education (3)**

Advanced course that focuses on evaluation and accountability models; application to educational programs. This course is restricted to doctoral students.

**EMD 693 - Dissertation Seminar (3)**

Same as BIL, C EP, ECED, EDUC, RDG, SPED 693.

**EMD 698 - Selected Topics (1-6)**

Offered under various subtitles which indicate the subject matter covered. May be taken for a maximum of 6 credits per semester and a total of 6 credits overall.

**EMD 700 - Doctoral Dissertation (0-9)**

Dissertation. Minimum of 3 credits per regular semester. May be taken for a maximum of 36 credits. Consent of instructor required.

**ENGL - ENGLISH****ENGL 451 - Practicum in the Grammar of American English (3)**

Studies of formal grammar of the English language in preparation for the teaching of the English language and/or advanced linguistic analysis.

**ENGL 452 - History of the English Language (3)**

This course examines the history of the English language from its Indo-European origins through its development into an international language. The aim is to describe the English language formally and to trace linguistic change over time. Samples of written English will illustrate various stages in the development of English. Also considered are contemporary social and political issues related to language, including the problem of 'standard English' and the uses of language in advertising, the media, and politics.

**ENGL 453 - World Literatures (3)**

Study of one or more literary traditions exclusive of those originating in Europe and the United States. Readings will include texts in translation. Repeatable once under a different subtitle.

**ENGL 454 - Postcolonial Literature (3)**

Study of the transformations of literature and theory produced in the context of decolonization and its aftermath, from the twentieth century to the present. Some texts will be read in translation. Repeatable once under a different subtitle.

**ENGL 456 - Ethnic Studies in US Literature and Culture (3)**

Concentrates on comparative study of literary and cultural production by two or more U.S. ethnic populations. Incorporates both literary and sociocultural readings of texts. Repeatable under different subtitles.

**ENGL 457 - American Indian Literatures (3)**

Intensive study of selected topics and genres from American Indian Literatures, such as American Indian oral tradition, the Native American Trickster figure, the development of American Indian fiction, and contemporary American Indian literature. Repeatable once under a different subtitle.

**ENGL 458 - Latino/a Literature and Culture (3)**

Focuses on established and emergent Latino/a literary and cultural production. Incorporates both literary and sociocultural readings of texts. Repeatable once under a different subtitle.

**ENGL 459 - Black Literature and Culture in the United States (3)**

Focuses on established and emergent Black U.S. literary and cultural production. Incorporates both literary and sociocultural readings of texts. Repeatable once under a different subtitle.

**ENGL 460 - Proposal Writing (3)**

Developing proposals and grants in a workshop setting.

**ENGL 462 - Interdisciplinary, Client-Based Project Practicum (3)**

- Hands-on experience in designing projects within interdisciplinary teams for organizational clients. Taught with ENGL 562.
- ENGL 463 - Advanced Study in English Literature (3)**  
Covers selected works for a particular period of English literary history. Repeatable under different subtitles.
- ENGL 465 - Intercultural Professional Communication (3)**  
Examines rhetorical traditions in intercultural profession, technical, academic, and government contexts.
- ENGL 469 - Advanced Study in American Literature (3)**  
Covers selected works for a particular period of American literary history. Repeatable under different subtitles.
- ENGL 470 - Approaches to Composition (3)**  
Theory and practice of teaching writing. Discussion and application of classroom practices, definition of standards, and evaluation of student writing.
- ENGL 478 - Document Design (3)**  
Advanced study in writing, with an emphasis on the computer as a tool for designing visually informative text. Includes theory and research in document design and the use of page composition and graphics software.
- ENGL 479 - Computers and Writing (3)**  
Examines how computers change the nature of writing and the teaching of writing.
- ENGL 480 - Screenwriting II (3)**  
Students will write two short scripts, 10-15 pages each. Focus will be on learning how to take notes and rewrite. Script analysis will be in a workshop format. Scripts will be read and discussed, scenes performed and reactions analyzed to consider effect of dialog, character development, etc. Prerequisite(s): ENGL 309 or CMI 309 or THTR 306 or consent of instructor. Crosslisted with: CMI 480
- ENGL 481 - Women's Literature (3)**  
Intensive study of literature by women, in particular historical, aesthetic, cultural, or intellectual contexts. Repeatable under different subtitles. Crosslisted with: W S 484
- ENGL 482 - Gender and Popular Culture (3)**  
Intensive study of the representations of gender in popular culture. Examines the historical, aesthetic, and cultural contexts of these representation and the various critical and theoretical lenses we use to understand them. Repeatable under different subtitles. Crosslisted with: W S 482
- ENGL 483 - Gender and Language (3)**  
Overview of current and historical approaches to the critical study of gender and language: how gender theoretically manifests in linguistic, social, cultural, academic, and professional texts and contexts.
- ENGL 484 - Gender and Literature (3)**  
Intensive study, critical and theoretical, of intersections between literature and gender. Examines representations or constructions of gender in literary discourse, as well as the gendering of literary activity in different cultural contexts. Repeatable under different subtitles.
- ENGL 486 - Hollywood Film (3)**  
Intensive study of Hollywood film in its artistic, cultural, or historical contexts. Repeatable under different subtitles.
- ENGL 487 - Modernist and Experimental Film (3)**  
Explores the variety of film aesthetics that depart to some degree from the conventions of classical cinema. Focuses on how film form relates to modernist, postmodernist, experimental, and avant-garde tendencies in the arts. Special attention will be paid to the implications of radical formal experimentation for cultural politics, in particular in the context of modern and contemporary history. Repeatable once under a different subtitle.
- ENGL 488 - Film and Literature (3)**  
Intensive study of literary and film texts in particular historical, generic, or cultural contexts, such as Film Adaptation, Religion in Literature and Film, or The American West in Fiction and Film. Repeatable under different subtitles.
- ENGL 489 - Cultural Studies: Literature and Theory (3)**  
Examines the theory and practice of cultural studies in relation to the variety of discourse describable as literary, including autobiography, avant-garde writing, nonfiction prose, the essay, online writing, folklore, and popular genre fiction (such as mystery, romance, thriller, or horror). Repeatable once under a different subtitle.
- ENGL 491 - Advanced Screenwriting (3)**  
Students will prepare a 30-60 page screenplay. Script analysis will be in an advanced workshop format. Scripts will be read and discussed, scenes performed and reactions analyzed to consider effect of dialogue, character development, etc. This course is aimed at preparing writers for the professional market. Consent of instructor required. Crosslisted with: CMI 490
- ENGL 492 - Old English (3)**  
An introduction to the language, literature, and culture of Anglo-Saxon England, including Beowulf.
- ENGL 493 - Middle English Textual Cultures (3)**  
Intensive study of cultures of reading, writing, and literary production in late-medieval England, situating Middle English literature in its manuscript contexts. No prior experience with Middle English required.
- ENGL 494 - Shakespeare for Educators (3)**  
In-depth study of selected plays by Shakespeare designed for present and future teachers of literature. Dual emphases on increasing knowledge of Shakespeare's plays in context and on developing effective strategies for teaching them.
- ENGL 497 - Internship (3-6)**  
Supervised technical and professional communication internship in business, industry, government, or the university. Repeatable for a total of 6 credits. Consent of instructor required.
- ENGL 500 - Supervised Study (1-3)**  
To prepare the student for the master's degree examinations by special studies in fields not covered in routine course work. Prerequisite: consent of instructor.
- ENGL 501 - Online Publishing (3)**  
This three-credit course provides a theoretical background for online publishing and design as well as hands-on experience publishing an online arts magazine. Taught with ENGL 430.
- ENGL 505 - Graduate Study in Chaucer (3)**  
Principal works, with emphasis on the Canterbury Tales. Requirements include independent directed research. Prerequisite: ENGL 261 or consent of instructor.
- ENGL 506 - Early Modern Poetry and Prose (3)**  
Survey of the major authors, genres, and themes of non-dramatic English Literature from 1500 to 1700. Emphasis on how writers of the period invented new literary forms and adapted existing ones to convey their experience of a changing world.
- ENGL 508 - Graduate Study in Shakespeare I (3)**  
Principal plays of Shakespeare's first two periods. Requirements include independent directed research.
- ENGL 509 - Graduate Study in Shakespeare II (3)**  
Principal plays of Shakespeare's last two periods. Requirements include independent directed research.
- ENGL 510 - Proseminar in Rhetoric and Professional Communication (3)**  
Introduction to research in rhetoric and professional communication. Taught with ENGL 610.
- ENGL 511 - Discourse and Theories (3)**  
Investigates theories describing how humans use language and considers production, reception, and cultural context. Topics vary. Repeatable for a maximum of 6 credits.
- ENGL 512 - Graduate Study in Writing in the Workplace (3)**  
Study of workplace writing practices, including a focus on research-based, theoretical, and pedagogical approaches to professional communication.
- ENGL 513 - Creative Writing Workshop: Fiction (3)**  
Advanced creative writing prose workshop. Imaginative writing, chiefly the narrative. Graduate level workshop for students who are not in the English Department MFA program. May be repeated for a maximum of 12 credits. Taught with ENGL 413 with additional work required at the graduate level.
- ENGL 514 - Creative Writing Workshop: Poetry (3)**  
Creative writing poetry workshop for advanced writers of poetry. Graduate level works for students who are not in the English Department MFA program. Repeatable for a maximum of 12 credits. Taught with ENGL 414 with additional work required at the graduate level.
- ENGL 515 - Creative Writing Workshop: Playwriting (3)**  
Advanced creative writing workshop in playwriting. Repeatable for up to 12 credits. Taught with ENGL 415.



**ENGL 516 - Graduate Study in Approaches to Literature (3)**

Understanding, appreciation, techniques of instruction in the high school. Requirements include independent directed research. Prerequisite: at least 6 credits in upper-division English courses.

**ENGL 517 - Graduate Study in Critical Theory (3)**

Advanced study of one or more major trends in theoretical inquiry within English studies. Some prior study of theory, such as English 301, 302, or 303, strongly recommended. Repeatable under different subtitles.

**ENGL 518 - History of Rhetoric (3)**

An investigation of the crucial writings that have shaped Western attitudes towards and practice of rhetoric. Course will examine key texts from the Greeks through the Enlightenment, especially as they have influenced contemporary rhetorical theory.

**ENGL 519 - Graduate Study in Modern Rhetorical Theory (3)**

Major figures in rhetorical theory, with particular emphasis on developments in rhetorical theory in the 20th century. Students will be responsible for all requirements of ENGL 419 and will in addition undertake independent directed research.

**ENGL 520 - Workshop: Advanced Composition (3)**

Intensive work in composition in a workshop setting.

**ENGL 521 - Graduate Study in a Literary Period or Movement (3)**

Close study of a topic in a particular literary period or movement. Requirements include independent directed research. Repeatable under different subtitles.

**ENGL 522 - Graduate Study in a Literary Form or Genre (3)**

Close study of a topic in a particular literary form or genre. Requirements include independent directed research. Repeatable under different subtitles.

**ENGL 523 - Graduate Study of a Major Author (3)**

Close study of selected works of a major author. Requirements include independent directed research. Repeatable under different subtitles.

**ENGL 524 - Graduate Study in a Major Text (3)**

Close study of a major text. Requirements include independent directed research. Repeatable under different subtitles.

**ENGL 525 - Graduate Study in Comparative Literature (3)**

Close study of a selection of non-English literary works read in translation. English-language works from a similar literary period or genre may also be read. Requirements include independent directed research. Prerequisite: graduate standing or consent of instructor. Repeatable under different subtitles.

**ENGL 526 - Special Topics in Critical Theory (3)**

Study of a specific historical or theoretical topic, trend, or movement in Critical Theory. Repeatable under different subtitles.

**ENGL 527 - Graduate Study in Film and Digital Media (3)**

Offers close graduate study of a form or genre, a major figure or style, a historical period or movement, or a major theme or text. Topics vary from semester to semester.

**ENGL 528 - Drama from the Renaissance to the Restoration (3)**

Survey of the major authors, genres, and themes of sixteenth- and seventeenth-century drama in England, with particular emphasis on Renaissance revenge tragedy, marriage comedy, and city comedy, and on Restoration comedy of manners.

**ENGL 529 - British Romanticism (3)**

Intensive study of major writers and critical topics from the Romantic period. Repeatable under different subtitles.

**ENGL 530 - Argument Theory and Practice (3)**

Examining theories of argument and how language convinces audiences to think and act in certain ways and not in others. Investigates argument across disciplines and in social/political contexts.

**ENGL 531 - Technical Editing (3)**

Uses workshops, readings, hands-on projects, and discussion to improve skills in gathering, writing, designing, and editing technical information. For students interested in technical communication as well as students interested in developing strengths in communicating in scientific and technical fields.

**ENGL 532 - Gothic Literature (3)**

Intensive study of gothic literature in particular historical, aesthetic, cultural, or intellectual contexts, such as American Gothic, Female Gothic, Dark Romanticism, or Vampire Literature. Repeatable under different subtitles.

**ENGL 533 - Victorian Literature (3)**

Intensive study of major writers and critical topics from the Victorian period. Repeatable under different subtitles.

**ENGL 534 - Graduate Study: Form and Technique in Fiction (3)**

Advanced study of issues in form and technique in fiction, including point of view, scene and dialogue, and story structure. Repeatable for a maximum of 6 credits.

**ENGL 535 - Graduate Study: Form and Technique in Poetry (3)**

Advanced study of issues in form and technique in poetry, including voice, tone, syntax, and structure. Repeatable for a maximum of 6 credits.

**ENGL 536 - The Borderlands Writing Project (3-6)**

Intensive month-long seminar for practicing teachers and educators designed to improve the teaching of writing and the writing process and literacy and reading in schools and other educational contexts. Reading, discussing, and writing about current professional literature; completing teacher inquiry; and planning action research. Participants complete personal and professional writing, as well as additional professional development activities. By invitation only. Affiliated with the National Writing Project. Consent of instructor required. Crosslisted with: RDG 536

**ENGL 537 - Practitioner Inquiry and Literacy Action Research (1-3)**

Inquiry concerning literacy practices within specific contexts and the planning, implementing, and assessing projects designed to increase and improve literacy within that context. Instruction includes reading and web-based discussion, bi-monthly seminars, and onsite consultations. Associated with ongoing community outreach by the English Department and the Borderlands Writing Project. Consent of instructor required.

**ENGL 538 - Literature of the American Renaissance (3)**

Intensive study of topics critical to the development of nineteenth century American literature before and during the Civil War, and the work of authors such as Emerson, Thoreau, Poe, Hawthorne, Melville, Whitman and Dickinson. Repeatable once under a different subtitle.

**ENGL 539 - American Realism and Naturalism (3)**

Key works of literary realism and naturalism, Civil War to World War I. Course readings vary, but will normally include works of Henry James, Edith Wharton, Willa Cather, Theodore Dreiser, as well as others. Repeatable once under a different subtitle.

**ENGL 540 - Harlem Renaissance and Modernism (3)**

Reading and study of key works of the flowering of African American literature known as the Harlem Renaissance of the 1920s and 1930s. Consideration of the literary context of the Harlem Renaissance, which includes both African American and non-African American writers of the early modern and modern periods.

**ENGL 541 - Modern and Contemporary American Fiction (3)**

Studies the development of American fiction from World War I to the present. Repeatable once under a different subtitle.

**ENGL 542 - Modern and Contemporary American Poetry (3)**

Studies the development of American poetry from World War I to the present. Repeatable once under a different subtitle.

**ENGL 543 - Multimedia Theory and Production (3)**

Issues, theories, and production practices underlying design of multimedia, including rhetorical choices, aesthetic approaches, usability concerns, and diverse academic and popular discourses contributing to continued development of digital texts. Taught with ENGL 643.

**ENGL 544 - Modern British Fiction (3)**

Study of the fiction produced in the British Isles in the 20th and 21st centuries. Repeatable once under a different subtitle.

**ENGL 545 - Postmodern Fiction (3)**

Study of the various forms of formally innovative experimental fiction produced since 1945, with a focus on the relationship between literary history and its sociohistorical contexts. Some texts will be read in translation. Repeatable once under a different subtitle.

**ENGL 546 - Advanced Creative Writing: Nonfiction Prose (3)**

This graduate level workshop will examine the many varieties of Creative Nonfiction. Students should be prepared for a rigorous reading load of published nonfiction and student submissions. Because of the workshop format, every student is expected to contribute extensively to every class, both in printed form and oral comments. Taught with ENGL 446 with additional work required at the graduate level. May be repeated up to 12 credits. Consent of Instructor required.

- ENGL 548 - Graduate Study in Empirical Research (3)**  
Introduction to empirical research methods in composition, professional communication, and rhetoric.
- ENGL 549 - Graduate Study in Writing (3)**  
Close study of a topic in composition, rhetoric, and/or technical and professional communication. Topics vary. Repeatable for a maximum of 6 credits.
- ENGL 550 - Graduate Study in Literacy (3)**  
Studies in literacy theory and literacy research. Topics may vary. Taught with ENGL 650.
- ENGL 551 - Practicum in the Grammar of American English (3)**  
Studies of formal grammar of the English language in preparation for the teaching of the English language and/or advanced linguistic analysis. Taught with ENGL 451.
- ENGL 552 - Graduate Study in History of the English Language (3)**  
This course examines the history of the English language from its Indo-European origins through its development into an international language. The aim is to describe the English language formally and to trace linguistic change over time. Samples of written English will illustrate various stages in the development of English. Also considered are contemporary social and political issues related to language, including the problem of 'standard English' and the uses of language in advertising, the media, and politics.
- ENGL 553 - World Literatures (3)**  
Study of one or more literary traditions exclusive of those originating in Europe and the United States. Readings will include texts in translation. Repeatable once under a different subtitle.
- ENGL 554 - Postcolonial Literature (3)**  
Study of the transformations of literature and theory produced in the context of decolonization and its aftermath, from the twentieth century to the present. Some texts will be read in translation. Repeatable once under a different subtitle.
- ENGL 555 - Graduate Study in Rhetoric of Scientific Literature (3)**  
Intensive study of the rhetoric of selected works of scientific literature.
- ENGL 556 - Ethnic Studies in US Literature and Culture (3)**  
Concentrates on comparative study of literary and cultural production by two or more U.S. ethnic populations. Incorporates both literary and sociocultural readings of texts. Repeatable under different subtitles.
- ENGL 557 - American Indian Literatures (3)**  
Intensive study of selected topics and genres from American Indian Literatures, such as American Indian oral tradition, the Native American Trickster figure, the development of American Indian fiction, and contemporary American Indian literature. Repeatable once under a different subtitle.
- ENGL 558 - Latino/a Literature and Culture (3)**  
Focuses on established and emergent Latino/a literary and cultural production. Incorporates both literary and sociocultural readings of texts. Repeatable once under a different subtitle.
- ENGL 559 - Black Literature and Culture in the United States (3)**  
Focuses on established and emergent Black U.S. literary and cultural production. Incorporates both literary and sociocultural readings of texts. Repeatable once under a different subtitle.
- ENGL 560 - Proposal and Grant Writing (3)**  
Developing proposals and grants in a workshop setting.
- ENGL 561 - Topics in Writing Program Administration (3)**  
Explores issues, theories, and research underlying the design of writing programs and the administration of writing centers. Repeatable for a maximum of 6 credits. Taught with ENGL 661.
- ENGL 562 - Interdisciplinary, Client-Based Project Practicum (3)**  
Hands-on experience in collaborating within interdisciplinary teams designing projects for organizational clients. Taught with ENGL 462.
- ENGL 563 - Graduate Study in English Literature (3)**  
Covers selected works for a particular period of English literary history. Repeatable under different subtitles.
- ENGL 564 - History and Theory of Composition Studies (3)**  
Studies in the history and theory of composition as a discipline. Taught with ENGL 664.
- ENGL 565 - Intercultural Rhetoric and Professional Communication (3)**  
Examines rhetorical traditions in intercultural professional, technical, academic, and governmental contexts. Taught with ENGL 665.
- ENGL 566 - Online Pedagogy for Writing and Professional Communication (3)**  
Course explores key issues related to teaching and learning in online environments, with a focus on the teaching of writing and professional communication. Examines digital classroom practices and the theories that inform them and evaluates applicability and relevance of available technologies.
- ENGL 567 - Documentary Film Theory and Criticism (3)**  
Course offers critical survey of documentary film theory and criticism including considerations of the epistemological assumptions, rhetorical choices, aesthetic approaches, political circumstances of historical and contemporary documentary film.
- ENGL 568 - Rhetoric and Cultural Studies (3)**  
Explores intersections between rhetoric and cultural studies. Examines theories and practices of texts and discourses in political and cultural contexts. Taught with ENGL 668.
- ENGL 569 - Graduate in American Literature (3)**  
A group of works from a particular period of American literary history. Repeatable under different subtitles.
- ENGL 570 - Graduate Study in Approaches to Composition (3)**  
Theory and practice of teaching writing, including classroom practices, definition of standards, and evaluation of student writing. Requirements include independent directed research.
- ENGL 571 - Composition Pedagogy and Practicum (3)**  
Examines the pedagogical implications of contemporary composition theory and research. Focuses on teaching composition at the college level. Consent of instructor required.
- ENGL 572 - Technical-Professional Communication: Theory and Pedagogy (3)**  
Topics in teaching business, technical and scientific communication in academic and workplace contexts. Prerequisite: graduate standing.
- ENGL 573 - Writing Assessment and Evaluation (3)**  
Theory and practice of writing evaluation and program assessment. Examines pedagogical, political, legal, and policy issues involved in assessment.
- ENGL 574 - Workshop: Advanced Writing Prose (3)**  
Intensive practice in prose writing, primarily fiction, in a workshop environment with peer criticism. Repeatable for a total of 15 credits. Consent of instructor required.
- ENGL 575 - Workshop: Advanced Writing Poetry (3)**  
Intensive practice in poetry writing in a workshop environment with peer criticism. Repeatable for a total of 15 credits. Consent of instructor required.
- ENGL 576 - Workshop: Advanced Writing Playwriting (3)**  
Intensive practice in dramatic writing in a workshop environment with peer criticism. Repeatable for a total of 9 credits. Consent of instructor required.
- ENGL 577 - Workshop: Advanced Technical and Professional Writing (3)**  
Intensive practice in technical and professional writing and editing in a workshop environment. May be repeated for a total of 6 credits. Consent of instructor required.
- ENGL 578 - Topics in Rhetoric and Technology (3)**  
Explores intersections between rhetoric and technology, approaches may highlight theory, media production, and/or research. Repeatable for a maximum of 6 credits. Taught with ENGL 678.
- ENGL 579 - Computers and Writing (3)**  
Examines how computers change the nature of writing and the teaching of writing.
- ENGL 580 - Graduate Problems in Creative Writing (3)**  
Independent study in creative writing. Consent of instructor required. Repeatable for a total of 9 credits.
- ENGL 581 - Women's Literature (3)**  
Intensive study of literature by women, in particular historical, aesthetic, cultural, or intellectual contexts. Repeatable under different subtitles. Crosslisted with: W S 584
- ENGL 582 - Gender and Popular Culture (3)**  
Intensive study of the representations of gender in popular culture. Examines the historical, aesthetic, and cultural contexts of these representation and the various critical and theoretical lenses we use to understand them. Repeatable under different subtitles. Crosslisted with: W S 582

**ENGL 583 - Gender and Language (3)**

Overview of current and historical approaches to the critical study of gender and language: how gender theoretically manifests in linguistic, social, cultural, academic, and professional contexts.

**ENGL 584 - Gender and Literature (3)**

Intensive study, critical and theoretical, of intersections between literature and gender. Examines representations or constructions of gender in literary discourse, as well as the gendering of literary activity in different cultural contexts. Repeatable under different subtitles.

**ENGL 585 - Advanced Writing Workshop: RPC Capstone (3)**

Students work to develop and revise their chosen Master's program Capstone Project (a portfolio, thesis or master essay) in consultation with instructor and classmates. Students provide and receive feedback on their work-in-progress. Consent of Instructor required.

**ENGL 586 - Hollywood Film (3)**

Intensive study of Hollywood film in its artistic, cultural, or historical contexts. Repeatable under different subtitles.

**ENGL 587 - Modernist and Experimental Film (3)**

Explores the variety of film aesthetics that depart to some degree from the conventions of classical cinema. Focuses on how film form relates to modernist, postmodernist, experimental, and avant-garde tendencies in the arts. Special attention will be paid to the implications of radical formal experimentation for cultural politics, in particular in the context of modern and contemporary history. Repeatable once under a different subtitle.

**ENGL 588 - Film and Literature (3)**

Intensive study of literary and film texts in particular historical, generic, or cultural contexts, such as Film Adaptation, Religion in Literature and Film, or The American West in Fiction and Film. Repeatable under different subtitles.

**ENGL 589 - Cultural Studies: Literature and Theory (3)**

Examines the theory and practice of cultural studies in relation to the variety of discourse describable as literary, including autobiography, avant-garde writing, nonfiction prose, the essay, online writing, folklore, and popular genre fiction (such as mystery, romance, thriller, or horror). Repeatable once under a different subtitle.

**ENGL 590 - Master's Seminar in Rhetoric (3)**

Studies in theories of and issues in rhetoric. Topics may vary from year to year. Repeatable for a total of 9 credits.

**ENGL 591 - Graduate Screenwriting (3)**

Students will prepare a feature-length screenplay. Script analysis will be in an advanced workshop format. Scripts will be read and discussed, scenes performed and reactions analyzed to consider effect of dialogue, character development, etc. Aimed at preparing writers for the professional market. Consent of instructor required.

**ENGL 593 - Middle English Textual Cultures (3)**

Intensive study of cultures of reading, writing, and literary production in late-medieval England, situating Middle English literature in its manuscript contexts. No prior experience with Middle English required.

**ENGL 595 - Master's Workshop: Poetry (3-6)**

Students will submit a draft of thesis project for workshop critique. Revision of the thesis draft submitted to the instructor. Prerequisite(s): Enrolled in MFA penultimate semester. Restricted to MFA CW majors.

**ENGL 596 - Master's Workshop: Fiction (3-6)**

Students will submit a draft of thesis project for workshop critique. Revision of the thesis draft submitted to the instructor. Prerequisite(s): Enrolled in MFA penultimate semester. Restricted to MFA CW majors.

**ENGL 597 - Internship in Technical and Professional Communication (3-6)**

Supervised technical and professional communication in business, industry, government, or the university. May be repeated for a total of 6 credits. Consent of instructor required.

**ENGL 598 - Master's Essay (3)**

Students electing the master essay option complete revision of a scholarly essay of 25-30 pages, the approximate length of a journal article, and reformulation of this essay to the 7-8 pages appropriate for presentation at a conference. This option also requires research of appropriate publication venues and a final oral defense of the project. A supervising faculty member will approve the selected essay, guide revision, and help students form an examining committee, which consists of at least two members of the graduate English faculty and one member of the graduate faculty from outside the department. Students are encouraged to undertake the Master Essay process

in the first half of their third semester of full time graduate work, or soon after completing 18 hours of course work. This option is the preferred exam option, particularly for those students who intend to pursue Ph.D. study. Consent of instructor required.

**ENGL 599 - Master's Thesis (0-15)**

Thesis.

**ENGL 600 - Doctoral Research (1-15)**

Assigns credit for research performed prior to the doctoral comprehensive examination.

**ENGL 601 - Qualitative Research (3)**

Theory and practice of designing research studies and of collecting and analyzing data. Emphasis on qualitative methods of research in composition, professional communication, and rhetoric.

**ENGL 602 - Quantitative Research (3)**

Theory and practice of designing quantitative research studies and of collecting and analyzing data. Emphasis on quantitative methods of research in composition, professional communication, and rhetoric.

**ENGL 603 - Rhetorical Criticism and Methodology (3)**

Theory and practice of designing research studies and of collecting and analyzing data. Emphasis on methods of rhetorical criticism.

**ENGL 610 - Proseminar in Rhetoric and Professional Communication (3)**

Introduction to research in rhetoric and professional communication. Required of and limited to students enrolled in the Ph.D. program in Rhetoric and Professional Communication.

**ENGL 643 - Multimedia Theory and Production (3)**

Issues, theories, and production practices underlying design of multimedia, including rhetorical choices, aesthetic approaches, usability concerns, and diverse academic and popular discourses contributing to continued development of digital texts. Taught with ENGL 543.

**ENGL 649 - Graduate Study in Writing (3)**

Close study of a topic in composition, rhetoric, and/or technical and profession communication. Repeatable for a total of 6 credits.

**ENGL 650 - Graduate Study in Literacy (3)**

Studies in literacy theory and literacy research. Topics may vary. Taught with ENGL 550.

**ENGL 661 - Topics in Writing Program Administration (3)**

Explores issues, theories, and research underlying writing programs and the administration of writing centers. Repeatable for a maximum of 6 credits. Taught with ENGL 561.

**ENGL 664 - History and Theory of Composition Studies (3)**

Studies in the history and theory of composition as a discipline. Taught with ENGL 564.

**ENGL 665 - Intercultural Rhetoric and Professional Communication (3)**

Examines rhetorical traditions in intercultural professional, technical, academic, and governmental contexts. Taught with ENGL 565.

**ENGL 667 - Documentary Film Theory and Criticism (3)**

Course offers critical survey of documentary film theory and criticism including considerations of the epistemological assumptions, rhetorical choices, aesthetic approaches, and political circumstances of historical and contemporary documentary film. Taught with ENGL 567

**ENGL 668 - Rhetoric and Cultural Studies (3)**

Explores intersections between rhetoric and cultural studies. Examines theories and practices of texts and discourses in political and cultural contexts. Taught with ENGL 568.

**ENGL 678 - Topics in Rhetoric and Technology (3)**

Explores intersections between rhetoric and technology, approaches may highlight theory, media production, and/or research. Repeatable for a maximum of 6 credits. Taught with ENGL 578.

**ENGL 690 - Doctoral Seminar in Rhetoric (3)**

Studies in theories of and issues in rhetoric. Topics may vary from year to year. Repeatable for a maximum of 9 credits.

**ENGL 699 - Research Practicum (3)**

Designing and conducting individual research projects, for students engaged in dissertation research.

**ENGL 700 - Doctoral Dissertation (0-15)**

Dissertation.

**ENVE - ENVIRONMENTAL ENGINEERING**

- ENVE 455 - Solid and Hazardous Waste Systems Design (3)**  
Design of processes and facilities used in the transport, storage, treatment, and disposal of solid and hazardous wastes. Prerequisite: C E 356 or consent of instructor.
- ENVE 456 - Environmental Engineering Design (3)**  
Design of chemical, physical and biological operations and processes involved in water and wastewater treatment. Prerequisite: C E 356.
- ENVE 462 - Sampling and Analysis of Environmental Contaminants (3)**  
Theory, application, methodology, and instrumentation used in the sampling and analysis of environmental contaminants. Prerequisites: C E 256 and E S 256. Same as E S 462.
- ENVE 487 - Air Pollution Control Systems Design (3)**  
An introduction to sources and nature of air pollution, regulations, and risk analysis. Detailed study of air pollution control technologies and design of air pollution control equipment. Prerequisite: senior or graduate standing. Restricted to C E, CH E, or M E majors. Main campus only.
- ENVE 551 - Unit Processes/Operation of Water Treatment (3)**  
Theory and applications with unit processes in environmental engineering. Physical / chemical treatment methods emphasized. Restricted to: ENVE majors.
- ENVE 551 L - Unit Processes/Operation of Water Treatment Laboratory (1)**  
Practical laboratory covering development of design information for common unit operations/processes using bench scale and small pilot scale facilities. Restricted to: ENGR majors.
- ENVE 552 - Unit Processes/Operation of Wastewater Treatment (3)**  
Theory and applications with unit processes in environmental engineering. Biological treatment methods emphasized. Prerequisite: consent of instructor. Corequisite: ENVE 552L. Restricted to majors.
- ENVE 552 L - Unit Processes/Operation of Wastewater Treatment Laboratory (1)**  
Dry laboratory emphasizing design of common unit operations/processes in biological treatment. Prerequisite: consent of instructor. Corequisite: ENVE 552. Restricted to majors.
- ENVE 553 - Chemical Theories of Environmental Engineering (3)**  
Theoretical aspects of physical chemistry applied to the solution of environmental engineering problems. Emphasis on carbonate equilibria solubility, buffering and redox conditions. Prerequisite: consent of instructor.
- ENVE 557 - Surface Water Quality Modeling (3)**  
Modeling the impacts of waste disposal practices on surface waters. Emphasis on fate and transport of bacteria, dissolved oxygen, nutrients, and toxicants in rivers, lakes, and tidal waters. Restricted to majors.
- ENVE 598 - Special Research Programs (1-3)**  
Individual investigations either analytical or experimental. May be repeated for a maximum of 6 credits. Restricted to majors.
- ENVE 599 - Master's Thesis (0-15)**  
Thesis. May be repeated for a maximum of 6 credits.
- ENVE 630 - Fate and Transport of Environmental Contaminants (3)**  
Modeling of transport phenomena in natural and engineered systems for predicting the fate of contaminants in the air, soil, sediment, and water compartments of the ecosystem. Prerequisites: C E 555 and consent of instructor.

**EPWS - ENTOMOLOGY, PLANT PATHOLOGY, AND WEED SCIENCE**

- EPWS 451 - Special Topics (1-4)**  
Specific subjects and credits to be announced in the Schedule of Classes. Maximum of 4 credits per semester and a grand total of 9 credits. Prerequisite: consent of instructor.
- EPWS 452 - Applied Pesticide Toxicology (3)**  
Classification, mode of action, and use of insecticides and related pesticides.
- EPWS 455 - Advanced Integrated Pest Management (3)**  
Examination of factors affecting the biology and ecology, population evaluations, and control of insect, disease, and weed pests with an emphasis on integrating management practices. Credit cannot be given for both EPWS 455 and EPWS 505. Prerequisite: either EPWS 303, EPWS 310, EPWS 311, or consent of instructor.
- EPWS 456 - Biological Control (3)**  
Principles of plant and animal suppression using living organisms. Interaction of biological control organisms with biotic and abiotic factors will be stressed. Credit cannot be given for both EPWS 456 and EPWS 506. Prerequisite: introductory course in entomology.
- EPWS 462 - Parasitology (3)**  
Introduction to classification, biology, ecology and management of the major parasites of human, domestic animals and wildlife.
- EPWS 462 L - Parasitology Lab (1)**  
Methods of collecting and identifying the major parasites of humans, domestic animals and wildlife. Concurrent enrollment in EPWS 462 is desirable.
- EPWS 471 - Plant Mineral Nutrition (3)**  
Same as HORT 471 and AGRO 471.
- EPWS 481 - Plant Nematology (3)**  
Biology, ecology and basic identification of soil-inhabiting nematodes, with emphasis on host-parasite relationships and management principles for plant-parasitic genera.
- EPWS 486 - Plant Virology (3)**  
An overview of viral pathogens associated with infectious plant disease. Includes pathogens, replication, genetics, transmission, and movement of plant viruses.
- EPWS 491 - Insect Physiology (3)**  
Metabolism of carbohydrates, amino acids, lipids, and vitamins. Physiology of development, reproduction, pheromone and sensory reception. Prerequisites: EPWS 303 or BIOL 433, CHEM 211, or consent of instructor.
- EPWS 492 - Diagnosing Plant Disorders (3)**  
Systematic diagnosis of the physiological, pathological, and entomological causes of plant disorders. Prerequisites: EPWS 303, EPWS 310. Same as AGRO 492 and HORT 492.
- EPWS 505 - Advanced Integrated Pest Management (3)**  
Examination of the factors affecting the biology and ecology, population evaluations, and control of insect, disease, and weed pests, with an emphasis on integrating management practices. Prerequisite: EPWS 303, EPWS 310, EPWS 311, or consent of instructor. Credit cannot be given for both EPWS 455 and EPWS 505.
- EPWS 506 - Biological Control (3)**  
Principles of plant and animal pest suppression using living organisms. Interaction of biological control organisms with biotic and abiotic factors will be stressed. Individual paper or project required. Prerequisite: introductory course in entomology. Credit cannot be given for both EPWS 456 and EPWS 506.
- EPWS 511 - Introduction to Weed Science (f) (4)**  
Covers the principles of weed science with emphasis on characteristics of invasive plants, methods of integrated weed management, and current issues impacting weed management. Includes identification of local weeds. Research paper required for graduate credit. Prerequisite(s): CHEM 111G and BIOL 211G. Crosslisted with: AGRO 511.
- EPWS 514 - Plant Physiology (3)**  
Overview of photosynthesis, respiration, water relations of plants, minerals and organic nutrition, growth and development. Prerequisite(s): BIOL 211G, CHEM 112.
- EPWS 523 - Environmental Toxicology (3)**  
Same as TOX 523.
- EPWS 530 - Plant Physiology: Metabolism (3)**  
Examination of major plant metabolic processes, including photosynthesis, nitrogen metabolism, lipid and secondary plant production metabolism, and how they are related. Prerequisites: BIOL/EPWS 314 and CHEM 314, or consent of instructor. Same as AGRO 530, BIOL 530, HORT 530, and MOLB 530.
- EPWS 549 - Special Problems (1-4)**  
Individual investigation in specific areas of entomology, plant pathology, and weed science. Maximum of 4 credits per semester and a total of 6 credits.
- EPWS 551 - Special Topics (1-4)**  
Specific subjects and credits to be announced in the Schedule of Classes. Maximum of 4 credits per semester. No more than 9 credits toward a degree.
- EPWS 573 - Fungal Biology (3)**  
Introduction to the taxonomy, morphology, physiology, and ecology of fungi. Prerequisite: EPWS 310 or consent of instructor. Same as BIOL 573.
- EPWS 590 - Graduate Seminar (1)**

Review of current scientific literature in entomology, plant pathology, and weed science, and verbal presentation of information. No more than 2 credits toward a degree.

**EPWS 598 - Graduate Internship (1-6)**

Supervised professional on-the-job learning experience. Limited to Master of Agriculture candidates. Not more than 6 credits toward the degree.

**EPWS 599 - Master's Thesis (0-15)**

Thesis.

**FCS - FAMILY AND CHILD SCIENCE**

**FCS 450 - Equine Assisted Learning (3)**

Covers the complex relationship between horses and humans. Students are introduced to human psychological theories and methods of how people and horses can work together and the application of such structured learning settings using horses to achieve learning outcomes. Students will also be introduced to horsemanship including proper use and maintenance of equipment, safety, handling, basic care, behavior of horses and benefits of the horse. Consent of instructor required. Crosslisted with: ANSC 450

**FCS 492 - Special Problems (1-4)**

Individual research in a selected subject area of family and consumer sciences. Maximum of 4 credits per semester and a total of 6 credits.

**FCS 524 - Supervised Practicum (1-9)**

Supervised experience in organizations providing services to families and children. Course subtitled in the Schedule of Classes. Prerequisite: consent of instructor. May be repeated for a maximum of 9 credits. Graded S/U.

**FCS 525 - Supervised Clinical Practice (1-9)**

Supervised clinical experience in Marriage and Family Therapy. Includes reviews of audio, video, and/or live sessions and case presentations. Maximum of 9 credits toward a degree. May be repeated up to 20 credits.

**FCS 546 - Adolescent Development and the Family (3)**

Advanced study in research and theory relevant to the physical, mental, social, and emotional development of the child, ages 12-18. Attitudes, knowledge, and skills related to working with adolescents in the family system.

**FCS 547 - Infancy and Early Childhood in the Family (3)**

Research and theory relevant to prenatal development and the physical, mental, and socio-emotional development of the child from birth to age 5. Attitudes, knowledge, and skills needed for working with young children and their families.

**FCS 548 - The Aging Family (3)**

Advanced study in research and theory related to the physical, mental, social, and emotional development of older adults. Attitudes, knowledge, and skills related to working with older adults in the family system, including normative and non-normative role transitions.

**FCS 549 - Family Ethnicities and Subcultures (3)**

Comparative study of American family subsystems with respect to selected social, economic and cultural backgrounds. Interaction of these subsystems in American society. Students responsible for all requirements for FCS 449V plus additional work

**FCS 550 - Equine Assisted Learning (3)**

Advanced study of the dynamic interplay of equine and human relations. Students take an in-depth look at the use of experiential learning and its application using horses. Students will learn to construct learning settings using horses to achieve learning outcomes.

**FCS 562 - The Business and Practice of Marriage and Family Therapy (1)**

This seminar course will provide students with an overview of the business and practice of Marriage and Family Therapy to the end that they will understand how to develop and maintain a private practice in the field of MFT. Restricted to FCS(MFT) majors. S/U Grading(S/U, Audit).

**FCS 572 - Family Dysfunction and Diagnosis (3)**

A study of the development of abnormal behavior patterns and characteristics to include the major mental and personality disorders and how these can influence and impact family systems. Emphasis is on the symptomology and/or life circumstances and events described in the various diagnostic categories.

**FCS 581 - Middle Childhood Development in the Family (3)**

Research and theory relevant to the physical, mental, and socio-emotional development of children from ages five to twelve. Attitudes, knowledge, and skills needed for working with school-age children and their families.

**FCS 582 - Theories of Marriage and Family Therapy (2)**

A balanced study of major theories, research, applications and principles of marriage and family therapy. This course will examine major therapy models and the theories they are derived from as well as the effectiveness of specific therapy models for specific mental health disorders through research. May be repeated up to 4 credits.

**FCS 583 - Parenting and Child Guidance (3)**

Theories, principles, and skills essential for parents and professionals in guiding children within the family system. Problem prevention techniques are stressed.

**FCS 584 - Family Law and Ethics (3)**

Study of selected aspects of federal and state laws and ethical issues as they relate to the family system.

**FCS 585 - The Family System (3)**

Contemporary family interaction: concepts, composition, resource and environment.

**FCS 586 - Sexuality and Family Dynamics (3)**

Psychosocial and physiological aspects of human sexuality from a life span and family systems perspective.

**FCS 587 - Contemporary Marriage and Family Issues (3)**

Investigation of one of the following topics each semester: dual career marriages, nontraditional relationships, aged in marriage.

**FCS 589 - Family Crises and Rehabilitation (3)**

Examination of the major crises experienced by families. Emphasis on family system functioning rather than individual functioning. Preventative measures, positive coping strategies, and therapeutic intervention approaches examined.

**FCS 590 - Special Topics (1-4)**

Specific subjects to be announced in the Schedule of Classes. Maximum of 4 credits per semester and a total of 9 credits toward a degree.

**FCS 592 - Strategies in Family Therapy (2)**

Effective intervention strategies in family therapy practice. Live and taped role plays of interventions for various family problems required. Constructive approaches for working with family systems and third-party payers. May be repeated up to 4 credits.

**FCS 598 - Special Research Programs (1-4)**

Individual investigations either analytical or experimental. Maximum of 4 credits per semester and no more than 6 credits toward a degree.

**FCS 599 - Master's Thesis (0-15)**

Thesis

**FCSC-FAMILY AND CONSUMER SCIENCE**

**FCSC 500 - Research Methods (3)**

This course covers the critical evaluation of research literature, development of research proposals and principles of program evaluation. Students will be introduced to the application of qualitative or quantitative methods. Students will be expected to develop research questions and test hypotheses using statistical analysis and a variety of methodologies.

**FCSC 598 - Special Research Programs (1-4)**

Individual investigations, either analytical or experimental. Maximum of 4 credits per semester and no more than 6 credits toward a degree.

**FCSC 599 - Master's Thesis (0-15)**

May be repeated for unlimited credit, maximum of 6 credits toward a degree.

**FCSE-FAMILY AND CONSUMER SCIENCE EDUCATION**

**FCSE 492 - Special Problems (1-4)**

Individual research study in a selected subject area of family and consumer sciences. Maximum of 4 credits per semester and 6 credits toward degree.

**FCSE 545 - Graduate Study in Vocational Programs for Youth and Adults (3)**

Covers vocational education history and programs and ancillary functions of family and consumer sciences. Experience in extension programs and teaching. Additional assignments beyond FCSE 445 required for students registering in FCSE 545.

**FCSE 546 - Graduate Study in Teaching Methods I (3)**

Objectives, content, and organization of family and consumer sciences in high schools; materials and methods of teaching. Additional assignments beyond FCSE 446 required for students registering in FCSE 546.

**FCSE 547 - Graduate Study in Teaching Methods II (3)**

Planning, preparation, and strategies for teaching family and consumer sciences in the secondary schools. Additional assignments beyond FCSE 447 required for students registering in FCSE 547.

**FCSE 548 - Graduate Study in Supervised Teaching in Family and Consumer Sciences (9)**

Seventy of full-time, supervised teaching in selected schools. Additional assignments beyond FCSE 448 required for students registering in FCSE 548. Prerequisite: FCSE 446 or FCSE 546, and consent of instructor. Corequisites: FCSE 447 or FCSE 547.

**FCSE 590 - Special Topics (1-4)**

Specific subjects and credits to be announced in the Schedule of Classes. May be repeated for a maximum of 9 credits toward a degree, 4 credits per semester.

**FIN - FINANCE**

**FIN 456 - Real Estate Investments and Financing (3)**

Basic considerations for real estate investment and financing in local, state, and national markets. Prerequisite: FIN 325 or BLAW 325 or consent of instructor.

**FIN 466 - Financial Policy Decisions (3)**

Application and integration of financial theory, concepts, and practice using the case method. Prerequisite: FIN 406 or consent of instructor.

**FIN 470 - Real Estate Appraisal (3)**

This course addresses issues influencing the value of real estate with some emphasis upon rural properties. Topics include courthouse records, property taxes, appraisal methodology, expert courtroom testimony, condemnation, and legal issues. Students will take field trips and write appraisals. Course material is relevant to student in Finance, Accounting, and Pre-Law, as well as Agriculture. Accredited for hours to apply to both pre-licensing and continuing education requirements of the New Mexico Real Estate Commission for both Appraisers and Real Estate Brokers. Prerequisite(s): Junior or above standing. Crosslisted with: AG E 470.

**FIN 475 - International Managerial Finance (3)**

International aspects of financial transactions, decision-making, banking and financial markets. Prerequisite: FIN 341. Same as I B 475.

**FIN 480 - Management of Financial Institutions (3)**

Asset and liability management of financial institutions; emphasis on commercial bank management. Prerequisite: FIN 385 or consent of instructor.

**FIN 490 - Selected Topics (1-3)**

Current topics in finance. Prerequisites: vary according to the seminar being offered.

**FIN 491 - Finance Internship and Cooperative Education II (1-3)**

Advanced application of finance techniques to the work environment. Prerequisite: consent of instructor. Restricted to finance majors.

**FIN 498 - Independent Study (1-3)**

Individual studies directed by consenting faculty with the prior approval of the department head. Prerequisites: junior or above standing and consent of instructor. A maximum of 3 credits may be earned.

**FIN 500 - Concepts in Finance (1.5)**

An overview of fundamental principles of finance necessary for prospective MBA students who do not have an undergraduate background in finance. Includes: Time value of money concepts and calculations; risk and calculation of return given appropriate risk measures; bond risk characteristics and calculation of the value of a bond; calculation of the value of common stock (determination as to whether a stock is over-valued or under-valued); and calculation of the costs of capital and capital budgeting problems using the cost of capital. Prerequisite(s): admitted to MBA Program or consent of course department. Restricted to: MBA majors.

**FIN 503 - Financial Management (3)**

Theory and application of financial analysis to asset management, project evaluation, capital structure, and dividend policy. Interrelationships among financial and other organizational decisions. Prerequisite(s): FIN 341 with a grade of B or better.

**FIN 511 - Financial Futures Markets (3)**

Same as AEEC 511.

**FIN 521 - Personal Financial Planning for Professionals (3)**

Introduction to personal financial planning, including goal setting and fact finding, cash management, credit, housing, retirement planning, taxation and estate planning. This course is intended for those planning careers in personal

financial advising in one of the various financial services environments.

Prerequisite(s): FIN 503 or FIN 341 or consent of instructor.

**FIN 525 - Financial Statement Analysis and Valuation (3)**

Financial statement analysis from the perspective of equity investors, creditors and company managers. Using a fundamental analysis approach, the primary objectives are development of financial statement analysis skills used in firm and stock valuation, as well as enhancement of skills in credit analysis and strategic firm management. Prerequisite: FIN 503 and ACCT 503. Graduate students only.

**FIN 535 - Investment Concepts (3)**

Investments in common stocks and other securities. Risk and return, securities markets, portfolio theory and management. Prerequisite(s): FIN 355 or FIN 503.

**FIN 536 - Applied Security Analysis and Portfolio Management (1-3)**

Application of analytical tools to security selection and portfolio management. Pre/Corequisite(s): FIN 435 or FIN 535.

**FIN 545 - Money and Capital Markets (3)**

Examination of financial markets and institutions. Emphasis on interest rate determinants, bond markets, and fixed income portfolio management. Prerequisite: FIN 503.

**FIN 555 - Derivative Markets and Securities (3)**

Institutional aspects of derivative markets and the arbitrage based pricing of derivative instruments such as stock options, interest rate options, future contracts and swaps. The applied component of the course demonstrates use of these instruments as hedge and/or investment vehicles. Prerequisite(s): FIN 503.

**FIN 566 - Advanced Financial Management (3)**

Application and integration of financial theory, concepts, and practice using the case method. Prerequisite: FIN 503.

**FIN 575 - International Managerial Finance (3)**

International aspects of financial transactions, decision-making, banking and financial markets. Prerequisite(s): FIN 503 or FIN 341.

**FIN 581 - Management of Financial Institutions (3)**

Asset and liability management of financial institutions; emphasis on commercial bank management. Prerequisite(s): FIN 385 or FIN 503.

**FIN 590 - Selected Topics (1-3)**

Current topics in finance. Taught with FIN 490 with differentiated assignments for graduate students. Consent of instructor required.

**FIN 598 - Special Research Programs (1-3)**

Directed individual reading or research. Prerequisite: consent of instructor.

**FREN - FRENCH**

**FREN 449 - Special Problems (1-3)**

Directed reading for graduate students in specific field to satisfy language requirement for master's or doctoral programs.

**FREN 451 - Special Topics in French (1-3)**

Selected topics relating to the cultures or literatures of the countries where French is spoken will be announced in the Schedule of Classes. Prerequisite: consent of instructor. May be repeated for a maximum of 12 credits.

**FREN 453 - Independent Studies in French (1-3)**

Individualized, self-paced projects for advanced students. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.

**FREN 462 - Advanced Contemporary French Culture (3)**

Advanced study of institutions, lifestyles and popular attitudes in modern France. Emphasis on everyday life rather than prestigious monuments in civilizations. Prerequisite: FREN 212 or consent of instructor.

**FREN 466 - Introduction to French Linguistics (3)**

This course aims to introduce the basic concepts of contemporary linguistics and to show the French language functions with regard to form and meaning. Consent of instructor required. Prerequisite(s): Advanced level in French.

**FREN 471 - The French Novel (3)**

Development of the novel and analysis of selected texts with emphasis on the nineteenth and twentieth centuries. Prerequisite(s): FREN 212 or consent of instructor.

**FREN 472 - The French Short Story (3)**

Study and discussion of French short stories through the ages. Prerequisite(s): FREN 212 or consent of instructor.

**FREN 478 - Studies in Francophone Cultures Around the World (3)**

Advanced studies of representative Francophone cultures through their history, literature, music and films. Prerequisite(s): FREN 212 or consent of instructor.

**FREN 486 - Advanced Contemporary Women Writers in French (3)**

Advanced study of literary texts by contemporary women writers in France and the Francophone world; emphasizes the cultural contexts that have defined women's relationship to writing. Selections will vary from year to year. Prerequisite(s): FREN 212 or consent of instructor.

**FRMG - FAMILY RESOURCE MANAGEMENT****FRMG 450 - Special Topics (1-4)**

Special subjects and credits to be announced in the Schedule of Classes. May be taken for a maximum of 4 credits per semester and a total of 9 credits toward a degree.

**FRMG 492 - Special Problems (1-4)**

Individual research study in a selected subject of Family and Consumer Sciences. Maximum of 4 credits per semester and a grand total of 8 credits towards a degree. Consent of Instructor required.

**FRMG 590 - Special Topics (1-4)**

Special subjects and credits to be announced in the Schedule of Classes. May be taken for a maximum of 4 credits per semester and a total of 9 credits toward a degree.

**FSTE-FOOD SCIENCE AND TECHNOLOGY****FSTE 450 - Special Topics (1-4)**

Specific subjects and credits to be announced in the Schedule of Classes. Maximum of 4 credits per semester and a grand total of 9 credits towards a degree. Consent of instructor required.

**FSTE 475 - ACES in the Hole Foods IV (1-4)**

Food production activities related to operation of ACES in the Hole Foods, a student-run food company that will give FSTE majors hands-on experience in all aspects of developing, producing and marketing food products. Prerequisite(s): FSTE 375. Restricted to FSTE majors.

**FSTE 492 - Special Problems (1-4)**

Individual research study in a selected subject of Family and Consumer Sciences. Maximum of 4 credits per semester and a grand total of 8 credits towards a degree. Consent of instructor required.

**FSTE 500 - Data Analysis for Food Scientists (0-3)**

An introduction to data analysis of food scientists. Modern statistical techniques used to analyze typical data collected by food scientists and researchers will be covered. Consent of Instructor required.

**FSTE 520 - Graduate Study in Food Microbiology (3)**

Detrimental and beneficial microbiological aspects of food products. Methods of quantification and identification of microorganisms associated with food spoilage and preservation. Additional work required at the graduate level. Prerequisites: BIOL 111G/111L, or BIOL 211G/211L, or BIOL 190, or consent of instructor.

**FSTE 521 - Graduate Study in Food Chemistry (3)**

Comprehensive study of the chemical and physicochemical properties of food constituents. Chemical changes involved in the production, processing and storage of food products and basic techniques used to evaluate chemical and physicochemical properties of foods. Additional work required at the graduate level. Prerequisites: CHEM 111G, CHEM 112G, and CHEM 211, or consent of instructor.

**FSTE 523 - Food Processing Technologies (4)**

Common food processing unit operations such as raw material preparation, separation, concentration, fermentation, pasteurization, sterilization, extrusion, dehydration, baking, frying, chilling, freezing, controlled atmosphere storage, water, waste and energy management, packaging, materials handling and storage and process control. Application of principles to processing food in a laboratory setting. Additional work beyond that for FSTE 423 required at the graduate level. Prerequisite(s): FSTE 528.

**FSTE 524 - Sensory Evaluation of Foods (3)**

Principles and procedures involved in the sensory evaluation of foods. Physiological, psychological and environmental factors affecting the evaluation of sensory properties. Analysis and interpretation of sensory data. Prerequisite(s): FSTE 263G and A ST 311 or STAT 251.

**FSTE 525 - Graduate Study in Food Analysis (3)**

Covers basic chemical and physical techniques used in establishing nutritional properties and overall acceptance of food products. Additional work required at the graduate level. Prerequisite(s): CHEM 111 or consent of instructor.

**FSTE 526 - Graduate Study in Dairy Products Manufacturing (3)**

Physical, chemical, microbiological and sensory properties of milk and dairy products. Capstone course which includes a variety of techniques used in previous classes to evaluate milk and dairy products. Additional work required at the graduate level. Prerequisites: FSTE 320, FSTE 325, and HNFS 420, or consent of instructor.

**FSTE 528 - Introduction to Food Engineering (4)**

Basic engineering principles including mass and energy balances, fluid flow, heat transfer and chemical kinetics and their application to food processing unit operations. Video and laboratory participation are used to enhance course content and relevance. Additional work beyond that for FSTE 328 required at the graduate level. Prerequisite(s): MATH 142G or consent of instructor.

**FSTE 529 - Product Development (3)**

Application of chemical, physical, nutritional and psychological principles and experimental methods to the development and evaluation of a food product for a specified food product development competition. Prerequisite(s): FSTE 320 and FSTE 425.

**FSTE 531 - Food Preservation (3)**

Processes used in home and commercial food preservation, including canning, freezing, drying, and irradiation. Same as FSTE 331 with additional work required at the graduate level.

**FSTE 532 - Designing and Brewing Great Beers of the World (3)**

The science and technology of brewing unit operations and the ingredients used in beer brewing. That knowledge is then applied to designing and brewing classic world beer styles. Styles investigated change every semester but typically include India Pale Ale, Pale Ale, Stout, Porter, Hefeweizen, Scottish Ale, and Black IPA. Comprehensive evaluation of the product relative to style guidelines completes the design-brew-evaluate cycle. Students must be at least 21 years of age on the first day of class.

**FSTE 547 - Experimental Foods (3)**

Application of chemical, physical, nutritional and psychological principles and experimental methods to the development and evaluation of foods. Students enrolling in the 500-level class will be required to complete additional assignments beyond what is required for FSTE 447. Prerequisite: FSTE 263G.

**FSTE 560 - Rumen Microbiology (so) (3)**

Same as ANSC 560.

**FSTE 575 - ACES in the Hole Foods (1-4)**

Food production activities related to operation of ACES in the Hole Foods, a student-run food company that will give FSTE majors hands-on experience in all aspects of developing, producing and marketing food products. Consent of instructor required. Restricted to FSTE majors.

**FSTE 598 - Special Research Programs (1-4)**

Individual investigations either analytical or experimental. Maximum of 4 credits per semester and no more than 6 credits towards a degree. Consent of instructor required.

**FWCE-FISHERY, WILDLIFE AND CONSERVATION ECOLOGY****FWCE 450 - Special Topics (1-4)**

Specific subjects and credits as announced in the Schedule of Classes. Maximum of 4 credits per semester and a grand total of 9 credits. Consent of instructor required.

**FWCE 455 - Environmental Risks and Decisions (3)**

Risk assessment and decision analysis in the context of environmental and conservation issues. Concepts of risk perception and uncertainty; precautionary principle; the roles of experts and stakeholders; the use of conceptual and probabilistic models in risk assessment. Pre/Corequisite(s): MATH 142 or MATH 191G, A ST 311, FWCE 301.

**FWCE 457 - Ecological Biometry (3)**

Use of ecological data to test scientific hypotheses. Stochastic and statistical models for environmental data, data visualization, likelihood-based and information-based model selection. Emphasis on open-source software tools. Prerequisite(s): MATH 142G or 191G, A ST 311, FWCE 301.

**FWCE 459 - Aquatic Ecology (4)**

Plant and animal communities in aquatic ecosystems with emphasis on chemical and physical properties, productivity, species interactions, population dynamics, and concepts for diagnosing problems and restoring aquatic ecosystems. Prerequisite(s): FWCE 301 or BIOL 301, CHEM 112G, MATH 142G.

**FWCE 462 - Conservation Biology (3)**

An examination of the patterns of biological diversity, the processes that generate and maintain it, as well as the forces that are eroding it. Aspects will include the value of biodiversity, factors driving extinction, national and international law and policy. Prerequisite(s): BIOL 111G and BIOL 111L. Pre/Corequisite(s): FWCE 301.

**FWCE 464 - Management of Aquatic and Terrestrial Ecosystems (4)**

Principles and methods for managing aquatic and terrestrial ecosystems and their fish and wildlife resources. Emphasis on quantitative techniques, data collection and analysis for management of systems at a landscape spatial scale. Prerequisite(s): BIOL 301 or FWCE 301, FWCE 330, A ST 311.

**FWCE 466 - Advanced Wildlife Management of Mammals (3)**

Ecological principles, production and harvest, habitat management, and techniques of mammal management.

**FWCE 467 - Herpetology (4)**

Systematics, taxonomy, ecology, behavior, and conservation of amphibians and reptiles. Field trips required. Prerequisite(s): FWCE 330.

**FWCE 482 - Ichthyology (4)**

Classification, morphology, identification, life history, and ecology of fishes. Prerequisite(s): FWCE 330 or consent of instructor.

**FWCE 488 - Conservation Genetics (3)**

Application of evolutionary theory and biotechnologies used in conservation of populations including concepts in population structure, gene flow, inbreeding, hybridization, and forensics. Consent of instructor required. Prerequisite(s): BIOL 305 or AGRO 305.

**FWCE 509 - Population Ecology (s) (3)**

Quantitative analysis of vital statistics and mechanisms promoting stability in wild populations. Theory and application of life tables and population models.

**FWCE 515 - Graduate Seminar (1)**

Current topics. May be repeated for unlimited credit.

**FWCE 522 - Fishery and Wildlife Research Methods (f) (3)**

Methods of research in fishery and wildlife management to include conceptual analysis of research problems; proposal preparation; presentation of results. Prerequisite(s): A ST 461 or consent of instructor.

**FWCE 532 - Environmental Biology of Fishes (4)**

What makes a fish a fish. Mechanisms of circulation, gas exchange, osmotic and ionic regulation, swimming, migration, reproduction, and chemoreception. Students are responsible for all requirements for FWCE 432 plus additional work.

**FWCE 534 - Aquatic Contaminants and Toxicology (4)**

Basic principles and methodologies of aquatic toxicity testing. Routes of exposure and modes of action. Environmental legislation and ecological risk assessment. Students are responsible for all requirements for FWCE 434 plus additional work.

**FWCE 535 - Special Topics (1-4)**

Specific subjects to be announced in the Schedule of Classes. Maximum of 4 credits per semester. No more than 9 credits toward a degree.

**FWCE 536 - Advanced Avian Ecology (3)**

Focuses on current topics and literature in avian ecology including systematics, mating systems, behavior, physiology, movement patterns and conservation. Includes required overnight field trips. Prerequisite(s): Graduate standing or consent of instructor.

**FWCE 537 - Wildlife Damage Management (3)**

Introduction to basic need and appropriate methods for resolving human-wildlife conflicts and management of animal damage. Socioeconomic, ecological, and political factors. Field trips required. Taught with FWCE 437.

**FWCE 540 - Wildlife Habitat Relationships (3)**

The study of wildlife-habitat relationships primarily seeks to describe how the distribution and abundance of resources used for food, cover and security, and constraints on the use of these resources influence the distribution of animals. This course will cover aspects of animal behavior related to how animals select habitat, theoretical models of habitat selection, the influence of

inter- and intra-specific interactions on habitat selection, habitat quality, study designs for wildlife-habitat studies, modeling habitat selection and data analyses.

**FWCE 545 - Advanced Fish and Wildlife Habitat Management (f) (4)**

Principles and methods for managing aquatic and terrestrial habitats for use by fish and wildlife. Quantitative methods and computer programs for evaluating habitats. Field trips and use of computer programs by students are required. Prerequisite: WLSC 522 or consent of instructor.

**FWCE 548 - Graduate Problems (1-3)**

Individual studies in fishery and wildlife sciences. Maximum of 3 credits per semester. No more than 6 credits of this course and FWCE 598, combined, toward a degree.

**FWCE 558 - Nonthesis Project (1-6)**

Independent study to satisfy nonthesis project requirement. Maximum of 6 credits toward degree. Available only to nonthesis students.

**FWCE 560 - Wildlife Ethology (s) (3)**

Comparative vertebrate behavior including social organization, dominance, marking, territoriality, and mother/offspring relationships and their management implications. Introduction to sociobiology. Prerequisite: consent of instructor.

**FWCE 567 - Herpetology (4)**

Systematics, taxonomy, ecology, behavior and conservation of amphibians and reptiles. Field trips required.

**FWCE 578 - Advanced Limnology (s) (a) (3)**

Concepts in aquatic production ecology and analytical methods for lake and flowing waters. Prerequisite: consent of instructor.

**FWCE 585 - Fish and Wildlife Planning (f) (3)**

Covers planning methodologies and concepts for fishery and wildlife professionals.

**FWCE 595 - Internship (1-6)**

Supervised professional on-the-job learning experience. Limited to Master of Agriculture candidates. No more than 6 credits toward the degree.

**FWCE 598 - Special Research Programs (1-3)**

Individual investigations, either analytical or experimental. Maximum of 3 credits per semester. No more than 6 credits of this course and FWCE 548, combined, toward a degree. Not available to students in the nonthesis program.

**FWCE 599 - Master's Thesis (0-15)**

Thesis.

## GS - GRADUATE STUDIES

**G S 500 - Masters Non-Thesis Final Exam Credit (1)**

Course for non-thesis masters students who have completed all program requirements except the final comprehensive exam. Prerequisites: advisor signature required. A maximum of 12 credits may be earned. Graded S/U.

**G S 600 - Doctoral Research (1-15)**

Course number is used for assigning credit for research performed prior to successful completion of the doctoral comprehensive examination.

**G S 700 - Doctoral Dissertation (0-15)**

Dissertation.

## GENE- GENETICS

**GENE 450 - Special Topics (1-3)**

Specific subjects to be announced in the schedule of classes. Maximum of 3 credits per semester and a total of 3 credits toward a degree. Consent of instructor required.

**GENE 452 - Applied Bioinformatics (3)**

Survey and application of publicly available bioinformatic tools that treat genomic DNA, cDNA, and protein sequences, RNA abundance, as well as tools that allow inference based on phylogenetic relationships. Prerequisites: AGRO/ANSC/BIOL/HORT 305 or GENE 315 and GENE 320, and BCHE 341, or BCHE 395.

**GENE 486 - Genes and Genomes (3)**

Extensive coverage of nuclear and organelle genome structure in plants and animals, genome restructuring including duplication, aneuploidy, chromosome translocations and inversions, comparative genomics, and



molecular systematics. Prerequisites: AGRO/ANSC/BIOL/HORT 305 or GENE 315, and GENE 320.

**GENE 488 - Gene Regulation (3)**

Extensive coverage of signal transduction processes and approaches used to monitor large scale changes in gene regulation and protein synthesis that occur during development and in response to environmental changes. Prerequisites: AGRO/ANSC/BIOL/HORT 305 or GENE 315.

**GEOG - GEOGRAPHY**

**GEOG 452 - Landscape Ecology (4)**

Analysis of the structure, function and change of natural and anthropogenic landscapes. Patches, corridors, matrix and network, spatial organization, landscape dynamics, and role of disturbance in overall functioning of landscapes. Role of landscape heterogeneity. Taught with GEOG 552. Prerequisite(s): Either GEOG 351, BIOL 301, or other basic ecology course or consent of instructor.

**GEOG 455 - Southwest Environments (3)**

The U.S. Southwest: physical and human geography, coupled human-environment interactions, causes and consequences of environmental issues, and implications for sustainable development. Taught with GEOG 555. Consent of Instructor required. Prerequisite(s): GEOG 281, physical geography class, human geography class, or equivalents.

**GEOG 467 - Transportation Geography (3)**

Nature and distribution of land, air and water transport facilities and their importance in regional development. Prerequisite: GEOG 120G or consent of instructor.

**GEOG 472 - Soil Morphology and Classification (4)**

Same as SOIL 472.

**GEOG 473 - Advanced Remote Sensing (4)**

Introduction to advanced topics in digital image processing, analysis, interpretation, and visualization. Topics include geometric and radiometric correction, image enhancement, image classification, change detection, and accuracy assessment. Lectures focus on the discussion of advanced remote sensing concepts, techniques, and applications; labs are applications-oriented. Prerequisite(s): GEOG 373, Intro to Remote Sensing or consent of instructor.

**GEOG 481 - Fundamentals of Geographic Information Science and Technology (GIS & T) (4)**

Fundamentals of computer-based systems which organize, analyze, and present spatially referenced data. Taught with GEOG 578. Prerequisite(s): GEOG 281 or GEOG 381.

**GEOG 482 - Geodatabase Design (3)**

A practical introduction to designing geodatabases. The course takes you through the eleven steps of geodatabase design divided into four stages: thematic characterization; developing the database elements, relationships and properties; capture and collection; and finally, implementation and documentation. Taught with GEOG 572. Prerequisite(s): GEOG 481 or consent of instructor.

**GEOG 483 - Field Explorations in Geography (3)**

A field-based class where students complete exercises in physical, human, and environmental geography in the Southwest. May be offered as a two-week intensive class where students are away from Las Cruces and camping; or may be offered with weekend field trips depending on the instructor. A lab fee for transportation and other expenses is required. Taught with GEOG 583. Prerequisite(s): Geography 281, physical geography class, human geography class, or equivalents, or consent of instructor.

**GEOG 487 - Geographic Information Science and Technology (3)**

A capstone course in geospatial analysis. Demonstration of competence in the use of geospatial tools, techniques, and concepts for the solution of applied geographic problems. Software may change from semester to semester. Taught with GEOG 577. Prerequisite(s): GEOG 373 and GEOG 481.

**GEOG 491 - Special Topics (1-3)**

Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits. Consent of instructor required.

**GEOG 492 - GIS&T Applications and Modeling (3)**

Group oriented class in which students conduct an applied research project in GIS application or modeling area of choice and conduct focused library research. Taught with GEOG 521 Prerequisite(s): GEOG 481 or Consent of Instructor.

**GEOG 493 - Special Problem Research (1-3)**

For advanced and exceptional students. Research, and preparation of a paper in some phase of geography. A maximum of 6 credits may be earned. Consent of instructor required.

**GEOG 495 - Directed Readings (1-3)**

Individual study through selected readings. A maximum of 6 credits may be earned. Consent of instructor required.

**GEOG 501 - Research Design and History of Geographic Thought (3)**

Understanding and application of the research process, including conceptualization and definition of a research problem, study designs, data sources, data collection, and report writing in development of geographic thought.

**GEOG 521 - GIS & T Applications and Modeling (3)**

Group oriented class in which students conduct an applied research project in a GIS application or modeling area of choice and conduct focused library research. Taught with GEOG 492. Prerequisite(s): GEOG 481, or consent of instructor.

**GEOG 552 - Landscape Ecology (3)**

Analysis of the structure, function and change of natural and anthropogenic landscapes. Patches, corridors, matrix and network, spatial organization, landscape dynamics, and role of disturbance in overall functioning of landscapes. Role of landscape heterogeneity in landscape management. Taught with GEOG 452. Prerequisite(s): Either GEOG 351, BIOL 301, or other basic ecology course or consent of instructor.

**GEOG 553 - Geomorphology (3)**

Examination of the principle theories and concepts of landform creation; exploration of the roles of structure, processes, climate, and time in the formation of various types of landforms. Taught with GEOG 353. Prerequisite(s): GEOG/GEOL 353 or GEOG/GEOL 111G.

**GEOG 555 - Southwest Environments (3)**

The U.S. Southwest: physical and human geography, coupled human-environment interactions, causes and consequences of environmental issues, and implications for sustainable development. Taught with GEOG 455. Prerequisite(s): GEOG 281, physical geography class, human geography class, or equivalents, or consent of instructor.

**GEOG 557 - Fundamentals of Biogeography (3)**

Floristic and physiognomic characteristics of the Earth's major ecosystems and their distributions; ecosystem dynamics, evolution, and physical environment; field and laboratory techniques including remote sensing. Taught with GEOG 351.

**GEOG 571 - Cartography and Geographic Information Systems (4)**

Graduate level design and construction of thematic maps. Introduction to cartographic principles in lecture. Emphasis on map-making using GIS software in the labs. Taught with GEOG 381. Prerequisite(s): GEOG 281.

**GEOG 572 - Geodatabase Design (3)**

Graduate level introduction to designing geodatabases. The course takes you through the eleven steps of geodatabase design divided into four stages: thematic characterization; developing the database elements, relationships and properties; capture and collection; and finally implementation and documentation. Taught with GEOG 482. Consent of instructor required. Prerequisite(s): GEOG 481.

**GEOG 573 - Introduction to Remote Sensing (4)**

Graduate level introduction to the theory, techniques, and applications of remote sensing. Topics include electromagnetic radiation; remote sensing systems; remote sensing of the biosphere, hydrosphere, atmosphere, lithosphere, and cultural landscapes. Course includes lectures and also labs focused on the basic analysis and interpretation of remote sensing product. Taught with GEOG 373. Prerequisite(s): GEOG 571.

**GEOG 577 - Geographic Information Science and Technology (3)**

Graduate level capstone course in geospatial analysis. Demonstration of competence in the use of geospatial tools, techniques, and concepts for the solution of applied geographic problems. Software may change from semester to semester. Taught with GEOG 487. Prerequisite(s): GEOG 373 and 481.

**GEOG 578 - Fundamentals of Geographic Information Science and Technology (GIS & T) (4)**

Graduate level fundamentals of computer-based systems that organize, analyze, and present spatially referenced data. Taught with GEOG 481. Prerequisite(s): GEOG 571 or consent of instructor.

**GEOG 581 - System Design for Geographic Information Science and Technology (GIS & T) (3)**

A critical aspect of GIS is its ability to provide the necessary products within the organization within which it is implemented. This is an in-depth analysis of currently accepted planning methodologies designed to create a successful implementation of GIS inside organizations. Taught with GEOG 441.  
Prerequisite(s): GEOG 481 or consent of instructor.

**GEOG 582 - Advanced Remote Sensing (4)**

Graduate level introduction to advanced topics in digital image processing, analysis, interpretation, and visualization. Topics include geometric and radiometric correction, image enhancement, image classification, change detection, and accuracy assessment. Lectures focus on the discussion of advanced remote sensing concepts, techniques, and applications; labs are applications-oriented. Prerequisite(s): GEOG 373/573 or consent of instructor.

**GEOG 583 - Field Explorations in Geography (3)**

A graduate level field-based class where students complete exercises in physical, cultural, and environmental geography in the Southwest. May be offered as a two-week intensive class where students are away from Las Cruces and camping; or may be offered with weekend field trips depending on the instructor. A lab fee for transportation and other expenses is required. Prerequisite(s): Basic map reading skills, physical geography class, human geography class, or equivalents, or consent of instructor.

**GEOG 585 - Advanced Spatial Analysis (3)**

Introduction to basic spatial and aspatial descriptive statistics, statistical analysis of point and area patterns, critical review of quantitative research in geography, and exploration of advanced spatial analysis routines including cluster analysis, hot/cold spot analysis, and spatially weighted regression. Prerequisite(s): STAT 251 or E ST 311; or consent of instructor.

**GEOG 586 - Geospatial Techniques for Natural Resource Assessments (3)**

Use of integrated geographic information science and technology (GIST, includes remote sensing and geographic information systems) approaches for the monitoring and assessment of environmental issues. Lectures focus on the analysis and evaluation of current uses, potentials, and challenges of GIST. Labs emphasize the design and implementation of an original research project that uses GIST to model a local or regional environmental issue. Prerequisite(s): Geography 481/521 and 373/573 or equivalents.

**GEOG 595 - Directed Readings (1-3)**

Advanced individual study through selected readings. May be repeated for a maximum of 6 credits.

**GEOG 596 - Residency (3-12)**

A contractual learning experience in the public or private sector under the supervision of a field supervisor and two faculty members. Restricted to majors. PR/U grading only.

**GEOG 597 - Seminar in Advanced Digital Imagery (3)**

Supervised group study of geospatial techniques using advanced digital imagery. May be repeated for a maximum of 6 credits when topics change. Prerequisite: Graduate standing or consent of instructor.

**GEOG 598 - Selected Topics (1-3)**

Readings, discussions, lectures or laboratory studies of selected geographic themes. May be repeated for unlimited credit.

**GEOG 599 - Master's Thesis (0-12)**

Supervised individual study of a student's thesis topic. May be repeated for an unlimited number of credits.

**GEOLOGY****GEOLOGY 452 - Geohydrology (4)**

Origin, occurrence, and movement of fluids in porous media assessment of aquifer characteristics. Development and conservation of ground water resources, design of well fields. Crosslisted with: C E452 and E S452. Prerequisite(s): Junior or senior.

**GEOLOGY 454 - Advanced Stratigraphic Concepts (3)**

Geometry and origin of strata, emphasizing techniques for correlation and interpretation. Prerequisite: GEOLOGY 420 or equivalent.

**GEOLOGY 455 - Applied Geology (1-3)**

Geological research and field projects for the advanced student. May be repeated for a total of 6 credits. Prerequisite: consent of instructor.

**GEOLOGY 465 - Isotope Geochemistry (3)**

Geochemistry of stable and radiogenic isotopes and its application to a wide range of problems in the earth and planetary sciences. Prerequisite(s): CHEM 112G, GEOLOGY 360, GEOLOGY 399.

**GEOLOGY 470 - Structural Geology (3)**

Deformation of rocks of the earth. Prerequisite: GEOLOGY 310

**GEOLOGY 474 - Ground Water Geology (3)**

Steady-state and transient ground-water flow in porous media: effects of lithology on hydrologic characteristics of aquifers and confining units; Darcy's Law applied to steady-state flow; distribution of hydraulic head in confined and unconfined aquifers; recharge and discharge in regional and local ground-water flow systems; ground-water surface-water interaction; steady-state and transient flow to wells; aquifer testing and evaluation of safe yields. Introduction to numerical flow modeling. Prerequisite: GEOLOGY 111G.

**GEOLOGY 475 - Geology of Mineral Resources (3)**

Introduction to ore deposits and industrial rocks and minerals; genesis, mining methods, estimation of reserves, exploration, and economic aspects of selected commodities. Prerequisite: GEOLOGY 399.

**GEOLOGY 476 - Marine Paleogeology (3)**

Paleontological and sediment logic analysis of the fossil marine record to reconstruct past ecosystems by interpreting the life habits of past organisms, their association in communities and their relationship to the environments in which they lived.

**GEOLOGY 477 - Special Problems (1-3)**

Selected advanced topics of current interest or importance. May be repeated for a total of 6 credits. Prerequisite: consent of instructor.

**GEOLOGY 478 - Petroleum Geology (3)**

Stratigraphy, tectonics, and sedimentation in relation to occurrence of and exploration for hydrocarbons. Prerequisite: GEOLOGY 420.

**GEOLOGY 479 - Environmental Soil Chemistry (3)**

Same as SOIL 479.

**GEOLOGY 480 - Seminar (1-3)**

Supervised study of a subject not covered by regular courses. For organized group meetings treating selected advanced topics. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.

**GEOLOGY 490 - Field Geology (3)**

Mapping, instrumentation, and interpretation of geology in the field. Prerequisites: either GEOLOGY 420 and GEOLOGY 470.

**GEOLOGY 491 - Tectonic Evolution of North America (3)**

Current ideas regarding the plate-tectonic evolution of North America from Archean through Holocene time, emphasizing the use of regional stratigraphy and structural geology to interpret mountain building, magmatism, and basin development. Prerequisites: GEOLOGY 111G, GEOLOGY 399, GEOLOGY 420 and GEOLOGY 470.

**GEOLOGY 495 - Geology Field Camp (4)**

Three week intensive summer course. Geologic mapping in a site-based setting, emphasizing spatial relations, cross-section construction, and preparation of geologic reports. Prerequisite: GEOLOGY 490

**GEOLOGY 499 - Senior Thesis (1-3)**

Writing a formal paper describing original geologic research conducted under supervision of a faculty advisor. Prerequisite: consent of instructor. Restricted to majors.

**GEOLOGY 501 - Geology Colloquium (1)**

Presentations by visiting speakers and graduate students.

**GEOLOGY 508 - Geology for Educators (3)**

Assists K-12 teachers in developing pedagogy and content knowledge in the subject area of geology.

**GEOLOGY 515 - Advanced Principles of Geochemical Equilibria (3)**

Theory of thermodynamics and the applications of thermodynamics to geological problems. Phase equilibria in water-dominated and magmatic systems.

**GEOLOGY 516 - Colorado Plateau Seminar (3)**

Geologic history of the Colorado Plateau culminating in a 10-day field trip to choice geologic localities in Arizona and Utah. Prerequisites: GEOLOGY 420 or equivalent.

**GEOLOGY 520 - Selected Topics (1-3)**

Selected topics in geology. Prerequisites: graduate standing and consent of instructor. May be repeated for unlimited credit.

**GEOL 530 - Sandstone Petrology (3)**

Provenance and diagenetic history of sand and sandstone as determined by thin-section analysis.

**GEOL 531 - Depositional Environments (3)**

Interpretation of clastic depositional environments with reference to rock units exposed in southern New Mexico.

**GEOL 532 - Carbonate Petrology and Depositional Systems (3)**

Textures, composition, diagenesis, and interpretation of carbonate rocks. Laboratory study of rock suites and thin sections illustrating carbonate facies.

**GEOL 533 - Petroleum Geophysics (3)**

Introduction to fundamentals of exploration seismology, including seismic acquisition, processing, and geologic interpretation of 2-D data sets. Interpretation encompasses major geologic structural styles, including thrust belts, rift basins, and salt provinces.

**GEOL 534 - Tectonics of Sedimentary Basins (3)**

Origin of sedimentary basins with emphasis on subsidence mechanisms, geometry of basin fill and tectonic setting. Lab exercises include field techniques and seismic interpretation. Prerequisites: GEOL 420 or equivalent or consent of instructor.

**GEOL 553 - Applied Geomorphology (3)**

Same as GEOG 553.

**GEOL 554 - Advanced Stratigraphic Concepts (3)**

Geometry and origin of strata, emphasizing techniques for correlation and interpretation.

**GEOL 560 - Geochemistry of Diagenetic and Hydrochemical Systems (3)**

Solution-mineral equilibria and chemical kinetics applied to water-rock interactions, including diagenetic processes in sediments and sedimentary basins.

**GEOL 562 - Analytical Geochemistry (3)**

Techniques used to determine the major element, trace element and isotopic composition of rocks and minerals and the determination of mineral structure.

**GEOL 565 - Isotope Geochemistry (3)**

Trace element partitioning and isotope systematics applied to problems in petrology and ore genesis.

**GEOL 567 - Global Geochemical Systems (3)**

Generation of major element, trace element, and isotopic signatures of igneous rocks in different tectonic settings and propagation or destruction of those signatures by sedimentary and metamorphic processes.

**GEOL 576 - Marine Paleocology (3)**

Paleontological and sediment logic analysis of the fossil marine record to reconstruct past ecosystems by interpreting the life habits of past organisms, their association in communities and their relationship to the environments in which they lived.

**GEOL 578 - Petroleum Geology (3)**

Stratigraphy, tectonics, and sedimentation in relation to occurrence of and exploration for hydrocarbons. Prerequisite(s): GEOL 420.

**GEOL 580 - Tectonic Evolution of the Western U.S. (3)**

Geologic history and tectonic evolution of the Western U.S. Cordillera from the Precambrian assembly of the craton to the recent history of rifting in the Rio Grande valley. Focus on the geology of the Southwest, particularly southern New Mexico, but also topics such as evolution of San Andreas fault system.

**GEOL 582 - Plate Tectonics (3)**

Plate tectonics as a fundamental model for geological activity on a dynamic earth. Focuses on plate tectonic theory development and mechanisms, plus modern analogs of ancient processes.

**GEOL 584 - Cenozoic Geology (3)**

The Cenozoic geologic history of western North America is examined through lectures, discussion of classic and current literature, and local area field trips. Topics include the Laramide orogeny, ignimbrite flare-up, and Basin and Range/Rio Grande rift crustal extension.

**GEOL 585 - Geochronology (3)**

The principles, analytical methods, and interpretation of the most common geochronologic methods.

**GEOL 590 - Advanced Field Geology (3)**

Advanced problems in reconnaissance and detailed mapping and interpretation of rocks in the field. Main campus only.

**GEOL 598 - Special Research Programs (1-3)**

Investigations into contemporary geological problems. Prerequisites: graduate standing and consent of instructor. May be repeated for unlimited credit.

**GEOL 599 - Master's Thesis (0-15)**

Thesis research.

**GER - GERMAN****GER 451 - Special Topics in German (1-3)**

Selected topics in German language, literature or area studies announced in Schedule of Classes. May be repeated for credit when topic changes. Prerequisite: consent of instructor. May be repeated for a maximum of 12 credits.

**GER 453 - Independent Studies in German (1-3)**

Individualized, self-paced projects for advanced students. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.

**GERO - GERONTOLOGY****GERO 450 - Health Promotion for the Older Adult (3)**

Common health concerns and lifestyle issues relevant to older adults. Facts about the content area, health behaviors, and practices to promote health and prevent disease; program development strategies applicable to a variety of settings. Same as MPH 557.

**GERO 451 - Aging and Public Policy (3)**

Exploration of public policies relating to elders, historical development, current status and trends in public policy for this age group. Impact of political behavior of elders on policy making and implementing processes.

**GERO 456 - Biological Aspects of Aging (3)**

Aging, the developmental process of the body determined by cellular changes influenced by lifestyle, genetics, and environment. Investigates these changes, how health promotion influences them, and when they are considered a disease. Same as MPH 556.

**GERO 493 - Adulthood and Aging (3)**

Normal transitions in later life; those occurring from 40 years of age to the end of life are discussed. Changes in interpersonal relationships and adaptations commonly made by individuals and meeting those alterations are presented through research findings, case studies, and autobiographies. Same as MPH 593.

**GERO 494 - Aging in a Multicultural Society (3)**

Study and comparison of aging in the southwestern multicultural society with emphasis on health care. Same as MPH 594.

**GERO 495 - International Aging and Intellectual Disabilities (3)**

Graduate course for policy planners and staff trainers working in the field of Intellectual Disabilities. The course content will be relevant to service provision in developed and developing countries with emphasis on diverse cultures. The consequences of increased longevity for both social and health provision and family careers are covered.

**GERO 498 - Independent Study (1-3)**

Individual studies with prior approval of health science department head. Prerequisite: senior standing and consent of instructor. May be repeated for maximum of 6 credits.

**GOVT - GOVERNMENT****GOVT 465 - Peru: From Incas to Inca Kola (3)**

Explores issues of cultural and national identity in Peru from the Incas to the present, focusing on the modern period. Themes include indigenous resistance and adaptation to colonial rule, nationalism, militarism, terrorism, globalization, and the drug trade. Same as ANTH 459 and HIST 459.

**GOVT 468 - Rebels, Guerrillas, and Terrorists in Modern Latin America (3)**

Explores history of rebels in Latin America. Examines guerilla struggles attaining national dimension. Focus on modern events, including Peru's Shining Path, Columbia's FARC, and Mexico's Zapatistas. Same as HIST 331.

**GOVT 469 - Globalization (3)**

Analysis of the globalization process. Covers theories of globalization, the global economy, political globalization, global culture, transnational social movements, transnational migration and world labor market, global cities, and local-global linkages. Same as SOC 489.

**GOVT 473 - Germany (3)**

- Political, social, and cultural developments from the eighteenth century to the present, with emphasis on the Nazi era. Same as HIST 383.
- GOVT 474 - European Politics (3)**  
Politics in European countries, European integration, post-communist states, regionalism and border politics.
- GOVT 476 - Modern Eastern Europe (3)**  
Addresses the diversity of Eastern European political and cultural experiences from the end of the 19th century to the present day. Same as HIST 380.
- GOVT 493 - Mass Communications Law (3)**  
Same as JOUR 493 and COMM 493.
- GOVT 501 - Scholarly and Professional Writing (1)**  
Research, writing and editing skills for advanced academic and professional communication in disciplinary contexts.
- GOVT 502 - Research Methods in Government (3)**  
Contemporary methods of political analysis, including mathematical and statistical techniques and computer applications. MPA students must complete this class with a B- or better. MA students must complete either GOVT 502 or GOVT 503 with a B- or better.
- GOVT 503 - Qualitative Research Methods (3)**  
An overview of qualitative research methods such as fieldwork, ethnography, content analysis, case studies, focus groups and grounded theory. Introduces students to epistemology (the study of knowledge) and to basic components of research design. Explores activist scholarship, ethical dilemmas in research, and software tools for computer assisted analysis. Especially useful for students preparing theses, dissertation, or other research projects. MA students must complete either GOVT 503 or GOVT 502 with a B- or better.
- GOVT 505 - Directed Readings (1-3)**  
Selected topics in government. May be repeated for a total of 6 credits. Graded S/U. Prerequisite: consent of instructor.
- GOVT 510 - Internship (1-6)**  
Assignment with a public agency and research report. Only 3 credits apply toward degree requirements. Graded S/U. Prerequisite: approval of graduate advisor.
- GOVT 517 - Selected Topics in Government (3)**  
Selected issues which may cross sub-fields of the discipline. May be repeated for a total of 6 credits.
- GOVT 519 - Proseminar in Public Administration (3)**  
Review of classic and contemporary theory and practice in public administration. Application of written and oral skills to the presentation and defense of essays on various aspects of public administration. To be completed with a B- or better. Prerequisite(s): 30 credits of M.P.A.
- GOVT 522 - Public Sector Economics I (3)**  
Same as AEEC 522.
- GOVT 523 - Public Sector Economics II (3)**  
Same as AEEC 523.
- GOVT 524 - American Indian Politics (3)**  
Introduction to American Indian tribal governments, politics, policy, and administration; historical and contemporary leadership of Indian Nations; and the history and current status of American Indian-U.S. relations. Students learn about Native peoples' cultural responses, forms of resistance, and adaptations to colonization.
- GOVT 526 - Women, Politics and Administration (3)**  
Examination of women's participation in U.S. electoral politics as voters, candidates, and officeholders; their political activism in issue-based movements and strategies for affecting public policy; leadership as administrators and managers in public service agencies. Course also covers the influence of feminism in changing women's roles socially, legally, and politically.
- GOVT 527 - Issues in Public Management (3)**  
Selected issues in public management. May be repeated under different subtitles for a total of 6 credits.
- GOVT 528 - Public-Private Partnerships (3)**  
This course explores how taxpayer-funded services are administered and delivered through public-private partnerships involving privatization and government contracting with the nonprofit sector and for-profit companies. The class will explore funding, legal, accountability, and stakeholder issues in partnerships in health and human services, criminal justice, and homeland security.
- GOVT 530 - Seminar in Public Policy (3)**  
Survey of the political, administrative, and technical aspects of policy making in government. MA students taking Govt 530 as part of their core requirements must complete the class with a B- or better.
- GOVT 531 - Public Program Evaluation (3)**  
Politics, processes, and techniques for evaluating both program operations and the outcome of program endeavors.
- GOVT 535 - Education Policy and Politics (3)**  
Overview of current pressing policy issues and political debates on education in the U.S., including school choice, vouchers, accountability, and affirmative action. Multiple topics and perspectives covered, with political economy the main approach.
- GOVT 537 - Issues in Public Policy (3)**  
Selected issues in public policy. May be repeated under a different subtitle for a total of 6 credits.
- GOVT 540 - Seminar in Public Administration (3)**  
Survey course on the theory and practice of program, personnel, and financial management in government and the private, nonprofit sector. MA students taking Govt 540 as part of their core requirements must complete the class with a B- or better.
- GOVT 541 - Public Budgeting (3)**  
Budgetary processes; budget classification, analysis, and evaluation. MPA students must complete this class with a B- or better.
- GOVT 542 - Public Sector Human Resources Management (3)**  
Exploration of public personnel systems and practices, including job analysis, compensation, performance evaluation, recruitment, and labor-management relations. MPA students must complete this class with a B- or better.
- GOVT 543 - Skills Workshop (1-6)**  
Focus on management of task skills in selected areas of public administration. Specific topics will appear in the Schedule of Classes; may be repeated for a total of 6 credits.
- GOVT 544 - Public Policy Analysis (3)**  
Environment of policy analysis; various descriptive and quantitative designs for analyzing and evaluating public policy. Problems of policy analysis. MPA students must complete this class with a B- or better. Prerequisite(s): GOVT 502 or consent of instructor.
- GOVT 547 - Government Organizations (3)**  
Historical overview and present applications of organization theory in public management. MPA students must complete this class with a B- or better.
- GOVT 548 - Public Sector Leadership (3)**  
Theories and styles of leadership.
- GOVT 549 - Ethics in Government (3)**  
Examination of standards, perspectives, and issues for ethical decision-making in public agencies. MPA students must complete this class with a B- or better.
- GOVT 550 - Seminar in American Politics (3)**  
Overview of American political institutions. Includes study of American constitutional theory; legislative, executive, and judicial functions and processes; political parties and interest groups; and public policy formulation. MA students taking Govt 550 as part of their core requirements must complete the class with a B- or better.
- GOVT 553 - Issues in American Politics (3)**  
Selected issues in American Politics. May be repeated under a different subtitle for a total of 6 credits.
- GOVT 560 - Seminar in International Relations Theory (3)**  
A critical overview of leading approaches and controversies in international relations theory. The purpose of the course is to introduce students to contending theoretical perspectives and conceptual frameworks that help make sense of contemporary world politics. MA students taking Govt 560 as part of their core requirements must complete the class with a B- or better.
- GOVT 562 - Advanced Issues in Security and Intelligence Studies (3)**  
Selective issues in comparative security and intelligence studies.
- GOVT 563 - Issues in International Relations (3)**

Selected issues in international relations. May be repeated under a different subtitle for a total of 6 credits.

**GOVT 564 - Advanced National Security Policy (3)**

Major topical, theoretical, and regional issues in national security policy.

**GOVT 566 - Advanced Issues in American Foreign Policy (3)**

Major topical, theoretical, and regional issues in American foreign policy. May be repeated for a maximum of 6 credits under different subtitles.

**GOVT 567 - Terrorism and Political Violence (3)**

An advanced graduate course using an interdisciplinary framework to explore definitions, historical roots, contemporary manifestations and future trends in political terrorism. The course seeks to understand modern-day terrorism as a form of political violence.

**GOVT 568 - Advanced Intelligence Studies (3)**

Advanced survey of major theoretical approaches and substantive issues in intelligence studies.

**GOVT 569 - Advanced Issues in Globalization (3)**

Analysis of the globalization process. Covers theories of globalization; global economy; political globalization; global culture; transnational social movements; transnational migration and world labor market; global cities; local-global linkages. Same as SOC 589.

**GOVT 570 - Seminar in Comparative Politics (3)**

Examination of methods used for comparing various types of political entities. Investigation of criteria needed to examine a concept across cultures or national boundaries. MA students taking Govt 570 as part of their core requirements must complete the class with a B- or better.

**GOVT 571 - Seminar in Latin American Politics (3)**

Overview of the political structures of the Latin American region. Addresses a number of contemporary issues facing Latin American states, including interest groups, the church, labor, political parties, U.S.-Latin American relations, political development.

**GOVT 573 - Resistance Movements in World Politics (3)**

Advanced research on violent and non-violent resistance movements around the world. Focus on origins, demands, ideologies, strategies and impacts in the post-Cold War context of economic globalization, US military power and new geopolitical dynamics.

**GOVT 574 - Contemporary Comparative Studies (3)**

Major topical, theoretical, and regional issues in international politics. May be repeated once.

**GOVT 575 - Issues in Comparative Politics (3)**

Selected issues in comparative politics. May be repeated under a different subtitle for a total of 6 credits.

**GOVT 578 - Seminar in the U.S.-Mexican Border (3)**

An analysis of the political environment along the United States-Mexico border and a survey of the literature available for a number of contemporary issues.

**GOVT 579 - Seminar in Mexican Politics (3)**

Advanced research on politics and government of Mexico.

**GOVT 580 - Seminar in Political Theory (3)**

Examination of major issues in political theory, including democracy, sovereignty, classical and modern traditions of thought. May be repeated with different subject matter. MA students taking GOVT 580 as part of their core requirements must complete the class with a B- or better.

**GOVT 582 - Study of Political Theory (3)**

Examination of methods of interpretation and analysis of political theory, including Straussian, structuralist, historical, and other approaches to the study of political theory.

**GOVT 587 - Seminar in Religion and Politics (3)**

Historical, theoretical and comparative analyses of the interaction between politics and religion.

**GOVT 590 - Seminar Public Law and Legal Systems (3)**

Focus on U.S. Constitutional Law and other national legal systems. MA students taking Govt 590 as part of their core requirements must complete the class with a B- or better.

**GOVT 591 - Law for Administrators (3)**

Case-law definitions of the legal roles and powers of public administrators.

**GOVT 593 - Issues in Public Law (3)**

Selected issues in public law. May be repeated under a different subtitle for a total of 6 credits.

**GOVT 596 - International Law (3)**

Nature, growth and scope of law of nations; rights and obligations of states in peace and war; current issues.

**GOVT 598 - Special Research Programs (1-3)**

Individual investigations either theoretical, analytical or experimental. Three credits may be taken per semester for a total of 6 credits for thesis students, and 9 credits for non-thesis students. Consent of instructor required.

**GOVT 599 - Master's Thesis (0-15)**

Thesis.

**GPHY - GEOPHYSICS**

**GPHY 450 - Selected Topics (1-3)**

Readings, discussions, lectures or laboratory studies of selected areas of geophysics. Prerequisite: consent of instructor. May be repeated for a maximum of 12 credits.

**GPHY 500 - Special Topics Seminar (1-2)**

Supervised study of selected topics not covered by regular courses.

**GPHY 510 - Geophysical Field Methods (1-3)**

Field collection, reduction, and interpretation of geophysical data; equipment operation.

**GPHY 520 - Selected Topics (1-3)**

Formal treatment of graduate topics not covered in regular courses. Prerequisites: graduate standing, consent of instructor, and selection of a specific topic prior to registration. May be repeated for unlimited credit.

**GPHY 530 - Seismology (3)**

Seismic wave propagation in a layered earth, ray theory, exploration techniques, earth structure, and seismicity. Prerequisites: PHYS 511, MATH 472, or equivalent.

**GPHY 540 - Physics of the Earth and Planetary Interiors (3)**

Formation and evolution of the Earth and planets. Internal physical and chemical structure. Pressure and temperature effects on rocks. Equations of state. Physical mechanisms of plate tectonics. Physics of the Earth's core, planetary magnetism, geodynamo. Prerequisites: consent of instructor.

**GPHY 560 - Applied Inverse Theory (3)**

Inversion of data with an emphasis on geophysical problems. Curve fitting, tomography, earthquake location, overdetermined and underdetermined problems, linear and nonlinear problems. Computing experience desirable. Prerequisite(s): Either MATH 280, equivalent, or consent of instructor.

**GPHY 598 - Special Research Problems (1-3)**

Individual investigations, either analytical or experimental. May be repeated for unlimited credit.

**GPHY 599 - Master's Thesis (0-15)**

Thesis.

**GPHY 620 - Advanced Topics in Geophysics (3)**

Advanced formal treatment of a topic or topics not covered in regular courses. Prerequisite: consent of instructor. May be repeated for unlimited credit.

**GPHY 621 - Special Topics Seminar (1-3)**

Seminar treatments of advanced special topics in geophysics. Prerequisite: consent of instructor. May be repeated for unlimited credit.

**GPHY 630 - Theoretical Seismology I (3)**

Advanced treatment of wave propagation, ray theory, inversion methods, extension to heterogeneous media, and free oscillations. Prerequisite(s): GPHY 530.

**GPHY 700 - Doctoral Dissertation (0-15)**

Dissertation.

**HIST - HISTORY**

**HIST 500 - Special Topics (1-9)**

Specific subjects to be announced in the Schedule of Classes. Graduate research paper required. May be repeated for a maximum of 12 credits.

**HIST 502 - Revolutionary America, 1763-1800 (3)**

Development and consequences of the American Revolution, Articles of Confederation, Constitution, and Federalist period. Graduate research paper required.

**HIST 503 - The Jacksonian Era, 1800-1840 (3)**

Jeffersonian period, War of 1812. Social, political, and economic history of the Jacksonian era. Graduate research paper required.

**HIST 504 - Civil War Era, 1840-1877 (3)**

Mexican-American War, development of secession, American Civil War, Reconstruction. Graduate research paper required.

**HIST 505 - Progressive United States, 1877-1920 (3)**

Gilded Age through end of World War I. Emphasis on Populist movement, progressive reform, the impacts of industrialization, imperialist expansion, and World War I.

**HIST 506 - The New Deal, 1920-1960 (3)**

Roaring Twenties through Eisenhower presidency. Emphasis on the Great Depression, Roosevelt's New Deal, World War II, origins of the Cold War, and impact of the postwar baby boom. Research paper required.

**HIST 508 - Environmental History (3)**

Seminar discusses how the natural environment and people have shaped each other, and how people have perceived and imagined the natural world. May focus upon one specific topic or area. Course includes a field trip outside regular class times.

**HIST 509 - Native American History (3)**

Seminar explores the history of Native Americans, including tribal conflicts, interactions with Europeans, and Euro-Americans, land loss, degradation of natural resources, federal Indian policy, pan-Indian movements, cultural resistance and revitalization, and modern tribal economies.

**HIST 510 - New Mexico History for Educators (3)**

Course provides advanced content and innovative techniques for teachers of New Mexico history. Covers pre-contact Native American history through Spanish Colonial and Mexican periods through the twentieth century.

**HIST 511 - Making the American West (3)**

Development of the American West from 1803 to 1900, with emphasis on conquest, federal and corporate roles in western development, environmental change, and the mythic West. Includes extra class meetings to view feature-length films. Graduate research paper required.

**HIST 516 - History of Latinos in the United States (3)**

Development of Latino communities since 1500 in what is today the United States. Emphasis on 1846 to present, and on Mexican Americans, Puerto Ricans, and Cuban Americans. Major themes: race, colonialism, immigration, nationalism, class, culture, gender, and politics. Graduate research paper required.

**HIST 518 - From the Wild West to the Atomic West (3)**

Explores the transformation of the West, with particular attention to the roles of race, class, gender, and culture. Includes extra class meetings to view feature-length films. Graduate research paper required.

**HIST 520 - History of Women and Gender (3)**

Seminar discusses the position of women and the roles of both sexes in specific historical and geographic setting. Course emphasizes the ways in which women and gender were both central to and fundamentally affected by all political and social transformations in history.

**HIST 521 - U. S. Foreign Relations to 1919 (3)**

Foreign relations from colonial origins through World War I. Emphasis on diplomacy of the Founding Fathers, the continental expansion, and the United States rise to world power.

**HIST 522 - U. S. Foreign Relations since 1919 (3)**

Foreign relations from the conclusion of World War I to the present. Emphasis on isolationism, World War II, Soviet-American relations, Vietnam, and new challenges in a multipolar world.

**HIST 524 - Art, Thought and Literature (3)**

Seminar discusses a variety of artistic and literary expressions in their historical contexts and focuses on the ways in which cultural forms both reflect and construct the broader historical trends that surround them.

**HIST 525 - History of Magic and Witchcraft in Medieval and Renaissance Europe (3)**

Examines history of popular and scientific beliefs about magic and witchcraft in medieval and early modern Europe. Includes origins of occult Western sciences; Arabic sources of medieval magic; the occult sciences in scholasticism; witchcraft and scholasticism; witchcraft and medieval theology, witch hunts of the 16th and 17th centuries; and the decline of belief in magic and witchcraft. Emphasis on boundaries that defined and separated magic, science, and religion in Western thought from late antiquity through the Scientific Revolution. Prerequisite: HIST 101G.

**HIST 526 - Social and Cultural History (3)**

Seminar discussions focus on methodological approaches to social and cultural history in specific historical and geographical contexts. Includes such themes as historical demography, family structure, class formation, community and popular culture.

**HIST 527 - Labor History (3)**

Seminar discussions explore labor and working-class history, including such topics as pre-industrial labor, slavery, debt peonage, indentured servitude, and housework. May explore the history of labor organization, working-class culture and leisure activities, and responses to labor issues by the state.

**HIST 528 - History of Terrorism in Modern Europe and the Middle East (3)**

Advanced analyses of causes, methods, and consequences of terrorism in Europe and the Middle East from the Reign of Terror in the French Revolution to Al-Qaeda, Hamas, and Hezbollah in the contemporary Middle East and beyond.

**HIST 529 - Plague, Plunder, and Preservation: American Environmental History (3)**

Explores how the natural environment influenced human actions, decisions, and cultural and social development from the colonial period to the present; how people reshaped and reordered the natural environment; and how people perceived or imagined the natural world. Graduate research paper required.

**HIST 530 - Antiquity and Modernity (3)**

Seminar explores link between earlier and more recent historical periods. Examples may include the Renaissance rediscovery of ancient Rome or the early Chinese reassessment of its classical Confucian heritage. Readings include ancient sources and the modern reception of such works, and the scholarly assessment of these processes. Individual research projects required in areas of student interests.

**HIST 531 - The Scientific Revolution (3)**

Seminar discussions explore scientific thought and practice and technological change in specific historical contexts. Focus will be on the impact of science and technology on society, the development of scientific institutions, and the political and cultural context of science and technology.

**HIST 535 - War and Revolution (3)**

Seminar covers historical dynamics of violent social, political and economic transitions. May focus upon a particular war or upheaval, such as World War II or the French Revolution, or may examine more generic characteristics of conflict and radical change across many historical examples. Extensive readings in scholarly literature. Research projects relating to specific course contents.

**HIST 536 - Nations and Nationalism (3)**

Seminar examines major theories of nationalism from the nineteenth to the twenty-first centuries. Course includes nationalist case studies, from liberal nationalist state-building to ethnic cleansing in the Balkans.

**HIST 537 - Empire and Colonialism (3)**

Seminar covers the rise and fall of imperial and colonial systems. May examine the history of the British Empire, the rise of Russian and Chinese imperial orders in Central Asia, Spanish colonies in the New World, or other specific case studies, or may consider comparative patterns and narratives of imperial, colonial and post-colonial experiences. Readings include primary and secondary sources. Individual research projects required.

**HIST 538 - Special Topics in European History (3)**

Advanced special topics in European history to be announced in the schedule of classes. May be repeated for a maximum of 12 credits.

**HIST 539 - Twentieth Century Science (3)**

The development of science after 1900. Emphasis will be placed on the "second scientific revolution" in physics and on the emergence of genetics and molecular biology.

**HIST 540 - Special Topics in Middle Eastern History (3)**

Advanced special topics in Middle Eastern history to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.

**HIST 541 - Intellectual History of Modern Europe (3)**

Culture and ideas in Europe from 1600 to the present, from the Scientific Revolution to Postmodernism, including ideas and their expression in science, art, literature, and politics. Graduate research paper required.

**HIST 542 - Art and Life in Renaissance Italy (3)**

Examines how Italian Renaissance textual and visual culture offered Europe new ways of seeing and portraying itself, 1350-1550. Topics include: Florence,

- Venice, Rome, Leonardo, Michelangelo, Titian, humanism, the Medici, and republican and courtly culture. Same as ART 542.
- HIST 543 - Special Topics in Asian History (3)**  
Advanced special topics in Asian history to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.
- HIST 544 - Special Topics in Latin American History (3)**  
Advanced special topics in Latin American history to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.
- HIST 545 - Special Topics in United States History (3)**  
Advanced special topics in United States history to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.
- HIST 546 - World War I (3)**  
Cultural, social, and intellectual background and impact of World War I. Military and diplomatic events of the war. Consequences of the war. Graduate research paper required.
- HIST 547 - World War II (3)**  
Social, cultural and political aspects of World War II, in addition to traditional military events. Emphasis on U.S. involvement. Graduate research paper required.
- HIST 548 - Nuclear Nation (3)**  
Explores post-World War II history and the impact that atomic energy has had on the United States and the world.
- HIST 549 - Graduate Readings (1-3)**  
Individual study of selected readings and problems. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.
- HIST 549 L - Splendors of Imperial China (1)**  
This course consists of a FLIP trip to China, Fall 2014 which will explore the significant sites of imperial Chinese culture by spending 14 days traveling in China. Consent of instructor required. Crosslisted with: HIST323 L and ART511 L
- HIST 550 - Latin America and the United States: Uneasy Neighbors (3)**  
Covers U.S.-Latin American relations during the nineteenth and twentieth centuries. Assesses interactions between the United States and other nations in the Americas, surveys U.S. interventions in the region, and appraises social challenges facing the Americas as a whole.
- HIST 551 - Colonial Mexico (3)**  
Political, economic, and social development from the Aztecs to 1821. Graduate research paper required.
- HIST 552 - Modern Mexico (3)**  
From independence to the present, with emphasis on the Revolution. Graduate research paper required.
- HIST 553 - Cuba: Colony to Castro (3)**  
Economic, social, and political development of Cuba and other colonies and nations in the Caribbean, with emphasis on recent events. Graduate research paper required.
- HIST 555 - Brazil (3)**  
Economic, social, and political development of Brazil since independence. The influence of Brazil in the international arena. Graduate research paper required.
- HIST 557 - The Mexican Revolution (3)**  
Origins, causes, and scope of the Mexican Revolution, including leading personalities, with emphasis on the U.S.-Mexican border. Graduate research paper required.
- HIST 559 - Peru: From Incas to Inca Kola (3)**  
Crosslisted with: ANTH 559 and GOVT 565
- HIST 560 - History of Egypt (3)**  
Advanced study of history of Egypt from ancient through modern times. Includes the study of Egypt's interactions with the Middle East and the West, as well as its legacy for both civilizations.
- HIST 561 - Islam and the West: Cultural Contacts, Conflicts and Exchanges (3)**  
Examines interactions, encounters and cross-fertilization between the Islamic world and the West from the seventh to the twenty-first centuries. Course includes origins of Islam, relationships between Islam, Judaism, and Christianity, and concludes with the post 9/11 present. Prerequisites: C or higher grade in HIST 221G or HIST 222 or HIST 461; or enrollment in one of these courses at the same time as enrollment in HIST 561.
- HIST 563 - Nineteenth Century Europe (3)**  
Rise of Europe to a position of economic and political dominance in the world from the French Revolution to World War 1.
- HIST 564 - Twentieth Century Europe (3)**  
Course will address the foremost events, personalities, developments and ideas which marked the European continent during the twentieth century.
- HIST 565 - Cold War Europe (3)**  
Course deals with the Cold War's multipolar international climate as well as the individual paths charted by each European nation in response. Events, leaders, thinkers, ideas and developments will all be featured. Crosslisted with: GOVT 565
- HIST 566 - British Imperialism (3)**  
Survey of the activities of the British empire from the 16th century through the 20th century, with emphasis on Ireland, North America and India. Assesses the impact of imperial activities on British domestic politics, culture and social history, and the process and impact of decolonization.
- HIST 567 - Race and Ethnicity (3)**  
Seminar explores the historical social construction of race and ethnicity, and their relationship to other systems of social difference such as class and gender. Course will examine popular and academic theories of race and ethnicity as well as historical concrete effects of racial and ethnic differences in society.
- HIST 568 - Urban History (3)**  
Seminar discusses cities as complex catalysts for cultural, political, and scientific development, both within cities themselves and more broadly for their nations and regions. Course deals with such topics as the relationship between social organization and physical space; city development, morphology and dynamics; and the cultural and intellectual history of cities.
- HIST 569 - History of Religion and Spirituality (3)**  
Seminar examines religion and spirituality in a variety of historical settings. Includes formal religious institutions, popular religion, and heterodoxy. Introduces students to competing theories of religion.
- HIST 570 - The Cold War in Latin America (3)**  
Seminar discusses Latin American political history during the Cold War. Course focuses on how Latin Americans (individuals, parties, militaries, states) acted in an increasingly politicized arena defined by growing United States concerns over Cuban and Soviet influence in the area.
- HIST 571 - China through the Ming Dynasty (3)**  
History of China from origins to Ming Dynasty, 1368-1644. Cultural and political development with emphasis on social and economic contexts and long term trends. Research paper required.
- HIST 572 - China in the Modern World (3)**  
Covers the history of China from 17th through 20th centuries. Rise and fall of the Manchu Qing dynasty, internal dynamics of social and political change in the 19th and 20th centuries, impact of Western imperialism, and development of the Peoples Republic since 1949. Research paper required.
- HIST 573 - History of Japan (3)**  
Covers the history of Japan through the 20th century. Political and cultural developments and their social and economic contexts. Chinese influence on early Japan, rise of Samurai and Shogunate, impact of Western imperialism, and the emergence of modern Japan. Research paper required.
- HIST 574 - Gender in East Asian History (3)**  
Examines the position of women and the social roles of both sexes in traditional China and Japan, and traces the changes taking place in those societies in the course of modernization in the last century and a half. Scholarly literature and works of Chinese and Japanese literature (in translation) and cinema used. Same as W S 574.
- HIST 575 - History of the Global Political Economy (3)**  
Traces development of global systems of economic interaction and the rise of European dominance in the 18th and 19th centuries. Emphasis on East and South Asian roles in early modern history, and on challenges to European dominance in the 20th and 21st centuries.
- HIST 576 - The Holocaust (3)**  
Advanced study of the attack on European Jews by Adolf Hitler and the National Socialist Party in Germany and occupied Europe from his accession as chancellor in 1933 until the end of the Third Reich in 1945.
- HIST 577 - Early Russia (3)**  
Domestic affairs and international relations from the rise of the Kievan state to the mid-nineteenth century.

**HIST 578 - Modern Russia (3)**

Domestic policies and international relations from the mid-nineteenth century to the present with emphasis on the Soviet experience.

**HIST 579 - Oral History (3)**

Oral history through readings, discussion, and interviews. Course project required that includes an interview and transcription.

**HIST 580 - Graduate Research Projects (1-6)**

Intensive investigation of a selected area of history, including the completion of a research paper or a public history project. Consent of instructor required.

**HIST 581 - Time Traveling Through New Mexico's Past (3)**

Instructs historians and educators on how to make history come alive. Semester project includes role playing characters and activities from a past era with local schools and museums.

**HIST 582 - History and Memory (3)**

Seminar examines the interplay of memory and history. Explores how various nations and people construct the narratives of their past.

**HIST 583 - Advanced Historic Preservation (3)**

Covers the community development, the historic preservation movement, and the built environment. Field project and additional graduate work.

**HIST 584 - Advanced Historical Editing: Theory and Practice (3)**

Readings and projects in historical editing at the NMSU Archives. Includes editing papers and helping to produce a scholarly journal.

**HIST 585 - Public History Internship (3)**

Individual project in an area of public history, including a final written report. Research project required. Prerequisite: consent of instructor. May be repeated for a maximum of 9 credits.

**HIST 586 - Interpreting Historic Places for the Public (3)**

Advanced study of historic site interpretation, the scholarship and philosophy of historic interpretation, and the nature of heritage interpretation for historic places.

**HIST 587 - United States Labor History to 1877 (3)**

Seminar discussions explore United States labor and working-class history to 1877, including such topics as pre-industrial and industrial labor, slavery, debt peonage, indentured servitude and housework. May explore the history of labor organization, working-class culture and leisure activities, and responses to labor issues by the state.

**HIST 588 - United States Labor History since 1877 (3)**

Seminar discussions explore United States labor and working-class history since 1877, including such topics as pre-industrial and industrial labor, slavery, debt peonage, indentured servitude and housework. May explore the history of labor organization, working-class culture and leisure activities and responses to labor issues by the state.

**HIST 590 - Reading Seminar: Borders, Boundaries and Frontiers (3)**

Explores questions and issues concerning different kinds of borders, boundaries and frontiers. Introduces relevant theoretical literature and considers specific places and times through case studies, including U.S.-Mexico border. Restricted to students in HIST program.

**HIST 591 - Reading Seminar: Modernity and its Discontents (3)**

Examines the problem of modernization and the meaning of becoming and being modern, including positive and negative effects on individuals, cultures, environments and societies.

**HIST 592 - Reading Seminar: Nature and Society (3)**

Considers how humans and nature have reshaped each other, how people have perceived nature, how different cultures have understood their relationships to nature, and how social groups and nations have struggled over natural resources. Takes a comparative, transnational approach.

**HIST 593 - Reading Seminar: History, Myth and Memory (3)**

Course analyzes the complex and often contested process of writing national histories, creating national heroes, and forging collective memories. Students assess written texts, memorials, parades and celebrations.

**HIST 594 - Public History Seminar (3)**

Introduction to the discipline of public history, including its methodology and literature. Fieldwork is required.

**HIST 595 - Research Seminar, Oral History (3)**

Research seminar in oral history. Covers techniques, interpretation and use of oral interviewing; techniques of historical writing and documentation.

**HIST 596 - Research Seminar (3)**

Research seminar teaches students the process of conducting original historical research with primary source documents. Students will then use these research skills to produce a polished chapter or article-length manuscript. Restricted to HIST majors.

**HIST 597 - Public History Article (1-9)**

Researching and writing an article suitable for publication about a student's public history internship or other topic of interest within the field of public history.

**HIST 598 - Craft of History: Historical Theories, Methods, and Criticism (f) (3)**

Introduction to historical theories, methodologies, criticism, and skills essential to graduate study in history. Required for all history graduate students; restricted to history majors.

**HIST 599 - Master's Thesis (0-15)**

Thesis.

**HLS - HEALTH SCIENCE****HL S 450 - Epidemiology (3)**

Epidemiologic approaches to disease prevention and control. Factors influencing health status. Restricted to C HL, E S and HNFS majors. Crosslisted with: E S 450

**HL S 451 - Biometrics and Health Research (3)**

Critical analysis of community health research and related methodologies. Prerequisite(s): A ST 311G. Restricted to C HL majors.

**HL S 452 - Environmental Health (3)**

Introduction to environmental health designed to address public health issues. Prerequisite(s): Junior or Senior standing. Restricted to C HL, HNFS and E S majors. Crosslisted with: E S 454

**HL S 453 - Occupational Health (3)**

Identification, control, and prevention of occupational diseases and injuries. Prerequisite(s): Junior or Senior standing. Restricted to C HL and E S majors. Crosslisted with: E S 455

**HL S 454 - Environmental Epidemiology (3)**

Covers thematic and research aspects, as well as methodological issues related to environmental health and epidemiology, along with international and national priorities. Prerequisites: HL S 450 and HL S 452.

**HL S 457 - Administration of Health Programs (3)**

Covers administrative responsibilities, organizational theory, strategic planning, and systems theory as applied to the administration of a variety of health programs. Prerequisite(s): HL S 395 or HL S 450, or consent of instructor. Restricted to C HL majors.

**HL S 458 - Public Health Resources and Policy Analysis (3)**

Covers issues related to U.S.-health policy and allocation of resources. Examination of local, state, and federal public health and health care funding. Assessment of impact of health policy on health education, medical practice, and the workplace. Prerequisite: HL S 457 or consent of instructor. Same as MPH 558.

**HL S 459 - Infectious and Noninfectious Disease Prevention (3)**

History, etiology, and prevention of diseases affecting humans. Taught with MPH 559. Prerequisite(s): HL S 395 or HL S 470. Restricted to C HL majors.

**HL S 460 - American Indian Health (3)**

Critical health issues facing American Indians in the contemporary world. Course included in the undergraduate American Indian Program minor.

**HL S 461 - Health Disparities: Determinants and Interventions (3)**

Investigates: descriptions of health disparities and measurement issues; physical environmental factors, behavioral and emotional variables; impact of aging of the populations, increased racial and ethnic diversity, and technological developments; intervention strategies and evaluation results. Same as MPH 561.

**HL S 462 - Hispanic Health Issues (3)**

Cultural differences that aid or hinder communication with Hispanic clients and the application of cross-cultural communication skills. Some field trips may be required. Same as MPH 562.

**HL S 464V - Cross-Cultural Aspects of Health (3)**

An examination of health practices from a variety of cultural perspectives: communication, observation, research, and assimilation. Issues to be addressed will be examined from a number of viewpoints, such as individual, family, community, and professional roles.



**HL S 465 - International Health Problems (3)**

Comparison of domestic health programs and problems with those in other parts of the world; emphasis on political parameters and delivery processes. Additional attention is focused on the health issues of the U.S.-Mexico border. Prerequisite: HL S 395 or consent of instructor. Same as MPH 565.

**HL S 466 - International Health Practicum (1-3)**

Intensive examination of health practices and beliefs from a cultural perspective. Focus on health structure, index of diseases, morbidity, mortality and epidemiological approaches to planning. Required travel (personal travel, lodging, and related expenses are extra). Same as MPH 566.

**HL S 467 - Rural Health Issues (3)**

Comprehensive overview of rural health services with Southwestern United States and New Mexico focus. Prerequisite: HL S 395. Same as MPH 567.

**HL S 468 - Coping with Loss and Grief: A Cross-Cultural Perspective (3)**

A cross-cultural perspective to death, loss and grief. Hospice philosophy of caring for the dying will be included. Same as MPH 568.

**HL S 469 - U.S.-Mexico Border Health Issues (3)**

Interdisciplinary analysis of the impact of living conditions and health issues of communities along the U.S.-Mexico border and of the strategies and initiatives to address these issues. Problem-based learning, case analysis, lecture, guest speakers, Web-CT based instruction, and field trips. Same as MPH 569.

**HL S 471 - Health Informatics (3)**

The application of technology to engage communities and individuals in behavioral and environmental change processes. The course will focus on the use of technology to describe the magnitude of health problems and their sources; analyze risk factors; identify community strengths from which strategies may be defined and tools created to intervene, prevent problems, and promote health and well-being; and continuously evaluate, refine, and implement what works. Taught with MPH 571 Prerequisite(s): HL S 395 or consent of instructor. Restricted to: C HL majors.

**HL S 473 - Health Program Planning (3)**

Planning and development of community health education interventions for behavior change at the individual, family, social network levels of practice. Emphasis on applying program-planning models and designs into a grant-writing project. Restricted to C HL majors.

**HL S 475 - Methods of Community Health Education (3)**

Responsibilities of health educators, analysis of social forces affecting health needs, application of wide range of health education methods and instructional media, and program implementation skills. Taught with MPH 575. Prerequisite(s): HL S 275. Restricted to C HL majors.

**HL S 476 - Theoretically-Based Interventions (3)**

Identifying and developing interventions to problematic health-related behaviors. Taught with MPH 576. Prerequisite(s): HL S 473. Restricted to C HL majors only.

**HL S 478 - Health Program Evaluation and Research (3)**

Covers the application of research and evaluation models for decision-making program and policy development of community health education interventions. Focus on the individual, family, and social network levels of practice. Prerequisite: HL S 473. Restricted to community health majors. Same as MPH 578.

**HL S 480 - Communicable Disease Control (3)**

Provide an understanding of the microbiology of pathogenic organisms and a public health approach to the control of disease. Instruction through Web CT. Taught with MPH 580.

**HL S 481 - Public Health Preparedness and Response (3)**

This course is designed to teach students about the role of public health in emergency preparedness and response. It focuses on the nature of public emergencies as well as the role various sectors have in responding to them. One purpose of this online course is to introduce students to the basics of disaster preparedness and responding to disasters, and to build a base for further development in responder training. The course provides training and resources for a basic understanding of the Incident Command System (ICS) and National Incident Management System (NIMS). Same as HL S 481 with differentiated assignments for graduate students. Crosslisted with: MPH 581

**HL S 486 - Special Topics (3)**

Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits. Same as MPH 586.

**HL S 490 - Independent Study (1-6)**

Individual studies with prior approval of department head. Maximum of 12 credits. Prerequisites: consent of instructor.

**HL S 491 - Mind-Body Health and Complementary and Alternative Medicine (3)**

An examination of the multiple dimensions of health from international and cultural views, mind-body interaction, and health promotion assessment and intervention techniques. Same as MPH 591.

**HL S 492 - Health Care of the Aged (3)**

General concepts and principles of aging. Introduces students to the aging process and assists them in understanding the various aspects of growing old. Same as MPH 592.

**HL S 496 - Community Health Education Field Experience (1-6)**

Senior-standing community health education majors will integrate and apply various concepts related to actual community health education practice. Experience aims to prepare students to integrate the competencies and responsibilities of community health education. Approximately 55 hours at field agency required per credit hour. May be repeated for a maximum of 6 credits. Consent of instructor required. Prerequisite(s): HL S 475 or concurrent enrollment. Corequisite(s): HL S 497. Restricted to C HL majors.

**HL S 497 - Senior Seminar in Community Health Education (1)**

Critical analysis of issues in CHE and health care. Readings focus on social, economic, cultural, and political issues as they affect the profession and practice. Emphasis on future, local, national, and international health trends. Prerequisite(s): HL S 475 or consent of instructor. Corequisite(s): HL S 496. Restricted to C HL majors.

**HL S 499 - Problems in Health Education (3)**

Provides opportunity for synthesis of program planning, implementation, and evaluation methodologies in the preparation and delivery of health education topics. Some field trips will be required. Prerequisite(s): Either HL S 395, HL S 478, HL S 476, or consent of instructor. Restricted to C HL majors.

**HNDS-HUMAN NUTRITION AND DIET****HNDS 450 - Special Topics (1-4)**

Specific subjects and credits to be announced in the Schedule of Classes. Maximum of 4 credits per semester and a grand total of 9 credits.

**HNDS 492 - Special Problems (1-4)**

Individual research study in a selected subject area of family and consumer sciences. Maximum of 4 credits per semester and a total of 8 credits.

**HNDS 500 - Dietetic Internship Seminar I (3)**

Dietetic interns prepare for supervised practice rotations. Topics include professionalism, Code of Ethics, and dietetic internship portfolios. Consent of instructor required. Prerequisite(s): Acceptance into Dietetic Internship program.

**HNDS 501 - Advanced Animal Nutrition (so) (3)**

Prerequisite: CHEM 211 or consent of instructor. Same as ANSC 501.

**HNDS 504 - Maternal, Infant, and Child Nutrition (3)**

Nutritional needs and status during pregnancy, infancy, childhood and adolescence. Application also made to preschool and child care centers. Persons taking graduate-level class will have additional assignments and different grading scale from HNDS 404. Prerequisite: HNDS 251 or consent of instructor.

**HNDS 506 - Geriatric Nutrition (3)**

Nutritional needs, status, and problems of the elderly. Additional work required at the graduate level. Prerequisite: nutrition course or consent of instructor.

**HNDS 507 - Laboratory Techniques in Nutrition (4)**

Methodology and experimental procedures in measuring nutrient requirements and values of diets. Prerequisites: ANSC 422 and CHEM 321, or consent of instructor. Same as ANSC 507.

**HNDS 510 - Graduate Study in Sports Nutrition (3)**

Role of nutrition and nutrients in physical performance of competitive and recreational sports participants. Additional work required at the graduate level. Prerequisites: BIOL 254, BCHE 341, and HNDS 251, or consent of instructor.

**HNDS 512 - Research Methods in Animal Science (4)**

Same as ANSC 512.

**HNDS 516 - Nutrition and Culture (3)**

Cultural aspects of health, food, and nutrition for most ethnic groups of the United States. Covers traditional versus contemporary food habits along with the history

and beliefs that influence such habits. Students in this class will be given additional assignments and grading scale will be different from HNDS 416.

#### HNDS 517 - Graduate Seminar (1)

Current topics. Same as ANSC 515. Prerequisite: consent of instructor.

#### HNDS 522 - Animal Nutrition (f) (3)

Prerequisite: CHEM 211. Same as ANSC 522.

#### HNDS 530 - Graduate Studies in Food Service Organization and Management (3)

Personnel, financial, and general management in institutional and commercial food service operations. Additional work required at the graduate level.

#### HNDS 546 - Diet Therapy I (3)

Special diets and physiological basis for their use. Laws and regulations concerning the practice of dietetics. Additional assignments beyond HNFS 446 required for students registering in HNDS 546. Prerequisites: BIOL 254, BCHE 341, and HNDS 251, or consent of instructor.

#### HNDS 548 - Graduate Studies in Advanced Nutrition (3)

Covers biochemistry and physiology applied to nutrition. Students enrolled in the 500-level class will be required to complete additional assignments beyond what is required for HNDS 448. Prerequisite(s): BIOL 254, BCHE 341, and HNDS 251, or consent of instructor. Restricted to: Main campus only.

#### HNDS 549 - Diet Therapy II (3)

Continuation of HNDS 546. Prerequisites: HNDS 546 or consent of instructor.

#### HNDS 551 - Graduate Study in Community Nutrition (3)

Overview on the practice of community nutrition to include program planning, needs assessment, program implementation and program evaluation. Role of public and private agencies in nutrition programs that impact on nutrition of individuals and groups in the community. Additional work required at the graduate level. Prerequisite: HNDS 350 or consent of instructor.

#### HNDS 555 - Nutritional Toxicology (3)

Same as TOX 455 and ANSC 555.

#### HNDS 560 - Dietetic Intern Seminar (1)

Portfolio development for dietetic interns during supervised practice rotations. May be repeated up to 3 credits. Consent of Instructor required. Prerequisite(s): Acceptance into the NMSU dietetic internship.

#### HNDS 561 - Dietetic Internship: Supervised Practice in CES (1-5)

Provides dietetic interns with a minimum of 250 clock hours of supervised practice in Community Nutrition in Cooperative Extension Service settings. Dietetic interns will work under the guidance of faculty and Cooperative Extension Service professionals. May be repeated up to 5 credits. Consent of Instructor required. Prerequisite(s): Acceptance into Dietetic Internship. Restricted to: HNFS majors.

#### HNDS 562 - Dietetic Internship: Supervised Practice in Community Nutrition (1-3)

Provides dietetic interns with a minimum of 250 clock hours of supervised practice in community nutrition. Dietetic interns work under the guidance of faculty and community nutrition professionals. Students must complete a total of 3 credit hours of HNDS 562. Consent of instructor required. Prerequisite(s): Acceptance into Dietetic Internship. Restricted to Dietetic interns majors.

#### HNDS 563 - Community Nutrition for Dietetic Interns (3)

Advanced topics in community nutrition to include conducting community nutrition needs assessments, program planning and grant writing. Consent of instructor required. Prerequisite(s): Acceptance into Dietetic Internship. Restricted to HNDS majors.

#### HNDS 564 - Dietetic Internship: Supervised Practice in Food Service Management (1-5)

Provides dietetic interns with a minimum of 300 clock hours of supervised practice in foodservice management. Dietetic interns work under the guidance of faculty and foodservice management professionals. Students must complete a total of 4 credit hours of HNDS 564. May be repeated up to 5 credits. Consent of Instructor required. Prerequisite(s): Acceptance into Dietetic Internship.

#### HNDS 565 - Foodservice Management for Dietetic Interns (3)

Advanced topics in foodservice systems management to include business planning and marketing. Consent of Instructor required. Prerequisite(s): Acceptance into Dietetic Internship. Restricted to: HNFS majors.

#### HNDS 566 - Dietetic Internship: Supervised Practice in Clinical Dietetics (1-8)

Provides dietetic interns with a minimum of 500 clock hours of supervised practice in clinical dietetics. Dietetic interns work under the guidance of faculty and dietetics professionals. May be repeated up to 8 credits. Consent of Instructor required. Prerequisite(s): Acceptance into Dietetic Internship.

#### HNDS 567 - Nutrition Care Process for Dietetic Interns (3)

Advanced topics in nutrition care process and model to include medical nutrition therapy and evidence-based research and outcomes assessment in clinical dietetics. Consent of instructor required. Prerequisite(s): Acceptance into Dietetic Internship. Restricted to HNDS majors.

#### HNDS 568 - Review Course for National RD Exam (3)

Completion of dietetic internship portfolio and preparation for the national registration examination for dietitians. Consent of Instructor required. Prerequisite(s): Acceptance into Dietetic Internship.

#### HNDS 590 - Special Topics (1-4)

Specific subjects to be announced in the Schedule of Classes. Maximum of 4 credits per semester and a total of 9 credits toward a degree.

#### HNDS 598 - Special Research Programs (1-4)

Individual investigations either analytical or experimental. Maximum of 4 credits per semester and no more than 6 credits toward a degree.

#### HNDS 621 - Metabolic Functions and Dysfunctions (3)

Same as ANSC 621.

#### HNDS 625 - Nutrient Metabolism I: Mineral, Vitamin, and Nitrogen Metabolism (fo) (4)

Same as ANSC 625.

#### HNDS 626 - Nutrient Metabolism II: Carbohydrates, Lipids, and Energetics (se) (4)

Same as ANSC 626.

### HON - HONORS

#### HON 340V - INDIAN LAW AND POLICY (3)

Explores the principles, doctrines, and texts governing the legal relations between the United States and Indian tribes, the history of federal Indian law and policy, tribal property, treaty rights and sovereignty, congressional plenary power, the trust doctrine, jurisdiction in Indian country, and tribal government. Topic specifically examined in the course include tribal lawmaking powers, gaming and economic development in Indian country, protection of Indian religious rights and cultural property, water rights, fishing, hunting and other treaty-based rights.

#### HON 450V - The Sundt Honors Seminar (3)

The Sundt Honors Seminar is a unique, experience-based, interdisciplinary seminar developed and taught by the holder of the Sundt Honors Professorship for the year. The subject of the course will vary according to the discipline of the Sundt Professor. The course may include a travel experience related to the seminar topic, hosting of outside specialists, or other unique activity. Open to students by application. Students selected for the course are named Sundt Scholars. Prerequisite(s): ENGL 111G or equivalent.

### HORT - HORTICULTURE

#### HORT 450 - Special Topics (1-4)

Specific subjects as announced in the Schedule of Classes. Maximum of 4 credits per semester and a grand total of 9 credits.

#### HORT 462 - Plant Breeding (3)

Principles and practices involved with the genetic improvement of plants. Prerequisites: ANSC/AGRO/BIOL/HORT 305. Same as AGRO 462.

#### HORT 465 - Landscape Construction and Maintenance (4)

Application of landscape design and construction principles to build and maintain residential, small commercial and selected public managed landscapes. Prerequisite(s): HORT 307 or consent of instructor.

#### HORT 471 - Plant Mineral Nutrition (3)

Basic and applied aspects of plant requirements for soil-derived minerals and the processes whereby minerals are acquired, absorbed, translocated, and utilized throughout the plant. Prerequisite: EPWS/BIOL 314, or concurrent enrollment, or consent of instructor. Same as AGRO/EPWS 471.

#### HORT 479 - Advanced Turfgrass Science (3)

Extensive reviews of turfgrass sciences including ecology, physiology, entomology, pathology, weed science, and soil science. Prerequisite: HORT 378 or consent of instructor.

#### HORT 484 - Ornamental Plant Production and Management (4)

Covers the principles and practices of greenhouse and nursery crop production and management. Greenhouse irrigation and water quality, fertilization, containers and media, lighting, CO<sub>2</sub> enrichment, growth control, and crop scheduling. Prerequisite: HORT/AGRO 365 or consent of instructor.

#### HORT 485 - Vegetable Crop Management (4)

Physiological, environmental and cultural aspects of vegetable crop production. Corequisite(s): AGRO 365 or HORT 365, or consent of instructor.

#### HORT 488 - Greenhouse Management (4)

Principles and practices involved in greenhouse structures and construction, site considerations, covering materials, heating and cooling systems, greenhouse crop production techniques, and case studies. Prerequisite: HORT/AGRO 365 or consent of instructor.

#### HORT 492 - Diagnosing Plant Disorders (3)

Systematic diagnosis of the physiological, pathological, and entomological causes of plant disorders. Prerequisites: EPWS 303 and EPWS 310. Same as EPWS 492 and AGRO 492.

#### HORT 500 - Special Topics (1-4)

Specific subjects and credits to be announced in the Schedule of Classes. Maximum of 4 credits per semester. No more than 9 credits toward a degree.

#### HORT 505 - Research Orientation (4)

Training in writing research proposals, presentation of research results, and interpretation of research results. Crosslisted with: AGRO 505 and SOIL 505

#### HORT 506 - Plant Genetics (3)

Advanced treatment of the principles of classical genetics and heredity with emphasis on the nature and action of the gene including molecular analysis. Prerequisite: AGRO 305 or consent of instructor. CHEM 345 recommended. Same as AGRO 506 and MOLB 506.

#### HORT 514 - Soil-Plant Relationships (3)

Physical, chemical, and biological soil environment as it affects plant and crop growth. Prerequisites: BIOL 314, SOIL 252. Same as AGRO/SOIL 514.

#### HORT 515 - Crop Physiology (3)

Whole plant physiological processes as related to growth, development, yield, quality and post harvest physiology of crop plants within the environment of the crop community. Prerequisite(s): EPWS/BIOL 314 or consent of instructor. Crosslisted with: AGRO 515

#### HORT 516 - Molecular Analysis of Complex Traits (3)

Provide a comprehensive overview of molecular genetic analysis of complex phenotypes, including case histories/experiments in plants, animals and humans. Emphasize technological developments in DNA marker technologies and their application to molecular quantitative genetics. Explore the efficient application of these technologies in the future to complex genetic systems, breeding, and other areas of life sciences. Prerequisite: AGRO 305 or consent of instructor. Same as AGRO 516.

#### HORT 533 - Environmental Physiology of Plants (3)

Integral responses of plants and crop productivity to naturally occurring and modified environmental factors such as radiation, temperatures, water vapor, carbon dioxide, and air flow. Prerequisite: BIOL 314 or consent of instructor. Same as AGRO/BIOL 533.

#### HORT 590 - Graduate Seminar (1)

Current research discussions presented by masters level graduate students. Not more than one credit toward the degree. Same as AGRO/SOIL 590. Crosslisted with: AGRO 590 and SOIL 590.

#### HORT 595 - Internship (1-6)

Supervised professional on-the-job learning experience. Limited to Master of Horticulture or Plant & Environmental Science candidates. Not more than 6 credits toward the degree.

#### HORT 597 - University Teaching Experience (1-3)

Certain graduate students will be permitted to teach up to one-third of one AGRO/HORT/SOIL/ES course. The student will prepare and deliver lectures and will prepare, administer, and grade at least one examination. The professor in charge of the course will attend and evaluate the student's lectures. Consent of instructor required. Crosslisted with: AGRO 597 and SOIL 597

#### HORT 598 - Special Research Programs (1-6)

Individual investigations, either analytical or experimental. Maximum of 6 credits per semester. No more than 9 credits toward a degree. Prerequisite: consent of instructor.

#### HORT 599 - Master's Thesis (0-15)

Thesis.

#### HORT 609 - Breeding for Plant Disease Resistance (3)

A practically-oriented course of lectures and discussion on concepts and principles of breeding for disease and pest resistance. Labs familiarize

students with preparation, quantification, and application of inoculum to hosts. Same as AGRO 609.

#### HORT 610 - Advanced Crop Breeding (4)

Applications of breeding principles to crop improvement. Emphasis on breeding methodologies using modern techniques, including biotechnology. Prerequisite: AGRO 462 or consent of instructor. Same as AGRO 610.

#### HORT 620 - Instrumentation in Agronomy (3)

Use of instruments used in research in all areas of agronomy including gas chromatography, high performance liquid chromatography, neutron soil moisture probe, and other instruments. Same as AGRO/SOIL 620.

#### HORT 670 - Biometrical Genetics and Plant Breeding (3)

A statistical approach to gene action and population parameters as applied to plant improvement. Prerequisite: AGRO 462 or consent of instructor. Same as AGRO 670.

#### HORT 685 - Plant Genetic Engineering (3)

Analysis of plant genome structure and potential applications of emerging molecular techniques to the genetic improvement of plants. Prerequisites: HORT/AGRO 585 and AGRO/HORT 506 or CHEM 545, or consent of instructor. Same as AGRO/BIOL 685.

#### HORT 697 - University Teaching Experience (1-3)

Certain graduate students will be permitted to teach up to one-third of one AGRO/HORT/SOIL/ES course. The student will prepare and deliver lectures and will prepare, administer, and grade at least one examination. The professor in charge of the course will attend and evaluate the student's lectures. Consent of instructor required. Crosslisted with: AGRO 697 and SOIL 697

## HRTM - HOTEL, RESTUARANT AND TOURISM MANAGEMENT

#### HRTM 450 - Special Topics (1-4)

Specific subjects to be announced in the Schedule of Classes. Prerequisite: consent of instructor. Maximum of 4 credits per semester and a grand total of 9 credits.

#### HRTM 492 - Special Problems (1-4)

Individual research in a selected subject area of hospitality management. Prerequisite: consent of instructor. Maximum of 4 credits per semester and a total of 6 credits toward a degree.

#### HRTM 507 - Hospitality and Tourism Internship (3)

Supervised placement in a hospitality or tourism organization. An in-depth written report of the experience is required. Prerequisite: consent of instructor. Graded S/U.

#### HRTM 590 - Special Topics (1-4)

Specific subjects and credits to be announced in the Schedule of Classes. Prerequisite: consent of instructor. Maximum of 4 credits per semester and a total of 9 credits toward a degree.

#### HRTM 598 - Special Research Programs (1-4)

Individual investigations, either analytical or experimental. Prerequisite: consent of instructor. Maximum of 4 credits per semester and no more than 6 credits toward a degree.

#### HRTM 599 - Master's Thesis (0-6)

Thesis. Prerequisite: consent of instructor.

## I B - INTERNATIONAL BUSINESS

#### I B 450 - International Economics (3)

Trade and capital flows between countries, international payments, government policy in balance-of-payments and tariff matters, international organizations. Prerequisite(s): Econ 251G and Econ 252G. Crosslisted with: ECON 450G

#### I B 458 - Comparative International Management (3)

Cultural influences on management are examined in a global business environment with a particular emphasis on human behavior in multinational organizations and the management of human resources. Same as Mgt. 458.

#### I B 475 - International Finance (3)

Same as FIN 475.

#### I B 489 - Senior Seminar in International Business (3)

Capstone class for I B majors. Integration of previous classwork via the examination of case studies and completion of a major project. Prerequisite: I B core.

**IE - INDUSTRIAL ENGINEERING****IE 451 - Engineering Economy (3)**

Discounted cash flows, economics of project, contract and specifications as related to engineering design. Same as CH E 451.

**IE 453 - Leadership and Motivation (3)**

Theories of leadership and motivation. Motivational programs for complex organizations. Relationships between organizational power, authority, and management styles. Prerequisite: MGT 309 or consent of instructor. Same as MGT 453.

**IE 460 - Evaluation of Engineering Data (3)**

Analysis of engineering systems possessing variability, employing regression, analysis of variance, distribution theory, and experimental design methods. Prerequisite: IE 311 or equivalent.

**IE 466 - Reliability (3)**

Application of statistical theory to engineering reliability estimation, reliability improvement, and the analysis of reliability test data. Prerequisite: IE 311 or equivalent.

**IE 467 - Discrete-Event Simulation Modeling (4)**

Basic modeling concepts, organizations of simulations, input data analysis, random variate generation, simulation design and analysis, model validation, output analysis, and management of simulations. Differentiated graduate assignments. Prerequisite: IE 311 or equivalent. Same as IE 567.

**IE 477 - Ergonomics in Manufacturing Systems (3)**

Ergonomic analysis applied to manufacturing engineering environment. Covers: task analysis, workplace assessment and design, computer-integrated manufacturing, and legal/regulatory issues in manufacturing task and workplace design.

**IE 478 - Facilities Planning and Design (3)**

Plant location methods, total process analysis, process integration, materials handling analysis, and traditional and computerized plant layout methodologies. Prerequisite: IE 316. Pre/Corequisite: IE 424.

**IE 479 - Integrated Manufacturing (3)**

Automated process planning as a link between CAD and CAM. Emphasis on information flows and modeling concepts, design data analysis, feature recognition and generative planning. Prerequisite: knowledge of a programming language or consent of instructor. Same as IE 579.

**IE 480 - Senior Design (3)**

Multi-disciplinary team design project for external clients. Involves semester long activities including major design report and presentation. Prerequisites: senior standing, IE 467.

**IE 490 - Selected Topics (1-3)**

Prerequisite: consent of the head of the department. May be repeated for a maximum of 9 credits.

**IE 505 - Directed Readings (1-3)**

Prerequisite: consent of the head of the department. May be repeated for a maximum total of 6 credits.

**IE 515 - Stochastic Processes Modeling (3)**

Introduction to the use of stochastic processes in the modeling of physical and natural systems. Use of generating functions, conditional probability and expectation, Poisson processes, random walk models, Markov chains, branching processes, Markov processes, and queuing processes in an applied setting. Prerequisites: IE 311 or equivalent; and MATH 392 or equivalent.

**IE 522 - Queuing Systems (3)**

Elements and classification of queuing systems, single server models, multi-server models, cost analysis and applications. Prerequisite: IE 311 or equivalent.

**IE 523 - Advanced Engineering Economy (3)**

Theoretical basis for engineering economy methods, problems of cost estimation, replacement, nonmonetary factors, and feasibility studies. Same as C E 523.

**IE 524 - Advanced Production and Inventory Control (3)**

Organization and functions of manufacturing planning and control systems including forecasting, MRP, capacity planning, JIT systems, scheduling and inventory control. Same as IE 424 with differentiated assignments.

**IE 525 - Systems Synthesis and Design (3)**

Examination of the production management complex in terms of its components and the synthesis of these components into an effective operating unit. Development of input-output models representing the basis structure of all production activities.

**IE 530 - Environmental Management Seminar (1)**

Same as C E 530, E E 530, CH E 530.

**IE 531 - Fundamentals of Operations Research Techniques (3)**

Key concepts, terminology, paradigms, and methods of operations research: Linear programming including assignment and transportation algorithms; stochastic analysis, including inventory control and queuing systems; general approaches, including goal, integer, nonlinear and dynamic programming.

**IE 533 - Linear Programming (3)**

Linear programming problem formulation, simplex algorithm, theory of linear programming, duality, revised simplex algorithm, and sensitivity analysis.

**IE 534 - Nonlinear Programming (3)**

Theoretical and computational methods to solve optimization problems in engineering, statistics, economics, and operations research. Topics include convexity, optimality conditions, Newton's method, Lagrange multipliers, search algorithms for unconstrained and constrained problems, as well as barrier and penalty methods. Prerequisite: MATH 192G or equivalent

**IE 535 - Discrete Optimization (3)**

Combinatorial Optimization problems using both integer programming and graphtheoretic approaches. Emphasis on modeling and computational algorithms.

**IE 537 - Large Scale Systems Engineering (3)**

Systems engineering approaches to large-scale complex technological and societal problems. Concepts of interaction and structural graphs, matrices, delta, and Gantt charts. The hall matrix approach, structural concepts, reachability matrices, and cross impact-analysis, modeling and decision making.

**IE 539 - Fundamentals of Transportation and Routing in Logistics (3)**

Introduction to the conceptual, methodological, and mathematical foundations of transportation and routing problems in logistics system. Emphasis on mathematical modeling and computational algorithms.

**IE 545 - Characterizing Time-Dependent Engineering Data (3)**

Theory and techniques employed in the characterization of stochastic processes commonly found in engineering applications. Distribution models include exponential, gamma, Weibull, and extreme value. Design and analysis of experiments involving complete and censored data and elevated stress. Analytical techniques include parametric, nonparametric, and graphical approaches with emphasis on modern computer tools. Exact and approximate maximum-likelihood techniques are stressed. Prerequisite: IE 311 or equivalent.

**IE 561 - Advanced Safety Engineering (3)**

Regulation as well as qualitative, and quantitative methods to achieve and maintain safety in the workplace. Includes liability, worker's compensation, OSHA, hazard control, safety assessment, cost justification, and system analysis. Prerequisite: graduate status in engineering.

**IE 563 - Topics in Engineering Administration (3)**

Study of qualitative and quantitative aspects. Consideration given to philosophical, psychological, political and social implications of engineering administrative decisions.

**IE 567 - Design and Implementation of Discrete-Event Simulation (3)**

Basic modeling concepts, organizations of simulations, input data analysis, random variate generation, simulation design and analysis, model validation, output analysis, and management of simulations. Taught with IE 467 with differentiated assignments for graduate students.

**IE 569 - Stochastic Simulation Concepts and Techniques (3)**

Key computational and stochastic aspects of discrete-event simulation. Topics include selecting and using pseudo random number generators, estimating the value of intractable mathematical expressions, dealing with variation and uncertainty in models, dealing with autocorrelation, determining the precision of simulation results and how to improve simulation efficiency and effectiveness. This course is intended for engineering graduate students with a background in probability, statistics, and design of experiments. While beneficial to graduate students who wish to extend their current abilities in simulation, it presumes no prior knowledge of simulation modeling or simulation languages.

**IE 571 - Advanced Quality Control (3)**

Advanced topics in quality control and design of experiments for improvement of quality. Prerequisite: I E 311 or equivalent.

**I E 575 - Advanced Manufacturing Processes (3)**

Covers major process parameters in casting, forming, machining, and joining. Process economics and selection of processes design and interactions. Prerequisite: graduate standing.

**I E 577 - Ergonomics in Manufacturing Systems (3)**

Ergonomic analysis applied to manufacturing engineering environment. Covers: task analysis, workplace assessment and design, computer-integrated manufacturing, and legal/regulatory issues in manufacturing task and workplace design. Same as I E 477 with differentiated assignments for graduate students.

**I E 579 - Integrated Manufacturing (3)**

Study of automated process planning as a link between CAD and CAM. Emphasis on information flows and modeling concepts, design data analysis, feature recognition and generative planning. Prerequisite: knowledge of a programming language or consent of instructor. Same as I E 479 with differentiated assignments for graduate students.

**I E 590 - Selected Topics (1-3)**

Prerequisite: consent of the head of the department. May be repeated for a maximum of 9 credits.

**I E 598 - Special Research Programs (1-3)**

Individual analytical or experimental investigations. May be repeated for a maximum total of 6 credits. Prerequisite: consent of instructor.

**I E 599 - Master's Thesis (0-15)**

Thesis.

**I E 610 - Topics in Operations Research (3)**

Selected topics of current interest, to be designated by subtitle. May be repeated for a maximum of 6 credits.

**I E 620 - Topics in Computer Modeling (3)**

Selected topics of current interest, to be designated by subtitle. May be repeated for a maximum of 6 credits.

**I E 630 - Topics in Engineering Management (3)**

Selected topics of current interest, to be designated by subtitle. May be repeated for a maximum of 6 credits.

**I E 690 - Selected Topics (1-15)**

May be repeated. Prerequisite: consent of department head.

**I E 700 - Doctoral Dissertation (0-15)**

Dissertation.

**ICT-INFORMATION AND COMMUNICATION TECHNOLOGY**

**ICT 450 - Advanced Topics in Information and Communication Technology (3)**

Addresses the latest advances and topics in information and communication technology. Prerequisite(s): (ICT 362 or E T 362) and ICT 360.

**ICT 456 - Analysis of Physical Security Systems (3)**

The design, analysis and implementation of security systems and subsystems including threat detection and response, information and communications, security, and physical protection. Prerequisite(s): junior standing.

**ICT 457 - Introduction to Information Security Technology (3)**

Practical techniques of Data Encryption Technology, Steganography for Information Technology, Intrusion Detection and Countermeasures. Use of Python to write system tools for detecting anomalies in data flow. Design of physically secure data housing. Techniques of Industrial Espionage. Hiding and finding of secrets in the field. Dead drops, design of Fake ID's. Use of PGP and other public encryption methods. Using DNS tools to track down hackers. Hiding of information in music and other audio files. Prerequisite(s): ICT 339.

**ICT 458 - Database Design and Applications (3)**

MySQL and PHP. Data conversion using PHP, mysql and Python. Methods of transferring data from electronic boards and data feeds, into databases. Use of SQL in java programming. Remote programming of computers for running database systems in a mixed OS environment. Generation of web pages directly from Database queries. Prerequisite(s): ICT 360.

**ICT 460 - Advanced Topics in Multimedia Technologies (3)**

Addresses the latest multimedia technology advances and how they apply to the information and communication technology fields. Prerequisite(s): ICT 360.

**ICT 462 - Remote Access Operating Systems with Linux/Unix (3)**

Operating systems applications and interfacing with an introduction to systems administration. C Programming, System Backups, Setup and Maintenance of Unix Based Servers. Webserver with virtual domains, CGI programming and interface with MySQL databases Prerequisite(s): (ICT 362 or E T 362) and ICT 360.

**ICT 463 - Computer Systems Administration (3)**

Advance topics in computer systems administration from ICT 462. Includes installation and maintenance of Unix/Linux/Windows versions of Python. Use of Python to solve numerous engineering problems including video and audio. Image manipulation. Using PostScript for image and typesetting development. Integration of C programming with Python. Prerequisite(s): ICT 462 or E T 462.

**ICT 477 - Computer Networking II (3)**

Advanced concepts in computer network design and applications including managing the campus networks, virtual LANs (VLAN), network security, wireless networks, high-speed optical networks, voice over IP, and Linux networking. Prerequisite(s): ICT 377 or E T 377.

**JOUR - JOURNALISM**

**JOUR 460 - Public Relations Promotion in Sports (3)**

Examination of sports as a business and how public relations promotion is executed in professional sports franchises.

**JOUR 476 - Public Relations Cases and Problems (3)**

The study and solving of problems in the mass media industry. Prerequisite: JOUR 374.

**JOUR 482 - Electronic Media Regulation and Management (3)**

Station organization and management of commercial and public radio and television; FCC regulations; programming, sales, ratings.

**JOUR 484 - Public Opinion (3)**

Seminar on forces which help form public opinion; individual projects in attitude measurement; measuring effectiveness of mass communication.

**JOUR 489 - Mass Media Research (3)**

Examination of the role of empirical research in solving mass communication problems. Survey techniques, field studies, content analysis, data analysis.

**JOUR 490 - Advertising Campaigns (3)**

Capstone course utilizing all previous instruction to create and develop plans for a long-term national or local IMC (Integrated Marketing Communications) campaign. Consent of instructor required. Prerequisite(s): JOUR 300 and 312 or consent of instructor.

**JOUR 493 - Mass Communications Law (3)**

Examination of legal issues relating to mass media in the United States. Invasion of privacy, libel, sedition, copyright, and advertising regulation. Same as COMM 493, GOVT 493.

**JOUR 494 - Special Topics (3)**

Specific subjects to be announced in the Schedule of Classes.

**JOUR 495 - Mass Communication Theory (3)**

Theoretical approaches to mass communications. Examination of media effects, audiences, media socialization.

**JOUR 499 - Independent Study in Mass Communications (1-3)**

Individual study directed by consenting instructor with prior approval of department head. Prerequisites: 2.5 GPA and consent of instructor. May be repeated for a maximum of 6 credits.

**JPNS - JAPANESE**

**JPNS 449 - Special Problems (1-3)**

Directed readings for graduate students in their specific fields to satisfy language requirements for master's or doctoral programs. Course subtitled in the Schedule of Classes. May be repeated to a maximum of 6 credits.

**JPNS 453 - Independent Studies in Japanese (1-3)**

Individualized, self-paced projects for advanced students.

**LANG - LANGUAGE**

**LANG 451 - Special Topics (1-3)**

Selected topics relating to cultures or literatures of a specific country. Credit can be applied only towards fulfilling second language requirement. Credit is not accepted towards any graduate level major or minor. May be repeated for a maximum of 12 credits. Consent of instructor required.

**LANG 453 - Independent Studies (1-3)**

Individualized, self-paced projects for advanced students. Prerequisite: consent of instructor. May be repeated under different subtitles for a maximum of 6 credits.

## LING - LINGUISTICS

### LING 451 - Independent Studies in Linguistics (1-3)

Individual or group study of selected topics to be identified by subtitle. Prerequisites: LING 200G and prior arrangement with faculty supervisor. May be repeated for a maximum of 6 credits.

### LING 455 - Research in Linguistics (3)

This course will provide a capstone experience for students who have progressed through the program in linguistics and provide the foundation for further study at the post-graduate level in a linguistics-related field. Students will apply their foundation of knowledge and skills in linguistics through the realization of an individualized, inquiry-based project. Prerequisite(s): LING 200, LING 301, LING 302V, LING 303, plus 9 credit hours of related electives. Consent of instructor may enroll student only in case of elective credit shortfall with concurrent enrollment.

### LING 500 - Introduction to Linguistics (3)

Survey of the main branches of linguistics: phonology, morphology, syntax, semantics, language acquisition, sociolinguistics, historical linguistics and some of the theoretical issues in the field.

### LING 501 - Introduction to Psycholinguistics (3)

Students will be responsible for all requirements of LING 301 and will undertake independent, directed research. Prerequisite: PSY 201G. Same as PSY 501.

### LING 502 - Graduate Study in Sociolinguistics (3)

Study of how social identity including factors such as ethnicity, age, gender education and socio-economic class is expressed in language systems. Prerequisites: LING 200G or LING 500 recommended.

### LING 503 - Exploring Language Systems- Grad (3)

Students will be responsible for all requirements of LING 303 and will undertake independent, directed research. Prerequisite(s): LING 200 or LING 500.

### LING 505 - Selected Topics (3)

Studies, varying from year to year, in linguistics.

## ME - MECHANICAL ENGINEERING

### ME 452 - Introduction to Automation and Control System Design (3)

Control system design and implementation. Emphasis on practical applications of traditional control algorithms to mechanical engineering applications in thermofluid systems and mechanical systems. Design of feedback analog and digital control systems. Introduction to robots and automation. Lab assignments include programming industrial robotic and automation systems. Prerequisite(s): ME 338, ME 332, or consent of instructor.

### ME 456 - Experimental Modal Analysis (3)

Emphasis on hands-on techniques for structural vibration tests for practical applications. Interpretation of experimental results by means of advanced signal processing tools, basic system identification methodology, and reduced-order modeling procedures. Prerequisite(s): ME 332, MATH 392m ME 261, or consent of instructor.

### ME 460 - Applied Finite Elements (3)

Introduction to the practical aspects of structural finite element modeling. Course focuses on providing a working knowledge of how to effectively incorporate finite element techniques into the design process. Prerequisite(s): Senior Standing.

### ME 480 - Nuclear Systems (3)

Fundamentals of nuclear energy, systems, design, and analysis. Applications of nuclear energy in power production. Survey of modern nuclear systems. Prerequisite: MATH 192G or consent of instructor.

### ME 481 - Alternative and Renewable Energy (3)

Current and future energy needs of the United States and the world will be considered primarily from the standpoint of renewable energy sources such as solar, wind, ocean, and biomass. Technical, economic, and environmental aspects of each technology will be addressed. Prerequisite(s): ME 341, and (ME 338 or AE 339).

### ME 483 - Introduction to Combustion (3)

Introduction to compressible aerodynamics in the subsonic, transonic, and supersonic regimes. Prerequisites: ME 329, ME 468. Same as ME 538.

### ME 487 - Mechatronics (3)

Introduction to the analysis and design of computer-controlled electromechanical systems, including data acquisition and conversion, force and motion sensors, actuators, mechanisms, feedback control, and robotic devices. Students required to work in teams to construct and test simple robotic systems. Prerequisites: EE 201, and ME 345.

### ME 502 - Elasticity I (3)

Introduction to stress tensor, strain tensor, constitutive law, energy theorems, plane stress and plane strain. Also covers torsion of shafts and propagation of stress waves in elastic solids.

### ME 503 - Thermodynamics (3)

A comprehensive study of the first and second laws of thermodynamics, nonequilibrium processes, equations of state, and statistical thermodynamics.

### ME 504 - Continuum Mechanics (3)

Basic introduction to the Mechanics of Continuous Media. Its aim is to prepare the student for more advanced courses in Solid and Fluid Mechanics. The topics to be covered include: introduction to Cartesian tensors, tensor algebra and calculus; Lagrangian and Eulerian kinematics; Cauchy and Piola-Kirchhoff stresses; general principles of conservation; constitutive theory for ideal fluids, Newtonian and non-Newtonian fluids, finite and linear elasticity.

### ME 505 - Fundamentals of the Theory of Plasticity (3)

Basic concepts in continuum mechanics, equations of the plastic state, equations of elastic-plastic equilibrium, criteria for yielding, initial and subsequent yield surfaces, two-dimensional and axis-symmetric plasticity problems, dynamic problems. Prerequisite(s): ME 502.

### ME 509 - Individualized Study (3)

Individualized study covering specialized topics in mechanical and aerospace engineering. Consent of instructor required.

### ME 510 - Special Topics (1-6)

Topics in mechanical engineering. May be repeated for a maximum of 6 credits. Prerequisite: consent of the department head.

### ME 511 - Dynamics (3)

An advanced study of the dynamical behavior of systems of particles and rigid bodies, with emphasis on the theoretical background of dynamics.

### ME 512 - Vibrations (3)

Free and forced vibrations for discrete and continuous systems with single or multiple degrees of freedom. Introduction to nonlinear and random vibration and solution techniques for such systems.

### ME 514 - Advanced Composite Materials (3)

Study on the anisotropic elasticity, strength of anisotropic materials and micromechanics. Topics from micromechanics and macromechanics through lamination theory and examples of plate bending, buckling and vibration problems. Course taught on an as-needed basis.

### ME 515 - Non-Destructive Evaluation of Materials (3)

Develop field equations for the propagation of elastic waves in materials. Their application in non-destructive evaluation of materials will be explored. Prerequisite: ME 570

### ME 516 - Fracture Mechanics (3)

Brittle fracture of structures, elastic stress analysis of cracked components, elasticity of singular stress fields, stress-field theory of fracture, energy of fracture, static and dynamic failures, elastic-plastic fracture mechanics, fatigue crack growth and life prediction under constant and variable amplitude loading, environmental effects. Prerequisite(s): ME 502.

### ME 517 - Nonlinear Dynamics and Chaos (3)

Singular points, periodic solutions, stability, and local bifurcations for ODEs and maps; phase space methods, invariant manifolds, and Poincare maps; nonsmooth, periodic, time-delay, and Hamiltonian systems; perturbation, averaging, and harmonic balance methods; center manifold reduction and normal forms; strange attractors, Liapunov exponents, attractor dimension; dissipative and Hamiltonian chaos

### ME 518 - Finite Element Analysis (3)

Introduction to finite element method. Topics include mathematical modeling, variational formulation, shape functions, truss, beam, solid, and shell elements. Includes static, dynamic, and nonlinear analysis.

### ME 520 - Micromechanics (3)

The course covers fundamentals of micromechanics: point force solution, Eshelby's problem, various approximate methods to calculate effective material properties of inhomogeneous materials, variational principles of the mechanics of composites. The history of micromechanics is discussed from Navier and Cauchy to current state of the art. Prerequisite(s): ME 502.

**M E 522 - Mechanics of Plates and Shells (3)**

Pure bending of plates (Kirchhoff theory); rectangular, circular, and annular plates under lateral loads; various edge conditions; effects of transverse shear deformation; large deflections of plates; theory of thick curved shells; deformations and stresses of cylindrical and conical shells. Prerequisite(s): M E 502.

**M E 523 - Dynamic Stability (3)**

Develop field equations for discrete and continuous systems through motivational examples. Introduce mathematical theory of stability for both linear and nonlinear systems. Includes Lyapunov's direct methods, linearization methods, center manifold theory, normal forms, and topological methods.

**M E 524 - Advanced Topics in Mechanics (3)**

Course provides an in-depth introduction to the methods and analysis techniques used in computational solutions of engineering mechanics problems. Numerical formulation and algorithms include: variational formulation and variational constitutive updates, finite element discretization, time integration algorithms and convergence analysis. Projects on finite element procedures in linear and non-linear problems are included.

**M E 525 - Nonlinear Structural Dynamics (3)**

Modern techniques to analyze and simulate nonlinear dynamical systems that arise in structural dynamics. The course will cover the following topics: summary of linear theory of multi-degree of freedom systems; sources of nonlinearity encountered in structural dynamics; effects of nonlinearity on structural response; nonlinear normal modes; reduced order modeling methods; data analysis methods; and applications from among aeroelasticity, energy pumping, structural health monitoring, system identification, and others.

**M E 526 - Robotics (3)**

Introduction to the fundamentals of robotics with emphasis on solutions to the basic problems in kinematics, dynamics, and control of manipulators of serial type. Covers modeling of rigid body motion, kinematics of articulated multibody systems, robot dynamics and simulation, sensing and actuation, robot controls, and task planning.

**M E 527 - Control of Mechanical Systems (3)**

Rigorous introduction to the control of dynamical systems, with a focus on mechanical systems. Includes basic systems theory, controllability, feedback and stabilization, observers and dynamic feedback, and applications of methods to systems of importance in mechanical engineering. Consent of Instructor required. Crosslisted with: A E527.

**M E 529 - Nonlinear and Optimal Control (3)**

Introduction to optimal control theory, Pontryagin's Maximum Principle, control of simple mechanical systems, Lagrangian and Hamiltonian methods, introduction to geometric control-Lie algebras, distributions, controllability and observability

**M E 530 - Intermediate Fluid Mechanics (3)**

Application of exact and empirical solutions to fundamental flow problems, including viscous and inviscid behavior. These applications establish a theoretical basis for the origin and physical role of common terms in the governing equations.

**M E 533 - Computational and Theoretical Fluid Mechanics (3)**

Application of fluid mechanics theory and computational approaches to advanced flow problems, including viscous/inviscid and laminar/turbulent behavior. Complex flow problems addressed through development of a theoretical formulation, followed by application of computational fluid dynamic (CFD) tools, and finally presentation and validation of solution data. Prerequisite: M E 530 or consent of instructor.

**M E 534 - Advance Computational Fluid Dynamics (3)**

Advanced techniques for large-scale numerical simulations of fluid flows: spectral numerical methods, including Fourier and other expansions, Galerkin and collocation projections, computational methods to solve incompressible and compressible Navier-Stokes equations, high-resolution methods for hyperbolic equations with discontinuous solutions, and issues related to implementation on supercomputers. Prerequisite(s): M E 533.

**M E 535 - Turbulence and Chaos (3)**

Classical and Computational Fluid Dynamics (CFD) techniques are used to investigate turbulent flows. Chaos and fractals introduced. Prerequisite(s): M E 530.

**M E 536 - Hydrodynamic Stability and Turbulence (3)**

Introduction to fundamentals of hydrodynamic stability, classical linear stability analysis of parallel shear flows and rotating flows, nonlinear stability, basic concepts in turbulence theory Prerequisite(s): M E 533.

**M E 537 - Vortex Dynamics (3)**

Basic laws of inviscid vortex motion-Helmholtz's laws, Kelvin's circulation theorem. Singular vortex models--point vortices, vortex rings, vortex patches, vortex sheets-with applications to vortex-dominated flows in engineering and nature. Numerical vortex methods Prerequisite(s): M E 533.

**M E 538 - Experimental Methods in Fluid Mechanics (3)**

Flow visualization techniques for incompressible and compressible flows, laser-based flow diagnostic methods, i.e., PIV (Particle Image Velocimetry), basic aspects of wind-tunnel design

**M E 540 - Intermediate Heat Transfer (3)**

Fundamentals of conduction, convection, and radiation heat transfer. Emphasis on the application of combined heat transfer to the solution of problems not accessible at the undergraduate level.

**M E 570 - Engineering Analysis I (3)**

Introduction to engineering analysis with emphasis on engineering applications. Topics include linear algebra, linear ordinary differential equations, and linear partial differential equations with focus on analytical methods.

**M E 580 - Engineering Analysis II (3)**

Engineering analysis with emphasis on engineering applications. Topics include analytical and numerical methods in linear and nonlinear ordinary and partial differential equations. Prerequisite: M E 570 or consent of instructor.

**M E 598 - Special Research Programs (1-3)**

Individual investigations, either analytical or experimental. May be repeated for a maximum of 6 credits.

**M E 599 - Master's Thesis (0-15)**

Thesis.

**M E 600 - Doctoral Research (1-15)**

This course number is used for assigning credit for research performed prior to successful completion of the doctoral qualifying examination.

**M E 698 - Special Research Programs (1-3)**

May be repeated for a maximum of 6 credits.

**M E 700 - Doctoral Dissertation (0-15)**

Dissertation.

**M SC - MILITARY SCIENCE****M SC 465 - Leading Small Organization - Graduate Level (3)**

Practical opportunities to lead small groups in situations of graduated complexity. Use of small unit defensive tactics and opportunities to conduct training for graduate students. Leader Lab M SC 465L, three physical fitness sessions per week and weekend exercises required. Research paper required. Prerequisite: consent of PMS. Corequisite: M SC 465L. No S/U option.

**M SC 465 L - Advanced Course Leadership Lab - Graduate Level (1)**

Planning, coordination, execution and evaluation of training and activities with basic course students and ROTC program. Students develop and refine leadership skills in positions of responsibility. Open only to students taking M SC 465. Prerequisite: consent of PMS. Corequisite: M SC 465.

**M SC 466 - Graduate-Level Leading Small Organizations (3)**

Open only to students taking M SC graduate-level courses. Delegation and supervision based on case studies. Use of ethical decision making to enhance team performance. Three physical fitness sessions per week, weekend exercises, and a research paper required. Prerequisite: consent of PMS. Corequisite: M SC 466L.

**M SC 466 L - Graduate-Level Leading Small Organizations Lab (1)**

Open only to students taking M SC graduate-level courses.

**M SC 501 - Leadership Challenges and Goal Setting (3)**

Planning, conducting, and evaluating activities of ROTC cadet organization. Articulation of goals and plans to attain them. Assessment of organizational skills and development of strategies to improve group cohesion. Leadership lab, three physical fitness sessions per week, weekend exercise, and research paper required. Consent of instructor required. Prerequisite(s): Consent of PMS. Corequisite(s): M SC 401L.

**M SC 502 - Transition to Lieutenant (3)**

Continuation of M SC 501. Identification and resolution of ethical dilemmas. Counseling and motivation techniques. Examination of tradition and law for officers. Leadership lab, three physical fitness sessions per week, weekend exercises, and research paper required. Consent of instructor required. Prerequisite(s): Consent of PMS. Corequisite(s): M SC 402L.

## MATH - MATHEMATICS

### MATH 451 - Introduction to Differential Geometry (3)

Applies calculus to curves and surfaces in three dimensional Euclidean space. Prerequisites: MATH 280 and MATH 391, or consent of instructor.

### MATH 452 - Foundations of Geometry (3)

Topics in projective, axiomatic Euclidean or non-Euclidean geometries. Prerequisite(s): C or better in MATH 331 or MATH 332. Restricted to: Main campus only.

### MATH 453 - Introduction to Topology (3)

Introduction to topological spaces and metric spaces, with connections to analysis, geometry, and the classification of surfaces. Prerequisite: MATH 332 or consent of instructor.

### MATH 454 - Mathematical Logic (3)

Propositional calculus and the first order predicate calculus, including Godel's completeness theorem for the latter, and additional topics at the option of the instructor. Prerequisite(s): C or better in MATH 331 or MATH 332, or consent of instructor.

### MATH 455 - Elementary Number Theory (3)

Covers primes, congruences and related topics. Prerequisite: grade of C or better in MATH 331 or consent of instructor.

### MATH 457 - Applications of Modern Algebra (3)

Topics may include coding theory, cryptography, graph theory, or symmetry groups. May be repeated up to 9 credits. Prerequisite(s): C or better in Math 331 or consent of instructor.

### MATH 459 - Survey of Geometry (3)

Basic concepts of Euclidean geometry, ruler and compass constructions. May include topics in non-Euclidean geometry. For non-math majors. Prerequisite(s): C or better in Math 331 or Math 332. Restricted to: Main campus only.

### MATH 466 - Lattice Theory (3)

Introduction to partially ordered sets, distributive, modular, and Boolean lattices. Prerequisites: MATH 330 or MATH 331 or MATH 332 or consent of instructor.

### MATH 471 - Complex Variables (3)

A first course in complex function theory, with emphasis on applications. Prerequisite: MATH 391 or both MATH 392 and MATH 291G.

### MATH 472 - Fourier Series and Boundary Value Problems (3)

Fourier series and methods of solution of the boundary value problems of applied mathematics. Prerequisite: MATH 392.

### MATH 473 - Calculus of Variations and Optimal Control (3)

Euler's equations, conditions for extreme, direct methods, dynamic programming, and the Pontryagin maximal principle. Prerequisite: MATH 392.

### MATH 475 - Business Applications (3)

Taught with MATH 375 with additional work. Does not fulfill requirements for degrees in mathematics. Prerequisite(s): C or better in Math 142G, or in MATH 191G, or in Math 235.

### MATH 480 - Matrix Theory and Applied Linear Algebra (3)

An application driven course, whose topics include rectangular systems, matrix algebra, vector spaces and linear transformations, inner products, and eigenvalues and eigenvectors. Applications may include LU factorization, least squares, data compression, QR factorization, singular value decomposition, and search engines. Prerequisite(s): C or better in any 300-level course with a MATH or STAT prefix.

### MATH 481 - Advanced Linear Algebra (3)

Rigorous treatment of vector spaces and linear transformations including canonical forms, spectral theory, inner product spaces and related topics. Prerequisite: grade of C or better in MATH 331.

### MATH 491 - Introduction to Real Analysis I (3)

Rigorous discussion of the topics introduced in calculus. Sequences, series, limits, continuity, differentiation. Prerequisite: grade of C or better in MATH 332 or consent of instructor.

### MATH 492 - Introduction to Real Analysis II (3)

Continuation of MATH 491. Integration, metric spaces and selected topics. Prerequisite: MATH 491 or consent of instructor.

### MATH 498 - Directed Reading (1-6)

May be repeated for a maximum of 6 credits. Graded S/U.

### MATH 501 - Introduction to Differential Geometry (3)

Same as MATH 451 with additional work for graduate students.

### MATH 502 - Foundations of Geometry (3)

Same as MATH 452 with additional assignments for graduate students.

### MATH 503 - Introduction to Topology (3)

Same as MATH 453 with additional work for graduate students.

### MATH 504 - Mathematical Logic (3)

Same as MATH 454 with additional assignments for graduate students.

### MATH 505 - Elementary Number Theory (3)

Same as MATH 455 with additional assignments for graduate students.

### MATH 506 - Lattice Theory (3)

Same as MATH 466 with additional assignments for graduate students.

### MATH 507 - Applications of Modern Algebra (3)

Taught with Math 457 with additional work for graduate students. May be repeated up to 9 credits. Prerequisite(s): C or better in Math 331 or consent of instructor.

### MATH 509 - Information Theory (3)

This class is a study of Shannon's measure of information and discusses mutual information, entropy, and channel capacity, the noiseless source coding theorem, the noisy channel coding theorem, channel coding and random coding bounds, rate-distortion theory, and data compression. Prerequisite(s): EE 571 or Stat 515. Restricted to: Main campus only. Crosslisted with: E E 586

### MATH 511 - Fundamentals of Elementary Mathematics I (3)

Topics from real numbers, geometry, measurement, and algorithms, incorporating calculator technology. Intended for K-8 teachers. As part of course students mentor MATH 111 undergraduates. Does not fulfill degree requirements for M.S. in mathematics.

### MATH 512 - Fundamentals of Elementary Mathematics II (3)

Real numbers, geometry, and statistics, incorporating calculator technology. Intended for K-8 teachers. Students serve as mentors to MATH 112 undergraduates. Does not fulfill degree requirements for M.S. in mathematics.

### MATH 513 - Fundamentals of Algebra and Geometry I (3)

Algebra and metric geometry, incorporating appropriate calculator technology. Intended for K-8 teachers. Students serve as mentors to MATH 313 undergraduates. Does not fulfill degree requirements for M.S. in mathematics.

### MATH 516 - Calculus with Hands-on Application (3)

This course, primarily for in-service teachers, is taught in an interactive laboratory format. Students design and construct physical objects for which the planning stage requires calculus techniques. All numerical computations are carried out on graphing calculators. Meets simultaneously with Math 316, primarily for prospective teachers. Does not fulfill degree requirements for M.S. in Mathematics. Prerequisite(s): Math 511 and Math 512 or consent of instructor.

### MATH 517 - Complex Variables (3)

Same as MATH 471 with additional work for graduate students.

### MATH 518 - Fourier Series and Boundary Value Problems (3)

Same as MATH 472 with additional work for graduate students.

### MATH 519 - Calculus of Variations and Optimal Control (3)

Same as MATH 473 with additional work for graduate students.

### MATH 521 - Financial Mathematics I: Portfolio Optimization (3)

Complete and incomplete markets, optimal investment paths, dynamic optimization, the Black-Scholes model, European options, American options. Prerequisite: STAT 515 and either MATH 280 or MATH 480.

### MATH 522 - Financial Mathematics II (3)

Bonds, Swaps, Exotic options, Barrier options, Asian options, Lookback options, options with transaction costs, Fokker Plank theory; computing expectations, The Heath-Jarrow-Morton theorem, the Ho-Lee model, Stochastic volatility models, Exponential-Affine models, numerical methods. Prerequisite: MATH 521.



**MATH 523 - Numerical Optimization and Applications to Financial Mathematics (3)**

Dynamic optimization of a monopolist, trading off inflation and unemployment, the optimal adjustment of labor demand, infinite planning horizon, the optimal investment path of a firm, the optimal social saving behavior, phase-diagram analysis, optimal control theory, the political business cycle, the dynamics of a revenue-maximizing firm, economic examples of state-space constraints. This course is offered simultaneously with Math 423. Prerequisite: Math 521.

**MATH 525 - Advanced Linear Algebra (3)**

Same as MATH 481 with additional work for graduate students. Prerequisite: grade of C or better in MATH 331.

**MATH 527 - Introduction to Real Analysis I (3)**

Same as MATH 491 with additional work for graduate students.

**MATH 528 - Introduction to Real Analysis II (3)**

Same as MATH 492 with additional work for graduate students.

**MATH 530 - Special Topics (1-3)**

Specific subjects to be announced in the Schedule of Classes. May be for unlimited credit with approval of the department.

**MATH 531 - Ordinary Differential Equations (3)**

Linear algebra and linear ordinary differential equations, existence and uniqueness of solution, smooth dependence on initial conditions, flows, introduction to smooth dynamical systems. Prerequisites: MATH 392 and MATH 527, or consent of instructor.

**MATH 532 - Partial Differential Equations (3)**

The basic equations of mathematical physics. Elliptic, hyperbolic, and parabolic equations. Characteristic surfaces. Well-posed problems. Prerequisite: MATH 518 or consent of instructor.

**MATH 534 - Nonlinear Programming (3)**

Theoretical and computational methods to solve optimization problems in engineering, statistics, economics, and operations research. Topics include convexity, optimality conditions, Newton's method, Lagrange multipliers, search algorithms for unconstrained and constrained problems, as well as barrier and penalty methods.

**MATH 540 - Directed Reading (1-6)**

May be repeated for a maximum of 6 credits. Consent of instructor required. Graded: S/U.

**MATH 541 - Topology I (3)**

Connectedness and compactness of topological spaces, introduction to the quotient topology, elementary homotopy theory, the fundamental group, the Seifert-van Kampen theorem Prerequisite(s): MATH 525 and MATH 528, or consent of instructor.

**MATH 542 - Topology II (3)**

Covering spaces and their classification, singular homology, degree theory, Brouwer's fixed point theorem, CW-complexes and cellular homology, and other applications. Prerequisite(s): MATH 541 or consent of instructor.

**MATH 555 - Differentiable Manifolds (3)**

Differentiable structures, tangent bundles, vector fields and differential equations. Additional topics may include differential forms, De Rham cohomology, Riemannian geometry, and topics chosen by the instructor. May be repeated for a maximum of 9 credits. Consent of instructor required. Prerequisite(s): MATH 525 and MATH 528, or consent of instructor.

**MATH 557 - Axiomatic Set Theory (3)**

A detailed study of Zermelo-Fraenkel and Bernays set theories. Prerequisite: MATH 504 or equivalent.

**MATH 561 - The Role of History in the Teaching of Mathematics (3)**

In-depth study of selected mathematical topics through examination of their historical development, with emphasis on studying original sources. Pedagogical aspects of using history and original sources in teaching mathematics. Research and preparation of classroom materials based on original sources.

**MATH 562 - History and Theories of Mathematics Education (3)**

A study of the history of the mathematics taught in American schools, including an examination of authentic original textbooks and the changes in their content and the approach to the subject over time, together with writings of people who have influenced the development and changes of mathematics education. Theories of learning mathematics, and current issues in mathematics education. Prerequisite(s): Restricted to graduate students.

**MATH 563 - Algebra with Connections (3)**

Connections between Algebra and other K-12 curriculum strands, especially Geometry and Probability / Data Analysis. Apply algebraic modeling and reasoning to a variety of mathematical problem solving situations. Does not fulfill requirements for degrees in mathematics. Consent of instructor required. Prerequisite(s): Admittance into the MC2-LIFT program.

**MATH 564 - From Number to Algebra (3)**

The progression from Number to Algebra in the K-12 curriculum as a concrete-to-abstract progression. Key concepts considered across the grade levels include the different uses of variables, equivalence in different contexts, patterns, and ratios. Does not fulfill requirements for degrees in mathematics. Consent of instructor required. Prerequisite(s): Admittance into the MC2-LIFT program.

**MATH 565 - Modeling Linear Decisions for Middle School Teachers (3)**

Introduction to linear decision-making algorithms. Topics include network models, systems of equations and linear programming. Does not fulfill requirements for degrees in mathematics. Prerequisite: MATH 185 or equivalent.

**MATH 566 - Data Analysis with Applications (3)**

Statistical concepts and terminology in professional uses of data by teachers, such as standardized test score reports and educational research; visual displays of data; measures of variation and central tendency; consideration of how K-12 topics in Data Analysis are developed from one grade level to the next. Does not fulfill requirements for degrees in mathematics. Consent of instructor required. Prerequisite(s): Admittance into the MC2-LIFT program.

**MATH 567 - From Measurement to Geometry (3)**

The progression from Measurement to Geometry in the K-12 curriculum as a concrete-to-abstract progression. Important concepts such as angle, length, and area progress from concrete, measurable situations to more abstract problems which require reasoning and proof. Does not fulfill requirements for degrees in mathematics. Consent of instructor required. Prerequisite(s): Admittance into the MC2-LIFT program.

**MATH 568 - Using Number Throughout the Curriculum (3)**

Understand number concepts more deeply by seeing many examples of those concepts applied in other content strands. Develop mathematical knowledge and understanding to build a repertoire of ways for students to practice and review basic number skills and concepts as part of later, more advanced courses. Does not fulfill requirements for degrees in mathematics. Consent of instructor required. Prerequisite(s): Admittance into the MC2-LIFT program.

**MATH 569 - Geometry with Connections (3)**

Connections between Geometry and other K-12 curriculum strands, especially Algebra and Probability / Data Analysis. Address key attributes of geometric concepts by considering their connections within and across grade levels. Does not fulfill requirements for degrees in mathematics. Consent of instructor required. Prerequisite(s): Admittance into the MC2-LIFT program.

**MATH 577 - Numerical Analysis I (3)**

Topics may include interpolation, differential equations, nonlinear equations, optimization. Prerequisites: MATH 480 and 527, or consent of instructor.

**MATH 581 - Algebra 1 (3)**

Examines groups, commutative rings, solvability of polynomials, Galois theory, ruler and compass constructions. Prerequisite/corequisite: MATH 525.

**MATH 582 - Algebra II (3)**

Group actions, fundamental theorem of finite Abelian groups, Sylow theorems, solvable groups, noncommutative rings, Noetherian rings, unique factorization domains, modules, tensor products. Prerequisite: MATH 581.

**MATH 583 - Introduction to Commutative Algebra and Algebraic Geometry (3)**

Introduction to the basic notions and techniques of modern algebraic geometry, including the necessary commutative algebra foundation. Topics likely to include algebraic and projective varieties, Nullstellensatz, morphisms, rational and regular functions, local properties. Other topics may include Noether normalization, dimension theory, singularities, sheaves, schemes, Grobner bases. May be repeated up to 9 credits. Prerequisite(s): MATH 581 or consent of instructor.

**MATH 584 - Representation Theory (3)**

Topics from representation theory of finite or infinite groups. Prerequisite: consent of instructor. May be repeated for a maximum of 9 credits.

**MATH 585 - Universal Algebra (3)**

Universal algebra and category theory. Theorems of Birkhoff and Tarski relating equational classes, free algebras and their construction through homomorphisms, subalgebras and products. Topics from model theory, sheaf

theory and representation by subdirect products. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.

**MATH 586 - Nonlinear Dynamics I (3)**

Same as PHYS 586.

**MATH 591 - Complex Analysis I (3)**

Rigorous treatment of complex differentiation and integration, properties of analytic functions, series and Cauchy's integral representations. Prerequisites: MATH 517 and MATH 528, or consent of instructor.

**MATH 592 - Complex Analysis II (3)**

Harmonic functions, product representations, conformal mappings, Riemann's mapping theorem, Riemann surfaces, and selected other topics. Prerequisite: MATH 591 or consent of instructor.

**MATH 593 - Measure and Integration (3)**

Measure spaces, measurable functions, extension and decomposition theorems for measures, integration on measure spaces, absolute continuity, iterated integrals. Prerequisite: MATH 528 or consent of instructor.

**MATH 594 - Real Analysis (3)**

Differentiation,  $L_p$  spaces, Banach spaces, measure and topology, other selected topics. Prerequisite: MATH 593.

**MATH 599 - Master's Thesis (0-15)**

Thesis.

**MATH 600 - Doctoral Research (1-15)**

Research.

**MATH 601 - Special Topics (1-3)**

Specific subjects to be announced in the Schedule of Classes. May be repeated for unlimited credit with approval of the department.

**MATH 643 - Topology III (3)**

Topics may include higher homotopy groups, fibrations, cohomology operations and obstruction theory, spectral sequences, or others chosen by instructor. Prerequisites: MATH 542 or consent of instructor. May be repeated for a maximum of 9 credits.

**MATH 655 - Topics in Differential Geometry (3)**

Representation theory of Lie groups, Riemannian geometry, or another topic chosen by instructor. Content varies. Prerequisite: MATH 555 or consent of instructor. May be repeated for a maximum of 9 credits.

**MATH 683 - Homological Algebra (3)**

Basic topics in homological algebra and category theory. Prerequisite: MATH 542 or MATH 582 or consent of instructor. May be repeated for a maximum of 9 credits.

**MATH 686 - Nonlinear Dynamics II (3)**

Same as PHYS 686.

**MATH 695 - Introduction to Functional Analysis I (3)**

Banach spaces. The three basic principles: uniform boundedness principle, closed graph/open mapping theorems, Hahn-Banach theorem. Prerequisites: MATH 541 and MATH 594, or consent of instructor.

**MATH 696 - Introduction to Functional Analysis II (3)**

Continuation of MATH 695. Topics selected from topological vector spaces, Hilbert space, spectral theory, Banach algebras, and distribution theory. Prerequisite: MATH 695 or consent of instructor.

**MATH 698 - Selected Topics (1-15)**

Selected topics.

**MATH 700 - Doctoral Dissertation (1-15)**

Dissertation.

## **MGT - MANAGEMENT**

**MGT 451 - Selection, Placement, and Performance Evaluation (3)**

Staffing processes for organizations and the evaluation of employee performance. Use of selection methods and measurement of work behavior.

**MGT 453 - Leadership and Motivation (3)**

Theories of leadership and motivation. Motivational programs for complex organizations. Relationships between organizational power, authority, and management styles. Crosslisted with: I E 453

**MGT 454 - Work Teams in Organizations (3)**

Theories of small groups and their application to the work situation. Why and how groups form, grow, communicate, and maintain themselves.

Prerequisites: senior or above standing.

**MGT 455 - Public Utilities Regulation (3)**

Same as ECON 455.

**MGT 458 - Comparative International Management (3)**

Cultural influences on management are examined in a global business environment with a particular emphasis on human behavior in multinational organizations and the management of human resources. Same as I B 458.

**MGT 460 - Compensation Management (3)**

An overview of wage and salary administration, including job evaluation, wage and salary surveys, program administration, legal aspects of pay systems, and benefits administration. Prerequisite(s): MGT 332 or consent of instructor.

**MGT 461 - Seminar in Entrepreneurship (3)**

For students interested in owning and operating their own business; students desiring hands-on, real-time experience in helping start up a business. Prerequisites: seniors in business administration or engineering, MBA students and others at the discretion of the instructor. Same as MKTG 461.

**MGT 462 - Introduction to Health Services Policy (3)**

Same as ECON 453.

**MGT 465 - Contemporary Issues in Human Resources Management (3)**

Integrative course in human resources management, emphasizing the application of advanced concepts to complex personnel cases. Prerequisite: MGT 332.

**MGT 466 - Managing Electronic Commerce: A Business Models Perspective (3)**

Surveys the emerging Internet technology involving business to business, business to consumer, and consumer to consumer forms of trade. Covers quantitative decision and negotiation analysis techniques as well as auction and market trade mechanisms.

**MGT 470 - Project Management in Organizations (3)**

Roles, responsibilities, and techniques of project managers in managing projects effectively. Preparation for professional certification.

**MGT 480 - Operations Strategy (3)**

The formulation and implementation of integrated operations plans as strategic as well as tactical means to organizational competitiveness. Integration of the operations management course sequence with the companion functional areas of business is achieved via the case method and a system design project.

**MGT 490 - Selected Topics (1-18)**

Seminars in selected current topics in the various areas of management and administration. Prerequisites vary according to the seminar being offered.

**MGT 491 - Management Internship and Cooperative Education II (1-3)**

Covers the application of management skills to the work environment. The amount of academic credit (1-3 cr.) will be determined by the academic experience and not be the work experience. Prerequisite: MGT 309 and consent of instructor. May be repeated for a maximum of 3 credits. Restricted to majors and minors.

**MGT 498 - Independent Study (1-3)**

Individual studies directed by consenting faculty with the prior approval of the department head. Prerequisites: junior or above standing and consent of instructor. A maximum of 3 credits may be earned.

**MGT 502 - Operations Management (3)**

Systems and specialized models applied to the management of production facilities and service operations, including physical and human resources. Prerequisite(s): Graduate students only.

**MGT 503 - Organizational Behavior and Management Processes (3)**

Covers the theory and practice related to the successful management of human resources in organizations operating within a dynamic global environment. Course goals include developing alternative frameworks for analyzing issues related to human behavior, management science, and organizational structure and theory. Prerequisite: graduate students only.

**MGT 512 - Quantitative Analysis for Business Decisions (3)**

Identification, collection, and analysis of an organization's data both internal and external, and use of the resultant information in managerial decision making. Prerequisite: graduate students only.

**MGT 524 - Human Resource Management (3)**

- Employment planning, recruiting, selection, orientation, performance evaluation, training, compensation, employee benefits, health and safety, equal employment opportunity, labor relations, and discipline.
- MGT 527 - Negotiation and Business Dispute Resolution (3)**  
Same as BLAW 527.
- MGT 545 - Seminar in Human Resources Management (3)**  
Systems, theories, and methods of managing human resources for optimum productivity.
- MGT 548 - Small Business Consulting (3)**  
Study, analysis, and presentation of recommendations for solving significant problems confronting small businesses. Same as MGT 448 with differentiated assignments for graduate students.
- MGT 583 - Leadership and Motivation (3)**  
Theories of leadership and motivation. Motivational programs for complex organizations. Relationships between organizational power, authority, and management styles. Same as MGT 453 with differentiated assignments for graduate students.
- MGT 585 - Public Utilities Regulation (3)**  
Same as MGT 455 with differentiated assignments for graduate students. Same as ECON 585.
- MGT 588 - Comparative International Management (3)**  
Covers human resource management in other countries, with emphasis on Mexico, Western Europe, and Japan. Examination of cultural influences on management systems. Prerequisite: consent of instructor. Same as MGT 458 with differentiated assignments for graduate students.
- MGT 589 - Global Agribusiness Environment (3)**  
Covers the integration of free trade, social equity, environmental and transnational corporation's aspects of agribusiness from a food and global market perspective and within the framework of open systems theory, the socio-ecological perspective (CSTE). Prerequisite: Graduate students only.
- MGT 590 - Strategic Management (3)**  
Covers the integration of functional, human, technological, and environmental aspects of business within the framework of management policy and strategy formulation. Formulate, implement, evaluate and control the various functions of the organization from a systems perspective. Understand the external environment and its impact on the organization. Prerequisite: M.B.A. student in his or her final semester. Restricted to majors.
- MGT 591 - Seminar in Entrepreneurship (3)**  
For students interested in owning and operating their own business; students desiring hands-on, real-time experience in helping start up a business. Prerequisite: M.B.A. student or consent of instructor. Same as MGT 461 with differentiated assignments for graduate students. Crosslisted with: MKTG 591.
- MGT 592 - Compensation Management (3)**  
An overview of wage and salary administration, including job evaluation, wage and salary surveys, program administration, legal aspects of pay systems, and benefits administration. Prerequisite: consent of instructor. Same as MGT 460 with differentiated assignments for graduate students.
- MGT 598 - Special Research Programs (1-3)**  
Individual investigations either analytical or experimental. Prerequisite: consent of instructor. A maximum of 6 credits may be earned.
- MGT 600 - Doctoral Research (1-15)**  
This course number is used for assigning credit for research performed prior to successful completion of the doctoral qualifying examination. Restricted to management majors.
- MGT 601 - Research in Management (1)**  
Ph.D. course provides opportunities for significant interaction between Management faculty and Management Ph.D. students. The course also provides opportunities for development of professional scholarly standards, ethics, and critiques, as well as insight into current research areas and topics supported by the Management Department and other relevant disciplinary areas. May be repeated for a maximum of 6 credits. Restricted to Ph.D. students. Graded S/U.
- MGT 640 - Instructional Development for Teaching Business (3)**  
Pedagogical issues and techniques in collegiate business education. Includes course and curriculum development, outcomes assessment, class management, and teaching techniques. Practical issues faced in college instruction. Restricted to doctoral students.
- MGT 645 - Seminar in Human Resources Management (3)**  
Seminar will address current issues in human resources management. Focus on research related to the selection, development, and effective use of human resources. Restricted to doctoral students.
- MGT 650 - Seminar in Organizational Behavior (3)**  
Seminar will include specific organizational behavior topics; motivation, leadership, group and inter-group relations, and attitude theory. Focus on current research and theory. Restricted to doctoral students.
- MGT 655 - Seminar in Organizational Systems and Theory (3)**  
Analysis of organizations from a macro perspective. Topics include organizational theory, organizational design, organizational environment, and sociotechnical systems. Restricted to doctoral students.
- MGT 660 - Research Design and Methodology (3)**  
Topics will include philosophy of science, theory building, and research methods applicable to the study of organizational behavior. Restricted to doctoral students.
- MGT 661 - Qualitative Research Methods (3)**  
In-depth coverage of selected topics in research methodology, including theory and logic of scientific investigation, grounded theory, action research, and ethnomethodology. Restricted to doctoral students.
- MGT 670 - Seminar in Operations Management (3)**  
Seminar examines the major problem areas, research findings, and research methodologies of operations management. Focus on the critical evaluation of current theory and methodology. Restricted to doctoral students.
- MGT 675 - Seminar in Strategic Management (3)**  
Survey of current and classical readings in strategy. Introduces the doctoral level student to strategic issues, strategic topics for research, and publication venues. Restricted to doctoral students.
- MGT 685 - Story Consulting to Organizations (3)**  
Apply various qualitative story and narrative research methods (plot analysis, script analysis, life history, and restoring) to action research consulting project. Students will conduct story assessment and (propose or enact) intervention with a local consenting organization. Restricted to doctoral students.
- MGT 690 - Special Topics (3)**  
Seminars in selected current topics in the various areas of management. May be repeated for unlimited credit. Restricted to doctoral students. Prerequisite(s): Vary according to seminar being offered.
- MGT 698 - Special Topics (1-3)**  
Prerequisite: consent of instructor.
- MGT 700 - Doctoral Dissertation (0-15)**  
Prerequisite: advancement to candidacy.

## **MKTG - MARKETING**

- MKTG 451 - Agribusiness Market Planning (3)**  
Same as AG E 451.
- MKTG 455 - Services Marketing Management (3)**  
How service organizations can grow and prosper through application of marketing. Analyzes nature of services, service environment, customer and marketing mix, and implementation of service strategies.
- MKTG 461 - Seminar in Entrepreneurship (3)**  
Same as MGT 461.
- MKTG 480 - Level 3, PGA's PGM Education Program (Part 2) (1.5)**  
Completion of Level 3 of the PGA's Educational Program. This class will focus on applying work experience while out on a PGA-required internship (co-op) to complete the PGA's Level education kit. Restricted to PGA Golf Mgt. students. Consent of PGA Director required. Consent of instructor required. Restricted to MKTG, PGM majors.
- MKTG 481 - PGA Final Experience (3)**  
The following is a requirement for successful completion of this senior level PGA Golf Mgt. capstone course: 16 months of co-op, completion of Level 1, Level 2, and Level 3 of the PGA's PGM Educational Program, and successful completion of the PGA's Playing Ability Test. Restricted to PGA Golf Mgt. students. Consent of PGA Director required. Consent of instructor required. Restricted to MKTG, PGM majors.
- MKTG 489 - Strategy and Policy (3)**  
Techniques and analysis of marketing strategy and policy planning and formulation. Prerequisites: senior standing or consent of instructor.
- MKTG 490 - Selected Topics (1-18)**

Covers materials and subjects not offered in regular Marketing courses. Students can take 18 credit hours of MKTG 490 if each class is a different subtitle. A maximum of 18 credit hours can be earned through MKTG 490.

#### MKTG 498 - Independent Study (1-3)

Individual studies directed by consenting faculty with the prior approval of the department head. Prerequisites: junior or above standing and consent of instructor. A maximum of 3 credits may be earned.

#### MKTG 500 - Concepts in Marketing (1.5)

An overview of fundamental principles of Marketing necessary for prospective MBA students who do not have an undergraduate background in Marketing. Includes: Terminology, basic functions and responsibilities associated with practice of marketing. Prerequisite(s): Admitted to MBA program or consent of course department. Restricted to: MBA majors.

#### MKTG 503 - Marketing Management (3)

Analysis of marketing problems and the integration of organizational resources as well as behavioral and quantitative techniques into the development and implementation of solutions. Prerequisite(s): MKTG 303 or equivalent with a grade of B or better. Graduate students only.

#### MKTG 591 - Seminar in Entrepreneurship (3)

For students interested in owning and operating their own business; students desiring hands-on, real-time experience in helping start up a business. Same as MKTG 461 with differentiated assignments for graduate students. Crosslisted with: MGT 591.

#### MKTG 598 - Special Research Programs (1-3)

Individual investigations either analytical or experimental. Prerequisite: consent of instructor. A maximum of 3 credits may be earned.

#### MKTG 601 - Marketing Management (3)

Covers the conceptual foundations of contemporary marketing management research, concepts, and literature. Fundamental to the understanding of contemporary marketing and the breadth of the field of marketing study.

#### MKTG 610 - Marketing and the Scientific Method (3)

Issues related to the evolution of research philosophies and methodologies. Critical to the development of appreciation for the value of research and experimentation.

#### MKTG 620 - Research- Theory Interface (3)

Theoretical and methodological issues involved in translating a theory into a research study. Prepares Ph.D. students to undertake dissertation research. Consent of instructor required.

#### MKTG 625 - Consumer Behavior (3)

Extensive reading of seminal and contemporary articles on consumer behavior and developing original research to explore cross-disciplinary issues relevant to the study of marketing.

#### MKTG 640 - Measurement and Structural Equation Modeling (3)

Explores theories of measurement that underlie all quantitative analysis, including the use of structural equation models. Contrasts classical test theory with item response theory and generalizability theory. Covers PRELIS and LISREL, and critiquing structural equation models by other researchers. Prerequisite: MKTG 630 or equivalent.

#### MKTG 670 - Marketing Theory (3)

The evolution, development, construction, and evaluation of the major theoretical perspectives of marketing. Fundamental to the understanding of contemporary marketing and preparation for investigations into the nature and role of theory in marketing.

#### MKTG 690 - Special Topics in Marketing (3)

A seminar on special topics in marketing. The topic of the course will vary according to the needs of the students in the program and the instructor. Ph.D. students may repeat this course up to three times for a maximum total of 9 credits.

#### MKTG 698 - Selected Topics (1-9)

Materials and subjects not offered in regular marketing courses. May be repeated for a maximum of 18 credits under different subtitles.

#### MKTG 700 - Doctoral Dissertation (0-15)

Prerequisite: advancement to candidacy.

## **MOLB - MOLECULAR BIOLOGY**

#### MOLB 450 - Special Topics in Molecular and Cellular Biology (1-3)

Selected topics of current interest in the fields of molecular and cellular biology. Specific topics announced in the Schedule of Classes. May be repeated for a maximum of 6 credits.

#### MOLB 452 - Independent Studies in Bioinformatics (1-3)

Individual investigation, theoretical or experimental, in bioinformatics or computational applications under the supervision of a molecular biology or computation science faculty member. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.

#### MOLB 520 - Molecular Cell Biology (3)

Same as BIOL 520.

#### MOLB 542 - Biochemistry I (3)

Same as BCHE 542. B or better required.

#### MOLB 545 - Molecular and Biochemical Genetics (3)

Same as BCHE 545 and BIOL 545.

#### MOLB 546 - Biochemistry II (3)

Same as BCHE 546.

#### MOLB 550 - Topics in Molecular Biology (1-3)

Selected topics of current interest in field of molecular biology for master's level students.

#### MOLB 590 - Discussions in Molecular Biology (1)

Oral presentations of ongoing research and/or research proposal for the masters thesis. Must be repeated twice for masters and three times for doctoral students. Graded by 2 options: S/U or Letter Grade

#### MOLB 597 - Laboratory Rotations/Research Discussions (1-3)

All entering students are required to take at least one credit, during their first semester, in which they will circulate through at least three different labs working on assigned problems and discussing research programs. May be repeated for a maximum of 4 credits. Graded S/U.

#### MOLB 598 - Special Research Programs (1-3)

Individual investigation, experimental or theoretical, under the supervision of a molecular biology faculty member. Course may be repeated up to a total of 6 credits with committee approval.

#### MOLB 599 - Master's Thesis (0-15)

Experimental and scholarly research leading to the preparation of a master's thesis.

#### MOLB 600 - Molecular Biology Research (1-15)

Laboratory research efforts prior to successful completion of doctoral comprehensive exam.

#### MOLB 650 - Advanced Topics in Molecular Biology (1-3)

Discussions and lectures on topics of current interest in molecular biology for doctoral students.

#### MOLB 698 - Advanced Research Projects (1-9)

Individualized special research assignments for doctoral-level students. Up to 9 credits, with approval of committee. Graded S/U.

#### MOLB 700 - Doctoral Dissertation Research (0-15)

Research for doctoral students after completing comprehensive exams.

## **MPH - MASTER OF PUBLIC HEALTH**

#### MPH 500 - Orientation to Public Health (3)

Introduction to the historical and contemporary perspectives of public health theory and practice. Includes an investigation of public health as a discipline, a profession, and the programmatic attempts to improve health status.

#### MPH 510 - Community and Psychosocial Aspects of Public Health (3)

Social, behavioral, and educational aspects of disease prevention and health promotion programs. Restricted to MPH majors.

#### MPH 515 - Introduction to Gerontology (3)

Social, psychological, and physiological aspects of aging with an interdisciplinary emphasis on health promotion. Demographic characteristics of the aging population. Same as GERO 415.

#### MPH 520 - Biostatistical Applications in Public Health (3)

Quantitative methods for public health students including tabular, graphical, and numerical descriptive methods, random sampling, principles of statistical inference, confidence intervals, statistical tests of hypothesis through analysis of variance and regression. Restricted to MPH majors.

#### MPH 530 - Epidemiological Approaches to Disease Control and Prevention (3)

Basic epidemiological principles applicable to infectious and noninfectious disease. Descriptive techniques and analytic designs, and application of statistical and epidemiological investigation methods included. Restricted to MPH majors.

**MPH 540 - Health Services System: Administration and Organization (3)**

This course focuses on using a systems approach to identify and analyze factors and interrelationships that influence the operation of health services organizations. Specific attention is to administrative structures and operations, finance and quality among public health departments, hospitals, multi-institutional systems, integrated health systems and strategic alliances. Main Campus only. Restricted to MPH majors.

**MPH 541 - Principles of Health Program Management (3)**

This course prepares the student to assume a supervisory role in the management of health and human services programs. The course will cover essential management functions such as leadership, organizational assessment, planning, decision-making, organizational structure, budgeting, marketing, and human resource management.

**MPH 545 - Health Services Organization and Delivery (3)**

This course includes the framework of the United States healthcare system; organization and administration of health services; alternate ways of organizing and financing health systems; the roles of the government and free market on health care services; and the barriers to health services delivery.

**MPH 546 - Public Health Finance and Budget Management (3)**

Introduces health care accounting and finance to non-financial students. Students are exposed to the financial structure of health care organizations and the environment within which they operate. Instruction also introduces the use of accounting and financial information in investor-owned and not-for-profit organizations in the health care industry. Topics include understanding the creation and interpretation of financial statements, financial accounting and reporting requirements, financial analysis, budgeting, and resource allocation.

**MPH 547 - Public Health Law and Ethics (3)**

This course examines major legal and ethical concepts and their impact on public health policy and practice. The course examines governmental authority, at various jurisdictional levels, to improve the public health within society. This course will focus on public health law in the United States.

**MPH 550 - Environmental Public Health Issues (3)**

Environmental health issues from a public health perspective. Restricted to MPH majors.

**MPH 553 - Occupational Health (3)**

Identification, control, and prevention of occupational diseases and injuries. Field trips outside of class will be scheduled.

**MPH 554 - Environmental Epidemiology (3)**

Covers thematic and research aspects, as well as methodological issues related to environmental health and epidemiology, along with international and national priorities. Prerequisites: MPH 530 and MPH 550. Same as HL S 454 with differentiated assignments for graduate students.

**MPH 556 - Biological Aspects of Aging (3)**

Aging - the developmental process of the body determined by cellular changes influenced by lifestyle genetics, and environment. Investigates these changes, how health promotion influences them and when they are considered a disease. Same as GERO 456.

**MPH 557 - Health Promotion for the Older Adult (3)**

Common health concerns and lifestyle issues relevant to older adults. Facts about the content area, health behaviors, and practices to promote health and prevent disease; program development strategies applicable to a variety of settings. Same as GERO 450.

**MPH 558 - Public Health Policy Analysis (3)**

Covers issues related to U.S.-health policy and allocation of resources. Examination of local, state, and federal public health and health care funding. Assessment of impact of health policy on health education, medical practice, and the workplace. Same as HL S 458. Prerequisite: MPH 540 or consent of instructor.

**MPH 559 - Infectious and Noninfectious Disease Prevention (3)**

History, etiology, and prevention of diseases affecting humans. Prerequisite: HL S 395 or HLS 470. Same as HL S 459 with differentiated assignments for graduate students.

**MPH 560 - American Indian Health (3)**

Critical health issues facing American Indians in the contemporary world. Same as HL S 460.

**MPH 561 - Health Disparities: Determinants and Interventions (3)**

Investigates: descriptions of health disparities and measurement issues; physical environmental factors, behavioral and emotional variables; impact of aging of the populations, increased racial and ethnic diversity, and technological developments; intervention strategies and evaluation results. Same as HL S 461.

**MPH 562 - Hispanic Health Issues (3)**

Cultural differences that aid or hinder communication with Hispanic clients and the application of cross-cultural communication skills. Some field trips may be required. Same as HL S 462 with differentiated assignments for graduate students.

**MPH 563 - Interdisciplinary Seminar (3)**

Problem-based approach to case study analysis designed to instill a broader appreciation of health issues and multidisciplinary collaboration. May be repeated for a maximum of 6 credits under different subtitles. Same as CHSS 463, HL S 463 with differentiated assignments for graduate students.

**MPH 565 - International Health Problems (3)**

Comparison of domestic health programs and problems with those in other parts of the world; emphasis on political parameters and delivery processes. Additional attention is focused on the health issues of the U.S.-Mexico border. Same as HL S 465 with differentiated assignments for graduate students.

**MPH 566 - International Health Practicum (1-3)**

Intensive examination of health practices and beliefs from a cultural perspective. Focus on health structure, index of diseases, morbidity, mortality and epidemiological approaches to planning. Required travel (personal travel, lodging, and related expenses are extra). Same as HL S 466 with differentiated assignments for graduate students.

**MPH 567 - Rural Health Issues (3)**

Comprehensive overview of rural health services with southwestern United States and New Mexico focus. Prerequisite: HL S 395 or MPH 500. Taught with HL S 467.

**MPH 568 - Coping with Loss and Grief: A Cross-Cultural Perspective (3)**

A cross-cultural perspective to death, loss and grief. Hospice philosophy of caring for the dying will be included. Same as HL S 468 with differentiated assignments for graduate students.

**MPH 569 - U.S.-Mexico Border Health Issues (3)**

Interdisciplinary analysis of the impact of living conditions and health issues of communities along the U.S.-Mexico border and of the strategies and initiatives to address these issues. Problem-based learning, case analysis, lecture, guest speakers, Web-CT based instruction, and field trips. Same as HL S 469.

**MPH 570 - Foundations of Public Health Education (3)**

Social, behavioral, and educational aspects of disease prevention and health promotion. Includes history and theoretical basis of health education. Prerequisite: MPH 510. Restricted to MPH majors.

**MPH 571 - Health Informatics (3)**

The application of technology to engage communities and individuals in behavioral and environmental change processes. The course will focus on the use of technology to describe the magnitude of health problems and their sources; analyze risk factors; identify community strengths from which strategies may be defined and tools created to intervene, prevent problems, and promote health and well-being; and continuously evaluate, refine, and implement what works. Taught with HL S 471

**MPH 572 - Techniques of Health Communication/Education (3)**

Application of a wide range of communication and education theories/methods, including program planning and evaluation, in public health programming. Prerequisite: MPH 570. Restricted to MPH majors.

**MPH 573 - Community Organization in Public Health (3)**

Strategies for identifying and involving community leaders, community needs assessment, small area analysis and planning, and community-level development strategies. Prerequisite: MPH 570. Restricted to MPH majors.

**MPH 574 - Health Program Planning (3)**

Covers process of successful public health education program planning and grant writing. Prerequisite(s): MPH 570.

**MPH 575 - Methods of Community Health Education (3)**

Responsibilities of health educators, analysis of social forces affecting health needs, application of wide range of health education methods and

instructional media, and program implementation skills. Prerequisites: MPH 570 or concurrent enrollment. Taught with HL S 475.

**MPH 576 - Theoretically-Based Interventions (3)**

Identifying and developing interventions to problematic health-related behaviors. Prerequisite: MPH 570. Taught with HL S 476.

**MPH 578 - Evaluative Approaches in Public Health (3)**

Survey and analyses of health testing and evaluation procedures, uses and limitations of knowledge and attitude tests, behavioral inventories, check lists, questionnaires, interviews, and other techniques. Prerequisite(s): MPH 570.

**MPH 579 - Research and Resources in Community Health (3)**

Exploration of available public health research studies, data, results and implications. Prerequisite(s): MPH 520. Restricted to MPH majors.

**MPH 580 - Communicable Disease Control (3)**

Provides an understanding of the microbiology of pathogenic organisms and a public health approach to the control of disease. Instruction through WebCT. Taught with HL S 480.

**MPH 586 - Special Topics (3)**

Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits. Taught with HL S 486.

**MPH 590 - Independent Study (1-6)**

Individual studies with prior approval of department head. May be repeated for a maximum of 6 credits.

**MPH 591 - Mind-Body Health and Complementary and Alternative Therapies (3)**

An examination of the multiple dimensions of health from international and cultural views, mind-body interaction, and health promotion assessment and intervention techniques. Same as HL S 491 with differentiated assignments for graduate students.

**MPH 592 - Health Care of the Aged (3)**

General concepts and principles of aging. Introduces students to the aging process and assists them in understanding the various aspects of growing old. Same as HL S 492 with differentiated assignments for graduate students.

**MPH 593 - Adulthood and Aging (3)**

Normal transitions in later life; those occurring from 40 years of age to the end of life are discussed. Changes in interpersonal relationships and adaptations commonly made by individuals and meeting those alterations are presented through research findings, case studies, and auto bibliographies. Same as GERO 493 with differentiated assignments for graduate students.

**MPH 594 - Aging in a Multicultural Society (3)**

Study and comparison of aging in the southwestern multi-cultural society with emphasis on health care. Same as GERO 494 with differentiated assignments for graduate students.

**MPH 596 - Field Experience (1-4)**

Student will work in a public health setting under the supervision of an experienced public health professional and will use acquired knowledge and skills to conduct a project which addresses a specific public health problem or program need. Projects are agreed upon by the student and faculty. Prerequisite: consent of department head. May be repeated for a maximum of 4 credits. Restricted to MPH majors.

**MPH 597 - Graduate Public Health Seminar (1)**

Capstone seminar for advanced-standing MPH students. Restricted to MPH majors. Prerequisite: MPH 570. May be repeated for a maximum of 2 credits.

**MPH 599 - Master's Thesis (1-6)**

Minimum of 4 credits required but may be repeated for a maximum of 6 credits. Restricted to MPH majors. PR grading.

## **MSW- MASTERS OF SOCIAL WORK**

**MSW 500 - Social Problems and Social Welfare Policy (3)**

An overview of social and economic problems in the United States and the historical and current social welfare policies aimed at alleviating these problems. Emphasis on developing an awareness and ability to change policies that impact vulnerable populations.

**MSW 501 - Social Work Leadership and Administration (3)**

Supervision, consultation, and administration in social services, emphasis on developing leadership skills. Prerequisite(s): MSW 520, MSW 521. Restricted to MSW majors.

**MSW 503 - Policy Analysis and Change (3)**

This course will emphasize policy practice focusing on policy analysis and creating and implementing policy change. Prerequisite(s): MSW 500. Restricted to MSW majors.

**MSW 505 - Foundations of Professional Social Work (3)**

This course is a comprehensive overview of social work. It serves as an introduction to the profession of social work, including its history, values and ethics, legal regulation, structure, philosophy and major fields of practice.

**MSW 509 - Sociocultural Concepts and Populations of the Southwest (3)**

Theoretical and sociohistorical perspectives on racism, sexism, ageism, heterosexism, classism, ableism, and other forms of discrimination and oppression. Cultural diversity, strengths, and Southwest and border issues are emphasized.

**MSW 510 - Human Behavior and the Social Environment I (3)**

The major theories of human behavior and the life span from conception to adolescence. Focuses both on the areas of concern and risk for client systems and on the opportunities and strengths in the social environment. Required. Restricted to MSW majors.

**MSW 511 - Human Behavior and the Social Environment II (3)**

Major theories of human behavior and the life span from young adulthood through old age. Focuses on the areas of concern and risk for client systems and on the opportunities and strengths in the social environment. Required. Prerequisite(s): MSW 510.

**MSW 520 - Social Work Practice I (3)**

This is the first course of a two-course sequence. An introduction to the generalist crosscultural, social work practice perspective with individuals and families, focusing on social work as a profession, social work knowledge base, professional development, relationship building and assessment with individuals and families within a framework of social work values and ethics. Corequisite(s): MSW 551. Pre/Corequisite(s): MSW 505 and MSW 510. Restricted to MSW majors.

**MSW 521 - Social Work Practice II (3)**

This is the second course of a two-course sequence. A continuation of the generalist crosscultural, social work practice perspective with individuals and families, focusing on goal setting, contracting, implementation, and outcome assessment. The course also applies the generalist practice perspective and methods to larger systems: groups, organizations, and communities and includes relationship building, assessment, goal setting, contracting, implementation and outcome assessment within a framework of social work values and ethics. Prerequisite(s): MSW 520. Corequisite(s): MSW 552. Restricted to MSW majors.

**MSW 524 - Practice III: Advanced Practice with Individuals (3)**

This class builds on Foundation Year Practice courses (MSW 520, 521) by integrating theory and practice, and advancing skills in selecting, applying and evaluating practice interventions in a culturally sensitive manner with individuals. Prerequisite(s): MSW 520, MSW 521. Corequisite(s): MSW 554. Restricted to MSW majors.

**MSW 525 - Practice IV: Advanced Generalist Practice with Groups (3)**

This course will address the knowledge, values and skills needed to work effectively with diverse populations in group settings. The course will build on Foundation Year courses (MSW 520 and 521) by integrating theory and practice, and advancing skills in selecting, applying and evaluating practice interventions in a culturally sensitive manner with social work groups. Prerequisite(s): MSW 520, MSW 521, MSW 551, MSW 552. Restricted to MSW majors.

**MSW 526 - Practice V: Advanced Practice with Families (3)**

This class builds on Foundation Year Practice courses (MSW 520 and 521) by integrating theory and practice, and advancing skills in selecting, applying, and evaluating practice interventions in a culturally sensitive manner with families. Prerequisite(s): MSW 520, MSW 521, MSW 552. Corequisite(s): MSW 554. Restricted to MSW majors.

**MSW 527 - Practice VI: Advanced Practice with Organizations and Communities (3)**

This class builds on Foundation Year Practice courses (MSW 520, 521) by integrating theory and practice, and advancing skills in selecting, applying, and evaluating practice interventions in a culturally sensitive manner with organizations and communities. Prerequisite(s): MSW 520, MSW 521, MSW 524, MSW 525, MSW 554. Restricted to MSW majors.

**MSW 541 - Alcohol and Other Drugs (3)**

The prevalence of the major types of substance abuse. Addresses major treatment approaches to substance abuse as well as theories related to the causes and effects of such abuse in systems of different sizes. Prerequisite(s): Consent of instructor.

**MSW 542 - Violence in the Family (3)**

Theory and skills relating to practice with families who victimize vulnerable members. Includes physical, emotional and sexual abuse, incest, and neglect. Emphasis on knowledge and skills in approaches that effectively preserve and restore healthy family functioning. Prerequisite: consent of instructor.

**MSW 543 - Family and Child Welfare Practice (3)**

Current issues and interventions in child protection, foster care, family preservation and support, family reunification, adoption, and permanency planning. Cannot receive credit for SWK 443 and MSW 543.

**MSW 547 - Social Work Mental Health Practice (3)**

Social work assessment and interventions of major mental health issues across the life span with an emphasis on building resiliency and coping skills. Attention will be paid to mental health disparities and the impact of culture on mental health issues. Offered in the fall. Prerequisite(s): MSW 521.

**MSW 551 - Generalist Field Practicum I (6)**

Supervised professional practice in a community social service agency, providing experiential instruction and learning. 225 clock hours required. Seminar required. Graded: S/U. Pre/Corequisite(s): MSW 505, MSW 509, MSW 510, MSW 520. Restricted to MSW majors.

**MSW 552 - Generalist Field Practicum II (3)**

Supervised professional practice in a community social service agency. 225 clock hours required. Seminar required. Prerequisite(s): MSW 520, MSW 551. Pre/Corequisite(s): MSW 500, MSW 510, MSW 511, MSW 521, MSW 560. Restricted to MSW majors.

**MSW 554 - Advanced Generalist Field Experience I (3)**

Supervised professional practice in a community social service agency providing experiential learning in advanced generalist practice. 250 clock hours required. Seminar required. Prerequisite(s): MSW 552. Corequisite(s): MSW 524, MSW 526. Restricted to MSW majors.

**MSW 555 - Advanced Generalist Field Experience II (3)**

Supervised professional practice in a community social service agency providing experiential learning in advanced generalist practice. 250 clock hours required. Seminar required. Prerequisite(s): MSW 554. Corequisite(s): MSW 525, MSW 527. Restricted to MSW majors.

**MSW 559 - Practice and Research (3)**

This course is required for all advanced standing students and is aimed at providing the conceptual orientation for the concentration year graduate program. The goal of this course is to enhance theory, practice, research, and policy skills and knowledge in advanced generalist social work. The key themes and concepts, presented, explored, and analyzed in this course include: the fit between the Social Work code of ethics and personal values and belief systems; use of evidenced based practice principles to critique theories, policy, and practice and the interaction with research modalities applicable to social work practice with individuals, groups, organizations and communities. Restricted to MSW Advanced Standing majors.

**MSW 560 - Social Work Research (3)**

Introduction to analytical skills used in social work research: problem formulation, research designs, measurement, instrumentation, data collection and analysis, use of human subjects in research, and application of research knowledge to social work practice. Required. Restricted to MSW students.

**MSW 561 - Advanced Generalist Research (3)**

Focused on advanced generalist practice research in multicultural settings. Advanced skills to evaluate practice with individuals, families, groups, organizations and communities in multicultural settings. Needs assessment as well as program and practice evaluation are emphasized. Prerequisite(s): MSW 560. Restricted to MSW majors.

**MSW 563 - Social Work with Hispanic Populations (3)**

This course focuses on advanced knowledge and skill development for intervention with Hispanic populations. Emphasis is placed on understanding historical and contemporary cultural, social and political forces shaping the worldview and life circumstances for Hispanic populations in the US Southwest.

**MSW 564 - Social Work with Native American Populations (3)**

This course focuses on advanced knowledge and skill development for intervention with Indigenous North American populations. Emphasis is placed on understanding historical and contemporary cultural, social and political forces shaping the worldview and life circumstances for Indigenous North American populations.

**MSW 572 - Pharmacology of Addictions (3)**

Concepts and principles of the pharmacology of psychoactive substances and the addiction process: including the pharmacological approaches to treatment. Corequisite: MSW 572L. Same as NURS 572.

**MSW 590 - Family and Child Welfare Policy (3)**

Historical review and evolution of child welfare policies, initiatives and factors that influence child welfare service. Child welfare policies and services specific to the state of New Mexico are infused throughout the course. Taught with SWK 490 with additional work required at the graduate level. Cannot receive credit for both SWK 490 and MSW 590. Prerequisite(s): SWK 300, SWK 313, SWK 314 and SWK 400.

**MSW 591 - Systemic Integration of Alcohol and Drug Issues (3)**

Capstone course for the alcohol and drug minor. Covers community, agency, and systemic facilitation of prevention and intervention services for substance-affected families. Prerequisites: acceptance into minor and department prerequisites. Same as FCS 591.

**MSW 595 - Independent Study (1-3)**

Individual study to augment depth of knowledge in area related to course of study. Prerequisite: consent of instructor. May be repeated for maximum of 6 credits.

**MSW 596 - International Social Work and Social Welfare (3)**

This course examines how people are affected by political, economic, educational, social conditions, and the policies designed to address those conditions. Comparative analysis of social policies and practices in the United States and the developing world will be emphasized. Taught with SWK 496 with additional work required at the graduate level. Cannot receive credit for both SWK 496 and MSW 596. Consent of instructor required.

**MSW 597 - Special Topics (1-3)**

Specific subjects to be announced in the Schedule of Classes. Open to graduate students in related disciplines and to community professionals in related disciplines and to community professionals in related fields. Prerequisite: consent of instructor. May be repeated for unlimited credit under different subtitles.

**MSW 599 - Graduate Thesis (0-6)**

Required for thesis option. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits. Restricted to MSW students.

**MUS - MUSIC****MUS 450 - Research Methods (3)**

Introduction to methodology of music research. Emphasis on important scholarly resources and academic writing. Prerequisite: consent of instructor. Restricted to majors. Main campus only. No S/U option.

**MUS 451 - Orchestra II (1)**

Las Cruces Symphony at NMSU, a full symphony orchestra concentrating on masterworks of the literature. Students must assume a leadership role. Consent of Instructor required.

**MUS 455 - Music Business Internship (3)**

Capstone course for the Music Business degree. Working with the music business coordinator, students must have been accepted as an intern in a music business setting before enrolling. Credit given for the internship based on criteria developed for each placement. Prerequisites: MUS 330 and piano proficiency. Restricted to majors. S/U only.

**MUS 465 - Composition III (2)**

Emphasis on extended compositional techniques, serialization, and modern counterpoint. Consent of Instructor required. Restricted to: Music majors. Traditional Grading with RR.

**MUS 466 - Composition IV (2)**

New music notation and techniques. Open forms, aleatory concepts. Consent of Instructor required. Prerequisite(s): MUS 465. Restricted to: Music majors. Traditional Grading with RR.

**MUS 470 - Special Topics III (1-3)**

Designed for highly motivated students. Independent study and individual guidance. May be taken for unlimited credit.

**MUS 471 - Graduate Theory Review (3)**

Comprehensive and accelerated study of modes, diatonic harmony, and classical form of the common practice period. Restricted to: Music majors. Traditional Grading with RR.

**MUS 475 - Intermediate Conducting (3)**

Serves as a bridge from undergraduate conducting study to the graduate level. Advanced undergraduate students may enroll to learn how the graduate

- program in conducting functions. The course also serves as the introductory experience for newly admitted graduate conducting majors. After successful completion of this course, students will be able to: Study musical scores from a conducting perspective; Demonstrate effective predetermined gestures and movements; Lead an ensemble; Research and give presentations related to composers and their music; Demonstrate advanced knowledge of conducting practices. Prerequisite(s): A grade of C or better in MUS 326 or 327. Traditional Grading with RR.
- MUS 476 - Music Cultures of the World: History and Criticism (3)**  
Listening, criticism, and analysis of musical cultures around the world. Emphasis on non-Western musical traditions and folk music of the world. Open to all majors.
- MUS 477 - Graduate Music History Review (3)**  
Comprehensive and accelerated study of music history from antiquity to the present. Restricted to: Music majors. Traditional Grading with RR.
- MUS 486 - Applied Music Pedagogy and Literature II (2)**  
Methods, materials, problems, literature, and techniques in teaching individual lessons. Consent of Instructor required. Restricted to: Music majors. Traditional Grading with RR.
- MUS 498 - Independent Study (1-3)**  
For students with a strong musical background wishing to explore content beyond the traditional curriculum. Prerequisite: consent of instructor. Restricted to majors. May be repeated for a maximum of 6 credits.
- MUS 511 - Survey of Traditional Harmony (3)**  
Tonal harmony in common practice and theory of the late 17th, 18th, and early 19th centuries. Prerequisite(s): A grade of B or better in MUS 471. Restricted to: Music majors. Traditional Grading with RR.
- MUS 513 - Twentieth Century Art Music (3)**  
Analytical techniques, structural design and compositional materials from Debussy to the Minimalist school in historical context. Prerequisite(s): A grade of B or better in MUS 471. Restricted to: Music majors.
- MUS 514 - Advanced Composition (3)**  
Original composition in 20th century idioms. Prerequisite: MUS 466.
- MUS 518 - Seminar in Music Theory (3)**  
Varying topics in Music Theory, providing a more specific and in-depth study of the particular topic. May be repeated up to 6 credits. Prerequisite(s): A grade of B or better in MUS 471. Restricted to: Music majors. Traditional Grading with RR.
- MUS 519 - Seminar in Music History (3)**  
Varying topics in Music History, providing a more specific and in-depth study of the particular topic. May be repeated up to 6 credits. Consent of Instructor required. Restricted to: Music majors. Traditional Grading with RR.
- MUS 520 - Music of the Middle Ages and Renaissance: History and Literature (3)**  
An overview of the music of the Middle Ages and Renaissance with an emphasis on history and literature.
- MUS 521 - Music of the Baroque Era: History and Literature (3)**  
An overview of the music of the Baroque Era with an emphasis on history and literature.
- MUS 522 - Music of the Classical Era: History and Literature (3)**  
An overview of the music of the Classical era with an emphasis on history and literature.
- MUS 523 - Music of the Romantic Era: History and Literature (3)**  
An overview of Romantic era music, with an emphasis on history and literature.
- MUS 527 - History and Analysis of the Symphony (3)**  
Historical background and development of the symphony from its inception (ca. 1740s) to mid-twentieth century. Analysis of major works by significant composers with emphasis on Sonata form. Prerequisite: MUS 413. Restricted to majors.
- MUS 528 - The Symphony in Historical Context (3)**  
Considers the historical development of the symphony, as a musical genre, from its inception to the 20th century.
- MUS 529 - Opera and Music Drama (3)**  
Lyric drama of the Greeks through works of Wagner and Verdi to contemporary opera. Restricted to majors.
- MUS 530 - Seminar in Music Education (3)**  
Varying topics in Music Education, providing a more specific and in-depth study of the particular topic.
- MUS 531 - Music in Elementary Schools (3)**  
This course is designed to provide experiences which will help the student gain skills to appropriately enhance the musical growth of children in K–6 classrooms. The course participant's personal skill and understanding of musical concepts will be developed; musical needs and capabilities of young children will be investigated; methods of teaching music to young children will be explored. Restricted to: Music majors. Traditional Grading with RR.
- MUS 535 - Current Issues in Music Education (3)**  
This course examines the rich and challenging complexities of music teaching and learning from a variety of perspectives. Educational theory to pedagogical inquiry of current educational practice will be examined, calling students to critically reflect on such professional activities as lesson planning, curriculum design, repertoire choice, program assessment, advocacy in the arts, and student evaluation. Restricted to: M ED majors.
- MUS 576 - Advanced Wind Conducting I (3)**  
Prerequisite: MUS 475.
- MUS 577 - Advanced Wind Conducting II (3)**  
Prerequisite: MUS 576.
- MUS 580 - Ensemble Performance (1)**  
Performance in university bands, orchestra, chorus. May be taken for unlimited credit.
- MUS 582 - Applied Music (2-4)**  
For music majors, individual instruction, including improvisation skills and techniques. Students may enroll for 2 or 4 credits. Prerequisites: audition and consent of instructor. May be repeated for a maximum of 16 credits.
- MUS 583 - Applied Music (2-4)**  
For music majors, individual instruction, including improvisation skills and techniques. Students may enroll for 2 or 4 credits. Prerequisites: audition and consent of instructor. May be repeated for a maximum of 16 credits.
- MUS 586 - Applied Music Pedagogy and Literature III (2)**  
Methods, materials, problems, literature, and techniques in teaching individual lessons. Prerequisite: MUS 486 or consent of instructor.
- MUS 590 - Supervised Studio Teaching (2)**  
Teaching of private lessons under supervision.
- MUS 598 - Special Research Programs (1-4)**  
May be taken for unlimited credit.
- MUS 599 - Master's Thesis (0-15)**  
Thesis.
- NURS - NURSING**
- NURS 460 - Strategies for Student Success (3)**  
This course is designed to assist and support students as they identify learning needs and develop a plan for successfully mastering nursing knowledge. Course activities and assignments will be designed to address student's self-identified learning goals to enhance their opportunity for success. Restricted to NURS, BSN, BSNP, BSNR majors.
- NURS 465 - Physical Assessment and Evaluation of Child Abuse (3)**  
This course will acquaint the student with physical assessment of specific injuries found in children who have experienced physical abuse and neglect. Topics will include patient interviewing techniques, taking a medical history, evaluating developmental milestones, and elements of the physical examination. Consent of instructor required.
- NURS 466 - Health and Illness Concepts III (4)**  
This course will cover health and illness concepts across the lifespan. Concepts covered are related to hemostasis/regulation, oxygenation/homeostasis, protection/movement, and emotional processes. Corequisite(s): NURS 467, NURS 468. Prerequisite(s): NURS 360, NURS 361, NURS 362. Restricted to: NURSING majors.
- NURS 470 - Nursing Organization and Management (3)**  
Concepts of organization and delivery of care to groups of patients based on the nursing process. Emphasis on the roles of the nurse as manager, leader, and change agent within health-care organizations.
- NURS 472 - Community and Population Focused Nursing (6)**



- Synthesis of nursing, social, and public health science to develop health promotion, disease prevention, and protection strategies for communities and populations. Clinical component included.
- NURS 475 - Issues and Trends in Professional Nursing (3)**  
Explores the challenges associated with issues and trends in health care and the legal and ethical implications of professional nursing practice.
- NURS 476 - Nursing Organization & Management for the R.N.: Clinical (3)**  
Nursing process applied to organization, management, and delivery of health care. An integrating experience for the R.N. student designed to facilitate the transition to professional practice. Students work with mentors in a clinical setting to develop professional nursing roles related to leadership and management.
- NURS 477 - Nursing Organization and Management for the RN (3)**  
Course covers nursing organization, leadership, and management principles, theories, and research for the practicing RN. Restricted to BSNC majors.
- NURS 479 - Nursing Care for Complex Patients (8)**  
Principles and priorities of nursing care for patients across the life span experiencing complex care problems. Includes integrating experiences designed to facilitate the transition from student to professional nurse. Includes clinical component.
- NURS 486 - Concept Synthesis (3)**  
This course will focus on the synthesis of curricular concepts in the care of complex patients. Corequisite(s): NURS 487, NURS 488, NURS 489. Prerequisite(s): NURS 466, NURS 467, NURS 468. Restricted to: NURSING majors.
- NURS 487 - Professional Nursing Concepts II (3)**  
This course covers policy concepts for professional nursing. Prerequisite(s): NURS 466, NURS 467, NURS 468. Restricted to: NURSING majors.
- NURS 490 - Independent Study (1-3)**  
Individual studies with prior approval of department head.
- NURS 467 - Clinical Intensive I (0-4)**  
This is the first of two Level Four clinical courses in which the student will apply the curricular concepts in the management of care participants with acute conditions across the lifespan. This course is a combination of seminar, lab, and clinical. Corequisite(s): NURS 466, NURS 468. Prerequisite(s): NURS 395, NURS 396, NURS 398. Restricted to: NURSING majors.
- NURS 468 - Clinical Intensive II (0-4)**  
This is the second of two Level Four clinical courses in which the student will apply the curricular concepts in the management of care participants with acute conditions across the lifespan. This course is a combination of seminar, lab, and clinical. Corequisite(s): NURS 466, NURS 467. Prerequisite(s): NURS 395, NURS 396, NURS 398. Restricted to: NURSING majors.
- NURS 488 - Clinical Intensive III (0-4)**  
The focus of this clinical course is application of the curricular concepts in the management of care participants with complex conditions across the lifespan. This course is a combination of seminar, lab, and clinical. Corequisite(s): NURS 486, NURS 487, NURS 489. Prerequisite(s): NURS 466, NURS 467, NURS 468. Restricted to: NURSING majors.
- NURS 489 - Capstone (0-4)**  
The synthesis, integration, and application of concepts to professional nursing practice will be applied in the final clinical course to ensure readiness to enter practice. Corequisite(s): NURS 486, NURS 487, NURS 488. Prerequisite(s): Successful completion of all previous nursing courses. Restricted to: NURSING majors.
- NURS 500 - Applied Statistics for Evidence-Based Practice (3)**  
Provides the logic and appropriate use of statistical techniques most commonly used. Emphasis is based on underlying logic of procedure, the appropriate use of underlying assumptions of procedures, interpretation of results from statistical software and evaluation of published results of the procedures. Statistical software will be used. Prerequisite(s): Admission to DNP Program. Restricted to: NURP majors.
- NURS 505 - Theoretical Foundations of Advanced Nursing (3)**  
This course is a graduate-level introduction to nursing theory. This course assists students in understanding the nature of theory development in nursing, evidence-based practice and related disciplines. Students examine the definitions and meanings of the basic concepts of theory along with theory development and will explore an analysis of selected theories/models and their application to nursing practice, research, education, and administration.
- Prerequisite(s)/Corequisite(s): Students must be enrolled in the graduate program in nursing or have the permission of advisor and faculty of course to enroll in course. Restricted to: NURS majors.
- NURS 506 - Health Policy and the Environment of Professional Nursing Practice (3)**  
Conceptual approach to understanding and analyzing the environment of professional nursing practice. Focus on the impact of health care economics, financing, law and regulation, ethics and health policy on individual and collaborative nursing practice. Restricted to majors.
- NURS 507 - Nursing Research in Evidence-Based Practice (3)**  
This course is designed to prepare advanced practice nurses with the skills and knowledge needed to critically analyze and synthesize scholarly evidence to promote high quality evidence-based practice. Prerequisite(s)/Corequisite(s): Students must be enrolled in the graduate program in nursing or have the permission of advisor and faculty to enroll in the course. Restricted to: NURS majors.
- NURS 508 - Professional Roles for Advanced Nursing Practice (3)**  
Role preparation for advanced nursing practice. Emphasis on core concepts and responsibilities for development of expertise in health promotion, disease prevention, and other advanced nursing practices. Restricted to majors.
- NURS 511 - Advanced Pathophysiology for Clinical Nursing (3)**  
In-depth study of the physiological and pathological bases of altered health states of patients across the life span. Case studies facilitate application of complex concepts to clinical nursing practice.
- NURS 512 - Advanced Clinical Pharmacology (3)**  
Principles of clinical pharmacology and the related human physiology and pathophysiology for advanced clinical practice.
- NURS 514 - Psychopharmacology for Advanced Practice (3)**  
Principles of clinical psychopharmacology with emphasis on clinical application of major drug classifications including decision making, prescribing, drug monitoring and patient education.
- NURS 515 - Advanced Nursing Assessment (3)**  
Assessment theory and skills for advanced clinical practice. Emphasis on assessment of patients across the life span. Restricted to MSN majors.
- NURS 516 - Diagnosis and Management (3)**  
This course is designed to enhance the student's knowledge of differential diagnosis based on physical assessment through both didactic and clinical methods. Students apply clinical problem-solving skills to determine differential diagnoses and use, interpret and apply laboratory and diagnostic techniques to determine the final diagnosis in adult patients. Prerequisite: NURS 515.
- NURS 518 - Genetics and Health (2)**  
Assess the impact of emerging genetic technologies on healthcare at the individual, system and population level. Prerequisite(s): Admission to DNP Program. Restricted to DNP majors.
- NURS 519 - Child and Adolescent Health (3)**  
This course provides an overview of child and adolescent health including conceptual and theoretical foundation for advanced nursing practice in child and adolescent health. Developmental changes that occur throughout infancy, childhood, and adolescence will be explored along with an overview of interventions that are used to maintain optimum health in this population. Requires knowledge and skills of the management of acute and chronic conditions in children and adolescents incorporating the family will be included. A holistic approach which incorporates inter-professional collaboration will be used throughout the course.
- NURS 521 - Concepts of Adult Health I (3)**  
The course establishes the foundation for a framework of collaborative practice in an advanced nursing practice role and is designed to facilitate the development of a theoretical, practical and evidence-based foundation for management of complex health dysfunctions/alterations in the chronically ill adult. The focus of the didactic and clinical components of the course is on nursing and medical diagnosis and management, pharmacological and non-pharmacological treatments, and an interdisciplinary approach to patients experiencing chronic diseases across the continuum care. Clinical experience include the implementation and evaluation of Medical-Surgical Nursing - Clinical Nurse Specialist roles in primary, secondary, and/or tertiary settings. Illness management, health promotion, and risk reduction are integrated into the assessment and management plans for adult patients. Prerequisite(s): NURS 511, NURS 512, and NURS 515. Restricted to MSN majors.
- NURS 522 - Concepts of Adult Health II (3)**

The course builds on Adult Health I with a focus on the management of complex health dysfunctions/alterations in the acutely and critically ill adult. Through didactic information and clinical experience, students develop the knowledge base and psychomotor skills central to planning, implementing and evaluating health care for patients with complex health problems commonly seen in acutely and critically ill adults across the continuum of acute care delivery systems. Illness management, health promotion, and risk reduction are integrated into the assessment and management plans for adult patients. Prerequisite(s): NURS 521. Restricted to MSN majors.

#### NURS 523 - Concepts of Adult Health III - CNS Practicum (3)

This course builds on Adult Health I and II and is designed to transition the graduate nursing students into the Clinical Nurse Specialist role. Emphasis is placed on enhancing competencies within the three spheres of influence of the CNS (patient, nursing, personnel, organization/network) and developing characteristics essential to CNS practice. A major focus is to identify strategies that promote appropriate clinical outcomes of care and cost-efficient utilization resources. Restricted to NURS majors. Prerequisite: NURS 522.

#### NURS 530 - Promoting Health Behavior (3)

Emphasis is on the role of the advanced practice nurse in facilitating health behavior change. The impact of health status on health behavior, ethical issues relate to health promotion, and the processes for promoting healthy behaviors are explored. Theoretical models of behavior change and primary, secondary, and tertiary prevention concepts serve as a basis for developing nursing interventions that promote behavior change.

#### NURS 531 - Advanced Community Health Nursing: Concepts and Practice (3)

Covers conceptual basis for advanced community health nursing practice. Emphasis on health care delivery to groups, families, and communities. Prerequisites: MPH 530 and MPH 550.

#### NURS 532 - Advanced Community Health Nursing: Program Planning and Evaluation (3)

Analysis of the impact of cultural, ecological, environmental, and epidemiological influences on the health of the community and populations at risk. Emphasis on strategies for program planning and evaluation. Prerequisite: NURS 531.

#### NURS 533 - Advanced Community/Public Health Nursing : Roles (3)

Role preparation for advanced community/public health nursing practice. Emphasis on examining diversity in the role of community and public health nurses and description of the rapidly changing roles, functions and practice settings.

#### NURS 537 - Principles of School Nursing (3)

Principles, theoretical frameworks and trends in school nursing; documentation and analysis of models of school nursing practice; identification of issues and future directions; program planning, development, implementation and evaluation; and research applicable to school health. Prerequisite: consent of instructor.

#### NURS 538 - Nursing Leadership in School Health Programs (3)

Principles, theoretical framework, and trends of school nursing leadership within the coordinated school health program. Focus on qualifications, roles, and competencies of school nurse administrators; documentation and analysis of school health models; identification of issues and future directions; program planning, development, implementation, and evaluation; and research into school health and leadership roles. Prerequisite: consent of instructor. Restricted to majors.

#### NURS 539 - Pediatric Health Assessment for School Nurses (3)

Assessment theory and skills for advanced clinical practice. Emphasis on assessment of the pediatric age group from birth through adolescence in the school setting. Prerequisite: consent of instructor. Restricted to majors.

#### NURS 540 - Advanced Psychosocial Pathology for Family, Psychiatric-Mental Health Nursing (3)

In-depth study of psychosocial pathology, factors contributing to psychosocial dysfunction, and diagnostic reasoning basic to advanced-practice psychiatric mental health nursing; emphasis on etiology and differential diagnoses. Prerequisite(s): Admission to the DNP Program. Restricted to: NURS majors.

#### NURS 541 - Psychiatric-Mental Health Nursing I (3)

The first in a three-course series assisting students in learning and practicing principles of adult psychotherapy using psychodynamic and cognitive/behavioral theories within a holistic framework. The concepts of personality development are examined as students learn to work therapeutically with individuals from a diverse cultural and socioeconomic background to develop intervention strategies. Content focuses on management of clients with neurobiological disorders, stressing application of

current psychotherapy outcomes research. Must obtain a "B" or better to pass the course.

#### NURS 542 - Psychiatric-Mental Health Nursing II (3)

The second in a three-course series in which students continue to develop skills in the practice of psychotherapy in a variety of settings with both individuals and families. This course focuses on family mental health and family functioning. Family dynamics and processes, theories and research are examined as the student continues to develop a conceptual framework to guide clinical practice. Emphasis is placed on increasing understanding of conceptual frameworks and strategies including the role of cultural influences within the family. Must obtain a "B" or better to pass the course. Prerequisites: NURS 541 and NURS 546. Corequisite: NURS 547.

#### NURS 543 - Psychiatric-Mental Health Nursing III (2)

The third in a three-course series that assists students in continuing to develop skills to function as a nurse psychotherapist with individuals, families, and groups. Focuses on an advanced study of dysfunctional processes of communication and interpersonal relationships and the therapeutic use of groups for adult clients with a diversity of psychiatric problems and psychosocial stressors. Emphasis is placed on critically analyzing models of group interventions, group dynamics, and processes, including their relevance to a culturally diverse clientele with a variety of lifestyles. Prerequisites: NURS 542 and NURS 547. Corequisite: NURS 548. Restricted to majors.

#### NURS 544 - Cross-Cultural Approaches to Border/Rural Community Mental Health (3)

Principles of epidemiology and a cultural lens to explore community mental health assessment, intervention and evaluation of culturally diverse rural/U.S.-Mexico border communities. Emphasis is on understanding the social/cultural context of community mental health practice, building collaborative relationships within culturally diverse communities and advancing the APN's role as a culturally proficient empowerment agent.

#### NURS 545 - Addictive Disorders (3)

Focus on care of the individual with addictive disorders. The impact on the individual as well as the community will be examined. Advanced practice nursing interventions based on theoretical and research based knowledge of addictions will be addressed. Treatment of addictive disorders and their relevance to culturally diverse clientele with a variety of lifestyles will be evaluated. Consent of instructor required.

#### NURS 546 - Psychiatric-Mental Health Practicum I (1)

Practice component for the adult psychiatric-mental health clinical specialist/nurse practitioner students.

#### NURS 547 - Psychiatric-Mental Health Practicum II (2)

Practice component for the adult psychiatric-mental health clinical specialist/nurse practitioner students. Prerequisite: NURS 541 and NURS 546. Corequisite: NURS 542.

#### NURS 548 - Psychiatric-Mental Health Practicum III (1)

Practice component for the adult psychiatric-mental health clinical specialist/nurse practitioner students. Prerequisite: NURS 542 and NURS 547. Corequisite: NURS 453.

#### NURS 550 - Curriculum and Teaching in Nursing (3)

Seminar and guided experiences in curriculum development and teaching of nursing, including planning, developing, implementing, and evaluating classroom and clinical instruction. Students work with a preceptor and submit a video tape or audio tape of teaching a unit of instruction. Restricted to NURSING majors.

#### NURS 551 - Measurement and Evaluation in Nursing Education (3)

Integration of concepts of assessment and evaluation into a nursing education framework. Students analyze assessment, evaluation concepts, models, and frameworks for applicability for students, faculty, curricula, and programs. Restricted to NURSING majors.

#### NURS 552 - Computer Technologies for Nurse Educators (3)

Covers a variety of computer technologies including principles for distance learning, use of the Internet in teaching and learning and integrating computer technologies into the teaching-learning process. Emphasis is given to theoretical frameworks that guide the selection, use and integration of computer technologies in nursing education programs.

#### NURS 562 - Innovations and Health Care Organizations (3)

Complex dynamics of organizational process, structure, culture, and outcomes emphasizing the integration and analysis of organizational theories and the role of professional nursing in health care organizations. Taught with NURS 649. Restricted to: NURS majors.

#### NURS 563 - Human Resource Management in Nursing (3)

Contemporary approaches to the development and management of nursing resources that complement organizational vision, strategies and management goals. Management of a diverse, quality workforce that results in an improved organizational performance. Performance evaluation, motivation, professional development and legal and regulatory aspects will be explored.

**NURS 564 - Nursing Fiscal Management (3)**

Concepts of financial management emphasizing principles of health care budgeting and finance in managing health care resources. A focus is to achieve quality outcomes through financial resource management. Prerequisite(s): NURS 562. Restricted to: NURS majors.

**NURS 565 - Advanced Nursing Leadership (3)**

Analysis of leadership theories as they pertain to the nurse executive and the advanced practice nurse in complex health care organizations. Emphasis is placed on organizational change and conflict management in working with interdisciplinary health care teams. Prerequisite(s): NURS 562. Restricted to: NURS majors.

**NURS 566 - Seminar in Nursing Administration- Roles (3)**

Role preparation for the nurse administrator as manager, leader, collaborator and change agent. Synthesis of concepts from management and nursing as a basis for role effectiveness in nursing administration. Corequisite: NURS 595.

**NURS 567 - Nursing Informatics (3)**

This course is designed to meet the needs of the nurse administrator and advanced practice nurse in acquiring informatics knowledge for the use of information technology in meeting today's health care challenges. Areas of concentration include informatics, competencies, knowledge management, acquisition, and implementation of health care information systems and the electronic health record. The role of the nurse administrator and advanced practice nurse in each of these areas will be emphasized. Consent of instructor required.

**NURS 571 - Pharmacology of Addiction for Advanced Practice Nurses (3)**

Concepts and principles of the pharmacology of psychoactive substances and the addiction process; including decision making, prescribing, drug monitoring and patient education.

**NURS 572 - Pharmacology of Addictions (4)**

Concepts and principles of the pharmacology of psychoactive substances and the addiction process; including the pharmacological approach to treatment. Corequisite(s): NURS 572L.

**NURS 572 L - Pharmacology of Addiction Laboratory (1)**

Analysis and applications of concepts and principles of the pharmacology of psychoactive substances and the addiction process, including pharmacological approach to treatment in selected simulated situations. Prerequisite(s): NURS 572.

**NURS 573 - Cardiovascular/Renal Nursing (3)**

This course emphasizes the comprehensive management of individuals with acute and chronic cardiovascular/renal diseases within the context of family and communities using a case-based approach. Prerequisite(s): Graduate status or permission of instructor.

**NURS 574 - Oncology Nursing (3)**

This course presents the clinical aspects of cancer diagnosis, the clinical management of major cancers, and their treatment modalities. The course will also focus on supportive therapies for the cancer patient and symptom management. Prerequisite(s): Graduate status or permission of instructor.

**NURS 575 - Professional Roles for Masters Entry to Practice (3)**

Role preparation for Masters entry into nursing. Emphasis on differentiating between the multiple roles of the nurse prepared at the graduate level. Exploration of the diversity of nursing roles in health care. Restricted to MSN majors.

**NURS 590 - Independent Study (1-10)**

Individual studies and directed research with prior approval of department head. May be repeated on a different topic. Prerequisite: consent of instructor. May be repeated for a maximum of 20 credits.

**NURS 591 - Preceptorship: Prescription Drugs, Medicines and Other Therapeutics (1-11)**

The course provides preceptored clinical experiences that provide advanced practice nursing students opportunities for practice and mastery of skills for management of culturally diverse patients within their designated specialty area to include prescribing drugs, medicines and other therapeutics, as well as monitoring the effects of the prescribed management. It requires the student to demonstrate integration, synthesis and application of assessment, diagnosis and management to include health promotion of patients with acute

and/or stable chronic health conditions. Graded: S/U. Prerequisite(s): NURS 542 or NURS 530 or NURS 521. Restricted to MSN majors.

**NURS 595 - Advanced Field Work in Nursing (1-6)**

Faculty-supervised, independent work in student's advanced practice role. Field work normally taken after the core and designated specialty courses. Minimum of three field-work credits (12 contact hours) required in major area of study. May be repeated for a maximum of 12 credits. Prerequisites: NURS 532 and NURS 561. Restricted to majors. Graded S/U.

**NURS 597 - Special Topics (1-3)**

Specific subjects to be announced in the Schedule of Classes. Prerequisite: consent of instructor. May be repeated for a different subject area. May be repeated for a maximum of 8 credits.

**NURS 600 - Philosophy of Science in Nursing (3)**

Offers a framework for asking both ontological and epistemological questions about knowledge, human science, and nursing science.

**NURS 601 - Theory I: Methods and Processes of Nursing Knowledge Development (3)**

Building on the Philosophy of Science course, the student will engage in analysis and critique of both developmental processes and composition of nursing disciplinary knowledge. Diverse approaches will be used to appraise and critique historical and contemporary milestones in the development and evaluation of nursing thought. Emphasis is also placed on implications of theory and knowledge development as related to multicultural and rural issues. Prerequisite(s): NURS 600.

**NURS 602 - Theory II: Contemporary Substantive Nursing Knowledge (3)**

Critically examine existing evolving substantive knowledge drawn from nursing and other disciplines. Focus on the construction, analysis of current substantive nursing knowledge, including evaluation of relationships among theories, evidence and explanation will be pursued. Special attention to existing and evolving theories applicable to rural, multicultural and educational settings. Prerequisite: NURS 601

**NURS 606 - Quantitative Methods in Nursing Research (3)**

Focus on approaches to developing nursing knowledge by means of quantitative research methods as applied to clinical problems, theoretical modeling of human responses to health and illness, and health policy issues. Emphasizes detailed analysis and critique of non-experimental and experimental designs, issues pertaining to sampling and statistical power, the reliability and validity of measures, and uses and abuses of descriptive and inferential statistics in nursing research literature. Students are expected to develop sufficient discernment to read, critique, evaluate, and discuss the quality, significance, and limitations of published quantitative nursing research. Prerequisite: NURS 621.

**NURS 607 - Qualitative Methods in Nursing Research (3)**

Major methodological traditions of qualitative research and their applications to knowledge development and clinical research in nursing are the emphasis. Overview of at least one computer-assisted qualitative data analysis software application. Students will engage in detailed critique and discussion of significant nursing investigation representing various qualitative approaches and traditions.

**NURS 608 - Field Methods in Qualitative Research (3)**

The purpose of this course is to provide opportunities for students to engage in, analyze and evaluate various procedures and techniques used to gather qualitative data. Major data collection approaches including ethnography, phenomenology, grounded and critical theory are discussed. Students have the opportunity to participate in mini-field work projects while gathering expertise in field techniques used in qualitative research. Issues such as role of literature in qualitative research, investigator as instrument, ethical dilemmas, field entry and departure, and reflexivity are analyzed as they relate to the process of gathering and interpreting qualitative data. Prerequisites: NURS 607 or consent of instructor.

**NURS 610 - Nursing Education: Pedagogy and Roles (3)**

Teaching-learning process in the clinical and classroom settings. Focuses on educational patterns and pathways in nursing and the roles of faculty in academia. Educational reform is analyzed in relationship to diversity in students, faculty, practice settings and technology-driven learning environments. Instructional designs, teaching strategies, and outcome evaluations are examined for their pedagogic use. The development of critical thinking outcomes, mentorships and partnerships to meet the needs of students are addressed. The course examines issues and challenges that impact the educational process such as student and faculty recruitment, the changing healthcare environment, differentiation of practice, advanced practice, reduced resources and links with theory and research.

**NURS 620 - Advanced Health Care Statistics I (3)**

This course provides knowledge, skills and practice in collecting, analyzing and interpreting data. The following quantitative techniques will be examined and utilized using SPSS: principle of measurement, probability, principles of parametric and non parametric techniques, Kolmogorov-Smirnov test, comparison of means, correlation analyses, use of psychometric techniques, binomial test, sign test, McNemar test, median test, Cochran Q test, Phi coefficient, Fisher's Exact test, Mann-Whitney U, Kruskal-Wallis test, Wilcoxon Signed Ranks and Spearman Rho. A graduate level statistics course completed within three years prior to the date of expected admission is desirable. Restricted to majors

**NURS 621 - Advanced Health Care Statistics II (3)**

This course is the second of a two-semester quantitative statistical course designed to provide knowledge, skills and practice in collecting, analyzing, and interpreting data. The following quantities techniques will be examined and utilized using SPSS: analysis of variance (ANOVA), analysis of covariance (ANCOVA), linear, multiple, and logistic regression, structural equation modeling (SEM), principle components analysis, and factor analysis. Restricted to majors. Prerequisite: NURS 620.

**NURS 623 - Mixed Methods (3)**

Presents a brief overview of research paradigms with emphasis on formulating research questions, aims and methods for a mixed method/model approach. Students may use proposals developed in earlier qualitative and quantitative research classes to devise mixed method proposal integrating readings on these methods and own research interests. Prerequisite: NURS 606 and NURS 607

**NURS 624 - Measurement in Culturally Diverse Border Populations (3)**

The focus of this course is the development of essential competencies required to locate, select, evaluate, and use instruments to operationalize nursing variables. Ethical considerations in nursing research and research issues in diverse populations will be discussed. Specific attention is given to the process of moving from concept to construct, measurement theory, validity/reliability issues, and measurement issues in diverse populations including literacy, social desirability bias, sensitive data, translations, and cultural equivalency. Prerequisite(s): Admission to PhD in Nursing program; NURS 606; NURS 623; or consent of Instructor. Restricted to PhD in Nursing majors.

**NURS 630 - Issues in Studying Health of Culturally Diverse and Border Populations (3)**

Health of culturally diverse and border populations will analyze the unique characteristics and future trends of health care and professional nursing using the Southwestern U.S., and the U.S.-Mexico border area as the case exemplar. Course content includes identifying and examining health care issues from multi-contextual local, regional, national, and international perspectives. Strategies to examine and affect health will incorporate rigorous critical reflection and dialogue, analysis and synthesis of ideas drawing on multi-disciplinary literature, and experiences with working with community based organizations and local advocacy groups to develop action plans for research and health care services.

**NURS 631 - Population Based Approaches to Health Promotion (3)**

Population based approaches to health promotion focuses on preparing nursing students to identify, critically analyze and evaluate health promotion initiatives in culturally diverse and border populations using the Southwestern U.S. and U.S./Mexico border as the case exemplar. It examines historical, socio-economic, legal and professional issues associated with health promotion and policy initiatives. It considers prospects for social change, political movements and alternative approaches to develop and hasten adaptation of health promotion initiatives in partnership with communities, advocacy groups and health care agencies.

**NURS 640 - Chronic Diseases: A Health Promotion Approaching Underserved Populations (3)**

Focus on the interrelationships of various chronic diseases and conditions in the understanding of how co-morbidities influence the prevention and health promotion in the infant, school-age child, adolescent, young, middle, and older adult. Students will apply and synthesize an understanding of chronic conditions such as cancer, cardiovascular disease, diabetes mellitus, COPD, asthma, osteoporosis, and sickle cell disease, among others, and how the various aspects of these conditions are interrelated, particularly in underserved populations resulting in health care disparities.

**NURS 649 - Innovations and Health Care Organizations (3)**

Examines complexity and innovations as they relate to health care systems, health care delivery, and population health. Areas of focus are systems, organizations, health disparities, and ethical decision making. Emphasis is on improvement in services and outcomes. Taught with NURS 562.

Prerequisite(s): Admission to DNP Program NURS 502, NURS 506. Restricted to: NURP majors.

**NURS 650 - Behavioral Approaches and Determinants of Nursing and Health (3)**

Focuses on how behavioral/mental health concepts are applied in determining health outcomes for individuals, families, and communities. Students will apply and synthesize theoretical constructs within practice and research focusing on behavioral/mental health concepts. Health outcomes are viewed in a traditionally holistic manner in that health outcomes are discussed as an integral part of the human experience of healing and health.

**NURS 651 - Applied Nursing Science for the APN (3)**

Explores the philosophical and scientific underpinnings for nursing knowledge relevant to the role of the doctorate of nursing practice. Prerequisite(s): Admission to DNP program and NURS 500. Restricted to DNP majors.

**NURS 652 - Translational Methods and Evidence-Based Practice (3)**

Designed to prepare DNP student to demonstrate advanced levels of clinical judgment, systems thinking, and accountability in design, delivery, and evaluating evidence based on care to improve patient outcomes. Translate evidence into their specialty practice environment. Prerequisite(s): Admission to DNP program. NURS 651. Restricted to: NURP majors.

**NURS 655 - Psychopharmacology for Advanced Practice (2)**

Principles of advanced clinical psychopharmacology with emphasis on clinical application of major drug classification including decision making, prescribing practices, drug monitoring, and patient education. Prerequisite(s): Admission to DNP program, NURS 512. Restricted to DNP majors.

**NURS 658 - The Aging Adult (3)**

This course focuses on the care and management of older adults and their families. Content is directed at assessment and management of acute and chronic presentations of illness and complex, multiple health problems across the health care continuum. It will include examination of the psycho-socio-cultural processes which influence the behavioral patterns, coping, and adaptation of older adults. Prerequisite(s): Admission to DNP program. Restricted to DNP majors.

**NURS 659 - Addictive Disorders (3)**

Focus on care of the individual with addictive disorders. The impact on the individual as well as the community will be examined. Advanced practice nursing interventions based on theoretical and research based knowledge of addictions will be addressed. The pharmacology of psychoactive substances, the addiction process, and pharmacological approach to treatment will be included. Treatment of addictive disorders and their relevance to culturally diverse clientele with a variety of lifestyles will be evaluated. Prerequisite(s): Admission to DNP program. Restricted to DNP majors.

**NURS 660 - Family, Psychiatric Mental Health Nursing I (5)**

The first in a three course series in learning and practicing psychotherapy principles using psychodynamics and cognitive behavioral theories within a holistic framework. Personality development concepts are examined and applied to work therapeutically with children, adolescents, young adults, adults and older adults from diverse cultural and socioeconomic backgrounds to develop intervention strategies. Management of clients with neurobiological disorders and application of current research-based psychotherapy outcomes is emphasized. Course includes supervised clinical practice. Prerequisite(s): Admission to DNP program. NURS 511, NURS 512. Restricted to: NURP majors.

**NURS 662 - Family, Psychiatric-Mental Health Nursing II (5)**

The second in a three-course series in which students continue to develop skills in the practice of psychotherapy in a variety of settings with both individuals and families. This course focuses on family mental health and family functioning. Family dynamics and processes, theories and research are examined as the student continues to develop a conceptual framework to guide clinical practice. Emphasis is placed on increased understanding of conceptual frameworks and strategies including the role of cultural influences within the family. Course includes supervised clinical practice. Prerequisite(s): Admission to DNP program. NURS 660. Restricted to: NURP majors.

**NURS 664 - Family, Psychiatric Mental Health Nursing III (5)**

The third in a three-course series that assist students in continuing to develop skills to function as a nurse psychotherapist with clients across the lifespan as individuals, families, and groups. This course focuses on an advanced study of dysfunctional processes of communication and interpersonal relationships and the therapeutic use of a variety of groups for children, adolescent, young adult, adult and older adult clients with a diversity of psychiatric problems and psychosocial stressors. Emphasis is placed on critically analyzing models of group interventions, group dynamics and processes, including their relevance

to a culturally diverse clientele with a variety of lifestyles. Course includes supervised clinical practice. Prerequisite(s): Admission to DNP program. NURS 662. Restricted to: NURP majors.

**NURS 670 - Diagnostic Reasoning (3)**

This course is designed to develop advanced knowledge of differential diagnosis based upon physical and mental assessment of clients/patients across the lifespan in a variety of clinical settings. Students apply, synthesize, and integrate advanced clinical problem solving and reasoning to determine differential nursing and medical diagnoses, interpret and apply laboratory and diagnostic techniques to determine a final judgment and diagnosis. Restricted to DNP majors.

**NURS 671 - Primary Care in Acute Illness (3)**

This course prepares students to use evidence to make clinical judgments which promote, restore, and maintain health of adult/gerontology clients/patients seeking primary care services. Emphasis will be placed on health promotion, disease prevention and common acute health problems of adult/gerontology clients/patients in diverse populations. Course includes supervised clinical practice in primary care settings with emphasis on care of adult and gerontology clients/patients. Restricted to DNP majors.

**NURS 672 - Primary Care in Chronic Illness (4)**

Students use an evidence based approach to primary care drawing upon theories, research, clinical knowledge and national standards to develop therapeutic plans for chronic health problems in the adult/gerontology client/patient. Focus is on comprehensive primary care management across settings, as well as evaluation of care approaches to adults and gerontology clients/patients. Students will examine the impact of contextual factors on health care services for adults and older adults with multi-system conditions. Course includes supervised clinical practice in primary care settings with emphasis on care of adult and gerontology clients/patients. Prerequisite(s): Admission to the DNP Program.

**NURS 673 - Integrated Primary Care (4)**

This course focuses on advanced practice role development and the study of issues in health service delivery related to the practice of primary health care in multiple health care settings. A major component is inter-professional practice within an integrated care setting. Economics, legal, policy, and cultural/ethical aspects of care are discussed. Course includes supervised clinical practice. Restricted to DNP majors.

**NURS 676 - Women's Health (3)**

The course will examine patient and family perspectives as well as health care system variables and societal issues that affect the organization and delivery of women's health care. Students will engage in critical analysis of the evidence base concerning psychosocial and spiritual concerns and barriers to and opportunities for improving women's health care across the diverse settings in which health care is delivered. Focus on evidence-based practice approaches to the primary care management of women. Course includes supervised clinical practice in primary care settings with emphasis on care of women. Restricted to DNP majors.

**NURS 680 - Advanced Public/Community Health Nursing I (3)**

Emphasis is on the foundations of advanced public/community health nursing including conceptual models/theoretical frameworks for advanced public/community health nursing practice. Population-focused evidence-based nursing practice including legal/ethical and cultural considerations and trends in population health status will be examined. Prerequisite(s): Admission to DNP Program. Restricted to: NURP majors.

**NURS 681 - Advanced Public/Community Health Nursing II: Assessment & Planning (4)**

Emphasis is on conducting a population-focused assessment and developing and evidence-based plan to address a health priority issue within a diverse population. Impact of culture, ecology, and environmental influences are considered. Various assessment techniques and planning models incorporating principles of epidemiology are examined. Prerequisite(s): Admission to DNP program. Restricted to: NURP majors.

**NURS 682 - Advanced Public/Community Health Nursing III: Implementation & Evaluation (4)**

Focus is on the implementation and evaluation of evidence-based population-focused strategies to reduce or eliminate a health priority issue in diverse populations. Impact of organizational culture and integration of planned change will be examined. Emphasis on inter-professional approach and integrated quality improvement systems. Prerequisite(s): Admission to DNP program. Restricted to: NURP majors.

**NURS 683 - Advanced Public/Community Health Nursing IV: Roles & Administration (4)**

Role preparation for advanced public/community health nursing practice. Emphasis on examining diverse roles of advanced practice public/community health nurses, work with interdisciplinary team, and development of higher level administrative expertise. Prerequisite(s): Admission to DNP program. Restricted to DNP majors.

**NURS 684 - Lifestyle Change and Adherence Issues with Diverse Populations (3)**

Includes the critical examination of selected theories of health behavior on life style choices and adherence issues with diverse populations within the community setting. Emphasis is given to the analysis of health behavior in regard to planning, development, and evaluation of population based health programs. Restricted to DNP majors.

**NURS 685 - Epidemiology for Advanced Public/Community Health Nurse (2)**

Emphasis is on practical application of the principles of epidemiology in the measurement and evaluation of population health. Epidemiology literature will be critiqued and synthesized to evaluate population-based public health nursing problems. Issues related to disease surveillance, causation, genetic patterns, screening and social trends in population health will be examined. Use of existing data bases and technology programs are covered. Prerequisite(s): MPH 530 and Admission to DNP program. Restricted to: NURP majors.

**NURS 690 - PhD Nursing Seminar: Developing Research in Nursing (1-3)**

Seminar to build nursing research skills broken into 3, 1 credit seminars that are taken throughout the PhD Program.

**NURS 691 - Independent Study (1-6)**

Individual studies and directed research with prior approval of department head. Prerequisite: consent of instructor. May be repeated for a maximum of 12 credits.

**NURS 697 - Professional Roles for Advanced Practice Clinical Nursing (3)**

This course will focus on providing an in depth understanding of the legal, historical, political, social, and ethical aspects of advanced practice nursing. Traditional and emerging roles for advanced practice nursing are examined. Prerequisite(s): Admission to DNP program, NURS 664 OR NURS 672. Restricted to DNP majors.

**NURS 698 - Advanced Clinical Residency (1-8)**

This course provides supervised clinical experiences in various health care settings commensurate with the students advanced practice area. Students will synthesize learning gained through the program, effectively incorporating new knowledge and skills. As appropriate for the specialty area, students will conduct history & physical examinations; develop medical and nursing diagnoses, formulate and deliver treatment plans that are inclusive of clinical interventions including pharmacologic agents. Health maintenance, health promotion and illness prevention strategies are incorporated. As appropriate populations/aggregate programs will be designed, implemented and evaluated. Graded: S/U. Prerequisite(s): Admission to DNP program. NURS 697. Restricted to: NURP majors. S/U Grading (S/U, Audit).

**NURS 699 - Clinical Scholarly Project (1-4)**

Building on the practice expertise of the DNP student, this series of credits is to provide the student with the opportunity to design an innovative clinical practice improvement project/program addressing an actual health care concern. Through mentored activities, the DNP student will identify, develop, implement, evaluate, and disseminate an independent analytic. Graded: S/U. Prerequisite(s): Admission to DNP program. NURS 652. Restricted to: NURP majors. S/U Grading (S/U, Audit).

**NURS 700 - Doctoral Dissertation (1-9)**

Dissertation may be repeated to maximum of 30 credits. Minimum requirements are 21 credit hours. Comprehensive examine is included within these 21 credits.

**PE P - PHYSICAL EDUCATION**

**PE P 455 - Adapted Physical Education (3)**

Selection and scope of corrective activities in posture and body mechanics, and the adaptation of movement activities for the exceptional student. Prerequisite: junior or senior standing.

**PE P 465 - Senior Seminar (3)**

Capstone course for physical education. Prerequisite: senior standing. Graded S/U.

**PE P 466 - Methods of Teaching Secondary Physical Education (6)**

Theoretical and practical applications of curriculum, pedagogy and assessment for teaching secondary physical education. Provides the students opportunities to develop curriculum, teach, and assess student learning through a supervised practicum in both middle and high school physical

education settings. Consent of instructor required. Prerequisite(s): PE P 315 and admittance to TEP required.

#### PE P 499 - Problems (1-3)

Problems in physical education and recreation and independent work in their solutions. A maximum of 3 credits during any one semester. May be repeated up to 6 credits. Consent of Instructor required.

#### PE P 501 - Graduate Athletic Training I (1-3)

Offered under various subtitles that indicate the subject matter.

#### PE P 504 - Teaching Processes in Physical Education (3)

Analysis of effective teaching and coaching. Systematic observation strategies will be employed to evaluate instructional variables such as feedback, climate, academic learning time, and styles of teaching.

#### PE P 509 - Biomechanics (3)

Mechanical and anatomical considerations applied to the analysis and teaching of human motion. Consent of instructor required. Prerequisite(s): SP M 305 or SP M 371 or consent of instructor.

#### PE P 515 - Advanced Athletic Training Education (3)

Advanced clinical experiences and education in athletic training. Assessment of Athletic Training Program clinical proficiencies as described by the National Athletic Trainers' Association Education Council. Consent of Instructor required.

#### PE P 545 - Skill Acquisition and Performance (3)

Behavioral and physiological examination factors that influence the acquisition and performance of motor skills. Restricted to: Main campus only.

#### PE P 550 - Advanced Topics in Physical Education (1-4)

Advanced study in teaching processes, perceptual motor development, bioenergetics, biomechanical instrumentation, psychological bases of performance, or motor control.

#### PE P 555 - Adapted Physical Education (3)

Selection and scope of corrective activities in posture and body mechanics, and the adaptation of movement activities for the exceptional student. Prerequisite: consent of instructor. Same as PE P 455 with additional requirements for graduate credit.

#### PE P 557 - Adapted Physical Education : A Practitioner's Approach (3)

Preparation for qualified physical education professionals to teach individuals with disabilities motor and fitness skills. Knowledge of the Adapted Physical Education National Standards is developed so students may become nationally certified in the field. The inclusion of disability sports into general physical education curriculum is also major emphasis of this course. Prerequisites: PE P 455 and PEP 555 or PE P 456 and PE P 556.

#### PE P 558 - Adapted Physical Education National Standards (APENS) Professional Preparation (3)

This distance education course is to prepare physical education teachers to pass the Certified Adapted Physical Education (CAPE) National Examination, which is based on the Adapted Physical Education National Standards (APENS). These standards were developed by professionals in the field to ensure that physical education instruction for students with disabilities is provided by qualified physical education teachers.

## PHIL - PHILOSOPHY

#### PHIL 463 - Independent Studies (1-3)

For students with a strong background in philosophy. Independent work in a specific area. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.

#### PHIL 505 - Advanced Studies in Philosophy and Literature (3)

Examination of philosophical issues (e.g. personal identity, free will, moral dilemmas, the meaning of life) as presented in selected literary works and literary criticism. Consent of Instructor required.

#### PHIL 522 - Environmental Ethics (3)

An exploration of philosophical issues raised by environmentalism including: the preservation of endangered species and wilderness areas; hunting, zoos, and the treatment of animals; the natural/unnatural distinction; sustainable development; and economic vs. non-economic measures of the value of nature.

#### PHIL 532 - Advance Studies in Ethics and Global Poverty (3)

Advanced philosophical scrutiny of and moral reflection on various aspects of global poverty and foreign aid. For example: Is poverty fundamentally a lack of income, or can it be understood as a failure to meet basic needs, or as a lack of valuable freedom? Do human rights exist? What, if any, are the moral

obligations of rich countries to poor countries? Can foreign aid be immoral? How should the answers to these questions influence public policy? Restricted to: Main campus only.

#### PHIL 540 - Science and Ethics (1-3)

Ethical concerns facing researchers in the basic and applied biological sciences. Coverage of responsible conduct in research including scientific integrity and research misconduct, mentor/trainee responsibilities, data management, authorship, publication practices, human subjects, animal welfare, intellectual property, conflicts of interest and effort and collaborative science. Emphasis on ethical reasoning skills. Discussion of ethical and societal implications of issues selected from a broad range of contemporary research areas (genetics, reproductive biology, environmental sciences, nanoscience, drug discovery, bioengineering, neuroscience). Subtitled. May be repeated for a maximum of 12 credits.

#### PHIL 548 - Advanced Philosophical Writing (3)

Advanced workshop on writing philosophy papers. Includes how to read and understand philosophical writing, organize a paper effectively, present a clear and forceful argument, and avoid common mistakes. Prerequisite(s): completed 18 hours of philosophy credit.

## PHYS - PHYSICS

#### PHYS 450 - Selected Topics (1-3)

Readings, lectures or laboratory studies in selected areas of physics. May be repeated for a maximum of 12 credits.

#### PHYS 451 - Intermediate Mechanics I (3)

Vector calculus, Lagrangian and Hamiltonian formulations of Newtonian mechanics. Topics include central force motion, dynamics of rockets and space vehicles, rigid body motion, noninertial reference frames, oscillating systems, relativistic mechanics, classical scattering, and fluid mechanics. Prerequisite(s): PHYS 213 or PHYS 215G, and MATH 291G. Pre/Corequisite(s): MATH 392.

#### PHYS 454 - Intermediate Modern Physics I (3)

Introduction to quantum mechanics, focusing on the role of angular momentum and symmetries, with application to many atomic and subatomic systems. Specific topics include intrinsic spin, matrix representation of wave functions and observables, time evolution, and motion in one dimension. Prerequisite(s): PHYS 315. Pre/Corequisite(s): MATH 392 and PHYS 395.

#### PHYS 455 - Intermediate Modern Physics II (3)

Continuation of subject matter of PHYS 454. Specific topics include rotation and translation in three dimensions, solution of central potential problems, perturbation theory, physics of identical particles, scattering theory, and the interaction between photons and atoms. Prerequisite(s): PHYS 454.

#### PHYS 461 - Intermediate Electricity and Magnetism I (3)

Covers electro- and magneto-statics, dielectric and magnetic materials, electromagnetic wave propagation, reflection, refraction, waveguides, radiating systems, interference and diffraction, Newtonian and relativistic electrodynamics and plasma physics. Prerequisite(s): PHYS 214 or PHYS 216G or equivalent and MATH 291G. Pre/Corequisite(s): MATH 392 and PHYS 395.

#### PHYS 462 - Intermediate Electricity and Magnetism II (3)

Continuation of topics in PHYS 461. Prerequisites: PHYS 461. Main campus only.

#### PHYS 471 - Modern Experimental Optics (2-3)

Advanced laboratory experiments in optics related to the material presented in PHYS 473. Crosslisted with: E E471. Prerequisite(s)/Corequisite(s): PHYS 473.

#### PHYS 472 - Non-Linear Optical and Laser Physics (3)

An introduction to the physics of non-linear optical processes primarily involving the interaction of intense laser radiation with matter. Topics include elements of laser physics, harmonic generation, stimulated Rayleigh, Raman, and Brillouin scattering, self-focusing and optical phase conjugation.

#### PHYS 473 - Introduction to Optics (3)

The nature of light, Geometrical optics, basic optical instruments, wave optics, aberrations, polarization, and diffraction. Elements of optical radiometry, lasers and fiber optics. Prerequisite(s): PHYS 216G or PHYS 217. Crosslisted with: E E 473

#### PHYS 475 - Advanced Physics Laboratory (0-3)

Advanced undergraduate laboratory involving experiments in atomic, molecular, nuclear, and condensed-matter physics. Prerequisite: PHYS 315 and 315L

#### PHYS 476 - Computational Physics (3)

- An introduction to finite difference methods, Fourier expansions, Fourier integrals, solution of differential equations, Monte Carlo calculations, and application to advanced physics problems. Prerequisite(s): PHYS 150 or equivalent and MATH 392.
- PHYS 477 - Fiber Optic Communication Systems (4)  
See E E 477 Prerequisite(s): C or better in E E 315 or PHYS 461. Crosslisted with: E E 477
- PHYS 478 - Optical Sources, Detectors, and Radiometry (4)  
See E E 478. Prerequisite(s): PHYS 217. Crosslisted with: E E 478
- PHYS 479 - Lasers and Applications (4)  
See E E 479 Prerequisite(s): C or better in E E 315 or in PHYS 461. Crosslisted with: E E 479
- PHYS 480 - Thermodynamics (3)  
Thermodynamics and statistical mechanics. Basic concepts of temperature, heat, entropy, equilibrium, reversible and irreversible processes. Applications to solids, liquids, and gases. Prerequisites: PHYS 217, PHYS 315 and MATH 291G.
- PHYS 485 - Independent Study (1-3)  
Individual analytical or laboratory studies directed by a faculty member. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.
- PHYS 488 - Introduction to Condensed Matter Physics (3)  
Crystal structure, X-ray diffraction, energy band theory, phonons, cohesive energy, conductivities, specific heats, p-n junctions, defects, surfaces, and magnetic, optical, and low-temperature properties. Prerequisite(s): PHYS 315.
- PHYS 489 - Introduction to Modern Materials (3)  
Structure and mechanical, thermal, electric, and magnetic properties of materials. Modern experimental techniques for the study of material properties. Prerequisite: PHYS 315.
- PHYS 491 - High Energy Physics I (3)  
Particle detectors, accelerators, and experimental techniques. Fundamental particles and interactions. Symmetries in particle physics. Quark model of hadrons. Electroweak theory. Strong interactions and QCD. Nuclear interactions at high energies. Grand unification. Super symmetry. Prerequisite(s): PHYS 455.
- PHYS 493 - Experimental Nuclear Physics (3)  
Selected experimental investigations in nuclear physics such as measurement of radioactivity, absorption of radiation, nuclear spectrometry. Prerequisite(s): PHYS 315 and PHYS 315L.
- PHYS 495 - Mathematical Methods of Physics I (3)  
Applications of mathematics to experimental and theoretical physics. Topics selected from: complex variables; special functions; numerical analysis; Fourier series and transforms, Laplace transforms. Prerequisite(s): MATH 392 and PHYS 395.
- PHYS 497 - Introduction to Space Plasma Physics (3)  
Properties of plasmas, especially those in the heliosphere such as the solar wind, planetary magnetospheres and ionospheres, cosmic rays, and the Sun. Topics include both independent-particle and fluid descriptions of plasmas such as magnetohydrodynamics, the solar cycle and solar flares, planetary magnetic substorms and aurorae, Van Allen radiation belts, shocks in the solar wind, and wave propagation in plasmas. Prerequisite(s): (PHYS 461 or EE 351) and MATH 392.
- PHYS 500 - Special Topics Seminar (1-2)  
Treatment of topics not covered by regular courses. Graded S/U. May be repeated.
- PHYS 508 - Physics for Educators (3)  
Assists K-12 teachers in developing pedagogy in physics. Addresses New Mexico benchmarks and standards.
- PHYS 511 - Mathematical Methods of Physics I (3)  
Same as PHYS 495. Additional work required at a more advanced level.
- PHYS 520 - Selected Topics (1-3)  
Formal treatment of graduate-level topics not covered in regular courses. Prerequisites: graduate standing, consent of instructor, and selection of a specific topic prior to registration. May be repeated for a maximum of 9 credits.
- PHYS 521 - Individual Study (1-3)  
Individual analytical or laboratory studies directed by a faculty member. Prerequisites: graduate standing, consent of instructor, and selection of a specific topic prior to registration. May be repeated for a maximum of 6 credits.
- PHYS 527 - Fiber Optic Communication Systems (4)  
Same as E E 527 Crosslisted with: E E 527
- PHYS 528 - Optical Sources, Detectors, and Radiometry (4)  
Same as E E 528 Crosslisted with: E E 528
- PHYS 529 - Lasers and Applications (4)  
Same as E E 529 Crosslisted with: E E 529
- PHYS 551 - Classical Mechanics (3)  
Lagrangian and Hamiltonian formulation of dynamics. Advanced treatments of most topics listed under PHYS 451, plus canonical transformations and Hamilton-Jacobi theory. PHYS 451 strongly recommended.
- PHYS 554 - Quantum Mechanics I (3)  
Wave function, indeterminacy, classical limit. Schrodinger equation. Atomic and nuclear systems. Angular momentum, intrinsic spin, identical particles. Scattering theory. Mathematical formalism, symmetry and conserved quantities. Perturbation theory. Dirac theory, introduction to quantized fields. PHYS 451 and PHYS 454 strongly recommended.
- PHYS 555 - Quantum Mechanics II (3)  
Continuation of topics in PHYS 554. Prerequisites: PHYS 554 or consent of instructor.
- PHYS 561 - Electromagnetic Theory I (3)  
Detailed advanced treatments of most topics listed under PHYS 461, PHYS 462, plus multipole radiation, collisions of charged particles and bremsstrahlung, scattering, and radiation reaction. PHYS 461 and PHYS 462 strongly recommended.
- PHYS 562 - Electromagnetic Theory II (3)  
Continuation of topics in PHYS 561. Prerequisites: PHYS 561 or consent of instructor.
- PHYS 571 - Advanced Experimental Optics (2)  
Taught with PHYS 471 with additional work required at the graduate level. Consent of Instructor required. Prerequisite(s)/Corequisite(s): PHYS 573.
- PHYS 572 - Advanced Nonlinear Optical and Laser Physics (3)  
Same as PHYS 472 with differentiated assignments for graduate students.
- PHYS 575 - Advanced Physics Laboratory (0-3)  
Selected experiments in atomic, molecular, nuclear and condensed-matter physics.
- PHYS 576 - Advanced Computational Physics I (3)  
Advanced treatment of topics listed under PHYS 476, plus additional required work. Applications of numerical methods to complex physical systems. Recommended knowledge of Fortran or C, and MATH 377 or MATH 392. Same as PHYS 476, but additional work required.
- PHYS 577 - Fourier Methods in Electro-Optics (3)  
Same as E E 577 Crosslisted with: E E 577
- PHYS 578 - Optical System Design (3)  
See E E 578. Crosslisted with: E E 578
- PHYS 580 - Laser Detection Techniques (3)  
Fundamentals of laser detection. Laser radar sensing (LIDAR), laser induced fluorescence, raman scattering, opto-galvanic spectroscopy, opto-acoustic spectroscopy, and other common laser detection techniques. Recommended preparation is PHYS 478 and PHYS 479 or equivalent.
- PHYS 584 - Statistical Mechanics (3)  
Thermodynamics review. Probability, entropy, equilibrium. Canonical and grand canonical ensembles. Classical and quantum statistics. Degenerate and classical gases. Application to the equilibrium properties of solids, liquids, and gases. Kinetic theory and transport processes. PHYS 452, PHYS 454, and PHYS 455 strongly recommended.
- PHYS 588 - Condensed Matter Physics (3)  
Same as PHYS 488, but additional work required. Prerequisite(s): PHYS 554 or consent of instructor.
- PHYS 589 - Modern Materials (3)  
Same as PHYS 489 with differentiated assignments for graduate students. Prerequisite: PHYS 554 or consent of instructor.
- PHYS 591 - Advanced High-Energy Physics I (3)

Taught with PHYS 491 with additional work required at the graduate level.  
Prerequisite(s): PHYS 555 or consent of instructor.

**PHYS 592 - Advanced High-Energy Physics II (3)**

Continuation of topics in PHYS 591 Prerequisite(s): PHYS 591.

**PHYS 593 - Advanced Experimental Nuclear Physics (3)**

Advanced experimental investigation of topics such as measurement of radioactivity, absorption of radiation, and nuclear spectrometry.

**PHYS 597 - Space Plasma Physics (3)**

Same as PHYS 497 but with added requirements.

**PHYS 599 - Master's Thesis (0-15)**

Thesis.

**PHYS 600 - Research (1-15)**

Doctoral research. May be repeated.

**PHYS 620 - Advanced Topics in Physics (1-3)**

Advanced formal treatment of topics not covered in regular courses.  
Prerequisite: consent of instructor. May be repeated for a maximum of 9 credits.

**PHYS 650 - General Relativity I (3)**

Basic foundations and principles of general relativity, derivation of the Einstein field equations and their consequences, the linearized theory, the Bel-Petrov classification of the curvature tensor, derivation of the Schwarzschild solution and the four basic tests of general relativity. Prerequisite(s): PHYS 511 or PHYS 561 or consent of instructor.

**PHYS 680 - Independent Study (1-3)**

Individual analytical or laboratory studies directed by a faculty member.  
Prerequisite: graduate standing or consent of instructor. May be repeated for a maximum of 6 credits.

**PHYS 688 - Advanced Condensed Matter Physics (3)**

Continuation of the advanced condensed matter physics presented in PHYS 588. Topics include electronic structure methods, optical, magnetic, and transport properties of solids, semiconductors, crystalline defects, nanostructures, and noncrystalline solids. PHYS 588 strongly recommended.

**PHYS 689 - Advanced Modern Materials (3)**

Advanced topics in the physics of modern materials, such as crystalline, amorphous, polymeric, nanocrystalline, layered, and composite materials and their surfaces and interfaces. Prerequisites: PHYS 555, PHYS 588, or consent of instructor.

**PHYS 691 - Quantum Field Theory I (3)**

Path integrals, gauge invariance, relativistic quantum mechanics, canonical quantization, relativistic quantum field theory, introduction to QED.  
Prerequisites: PHYS 555 and PHYS 562, or consent of instructor.

**PHYS 692 - Quantum Field Theory II (3)**

QED, running coupling constant, QCD, electroweak theory, asymptotic freedom, deep inelastic scattering, basic QCD phenomenology, path integrals in quantum field theory, lattice QCD. Prerequisite: PHYS 691 or consent of instructor.

**PHYS 700 - Doctoral Dissertation (0-15)**

Dissertation.

## PLAN - PLANNING

**PLAN 495 - Directed Readings (1-3)**

Individual study through readings. A maximum of 6 credits may be earned.  
Prerequisite: consent of instructor.

## PORT - PORTUGUESE

**PORT 453 - Independent Luso-Brazilian Studies (1-3)**

Individualized, self-paced projects for advanced students in Luso-Brazilian studies.

**PORT 513 - Graduate Portuguese for Romance Language Students I (3)**

Portuguese for beginners at the graduate level. May be completed on campus or via Study Abroad. Credit can be applied towards fulfilling the second language requirement. Credit is not accepted towards any graduate level major or minor.

**PORT 514 - Graduate Portuguese for Romance Language Students II (3)**

Portuguese for beginners at the graduate level. May be completed on campus or via Study Abroad. Credit can be applied towards fulfilling the

second language requirement. Credit is not accepted towards any graduate level major or minor. Prerequisite(s): Language placement exam or C or better in PORT 513, or consent of instructor.

## PSY - PSYCHOLOGY

**PSY 450 - Senior Thesis (3)**

A laboratory or field research project conducted under faculty supervision. Requires written research proposal, conduct of research, data analysis, and final written report. Prerequisites: PSY 310, 6 additional psychology credits, consent of supervising faculty member, and junior or above standing. May be repeated for a maximum of 6 credits.

**PSY 470 - Special Topics (1-3)**

Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.

**PSY 501 - Introduction to Psycholinguistics (3)**

Introduction to graduate studies in psycholinguistics. Psychological aspects of language; linguistic theories of grammar, psychological factors influencing language performance, primary language acquisition and the relationship of language to thought processes. Same as LING 501.

**PSY 507 - Quantitative Methods in Psychology I (3)**

Statistical concepts emphasizing distributions and methods most appropriate to the data, models, and theories in psychology. Prerequisite: An elementary statistics course or consent of instructor.

**PSY 508 - Quantitative Methods in Psychology II (3)**

Statistical concepts emphasizing distributions and methods most appropriate to the data, models, and theories in psychology. Prerequisite: PSY 507 or equivalent.

**PSY 509 - Quantitative Methods in Psychology III (3)**

Statistical concepts emphasizing distributions and methods most appropriate to the data, models in psychology. Prerequisite: PSY 507 or equivalent.

**PSY 510 - Computer Methodology (3)**

Use of computers in psychological research with emphasis on developing experimental control programs.

**PSY 520 - Learning (3)**

Classical areas of learning, including instrumental and classical conditioning paradigms, habituation, reinforcement variables, stimulus generalization and transfer, and memory.

**PSY 522 - Sensation and Perception (3)**

Stimulus and decision variables in judging auditory and visual events. Topics include: detection of signals; signal intensity versus perceived strength; size, shape, and movement perception; reading and listening.

**PSY 523 - Methods in Cognitive Psychology (3)**

Experimental and correlational methodologies appropriate for investigating cognitive psychological theories and problems. Prerequisite(s): PSY 524 or consent of instructor.

**PSY 524 - Cognitive Psychology (3)**

Examines theoretical and empirical work on human cognition. Topics include: information processing theories, pattern recognition, memory, attention, language, problem solving, decision making, and reasoning.

**PSY 525 - Behavioral Neuroscience (3)**

The biological basis of behavior with an emphasis on human cognitive functioning.

**PSY 527 - Social Psychology (3)**

Current and traditional theories, research findings, and research methodologies of social psychology.

**PSY 529 - Methods in Social Psychology (3)**

Experimental, quasi-experimental, and correlational methodologies appropriate for investigating social psychological theories and problems. Prerequisite(s): Graduate student in psychology or consent of instructor.

**PSY 530 - Human-Computer Interaction (3)**

Issues associated with human-computer interface design. Concepts, methods, and data from HCI, cognitive psychology, human factors, artificial intelligence, and psycholinguistics that apply.

**PSY 531 - Human Memory (3)**

Current and traditional theories and research findings related to human memory.

**PSY 535 - Developmental Psychology (3)**



Examines theoretical and empirical work in lifespan developmental psychology, with an emphasis on perceptual and cognitive development, language development, and social cognitive development.

**PSY 540 - History and Systems of Psychology (3)**

History of scientific method emphasizing outstanding methodological problems of contemporary science, especially psychology. Covers recent history of psychology and development of schools of psychology.

**PSY 543 - Cognitive Neuroscience (3)**

Introduction to the study of the neural mechanisms underlying cognitive processes. Topics include relations between neural processes and attention, perception, memory, thinking and language; measuring change in electrical activity, blood flow, and metabolism in the brain during cognition; the problem of consciousness; and evolutionary perspectives.

**PSY 547 - Engineering Psychology (3)**

Covers concepts, methods, and findings of human performance. Treats the human as a subsystem that receives, stores and processes information, makes decisions, and acts within a human-machine environment system.

**PSY 548 - Methods in Engineering Psychology (3)**

Engineering psychology methods such as task analysis, cognitive task analysis, user testing, prototyping, protocol analysis, cost-benefit analysis, safety and reliability analysis, and multivariate techniques. Prerequisite: PSY 547 or consent of instructor.

**PSY 570 - Special Topics (1-3)**

Specific subjects to be announced in the Schedule of Classes.

**PSY 590 - Research Seminar in Psychology (1)**

Presentations on research by students, faculty, and guest speakers. May be repeated for credit.

**PSY 598 - Special Research Programs (1-3)**

Individual investigations either analytical or experimental. May be repeated for credit.

**PSY 599 - Master's Thesis (0-15)**

Thesis.

**PSY 600 - Doctoral Research (1-15)**

This course number is used for assigning credit for research performed prior to successful completion of the doctoral qualifying examination.

**PSY 625 - Seminar in Cognitive Science (3)**

May be repeated with consent of instructor. May be repeated for unlimited credit.

**PSY 698 - Special Research Programs (1-3)**

Individual investigations either analytical or experimental. May be repeated for credit.

**PSY 700 - Doctoral Dissertation (0-15)**

Dissertation.

## **RDG - READING**

**RDG 510 - Adult and Family Literacy (3)**

Principles, practices, and instructional materials for adult and family literacy. Same as EDUC 506.

**RDG 511 - Literacy Assessment and Evaluation (3)**

Theoretical and practical aspects of using formal and informal assessment and evaluation procedures in literacy curriculum and instruction. Same as EDUC 511.

**RDG 514 - Content Area Literacy (3)**

Surveys integrated reading/writing/discursive practices in middle/secondary content areas. Same as RDG 314.

**RDG 522 - Language and Literacy Acquisition (3)**

Framework and strategies of language and literacy acquisition with attention to bilingual learners and the interrelationship among reading, writing, and oral language. Same as BIL 522, RDG 422.

**RDG 525 - Pedagogy and Theory of Literature for Adolescents (3)**

This course provides an in-depth exploration of pedagogy and theory related to literature for adolescents. Prerequisite(s): Graduate Standing.

**RDG 530 - Sociopsycholinguistics of Reading (3)**

Examines current research on reading process, learning to read, and teaching children to read and evaluates current programs and materials.

**RDG 536 - Special Studies in Literacy (1-6)**

Each study will be designated by a qualifying subtitle. Same as RDG 636.

**RDG 537 - Independent Study in Literacy (1-6)**

Each project will be designated by a qualifying subtitle. Same as RDG 637.

**RDG 551 - Literacy Development in Early Childhood (3)**

Advanced theory, research, and practice relating to early childhood reading. Same as RDG 351.

**RDG 555 - Introduction to Instructional Leadership for Literacy Educators (3)**

Three credit course will introduce students to the roles and responsibilities of literacy specialists in the k-12 school setting. Prerequisite(s): Graduate standing, RDG 511 RDG 530.

**RDG 560 - Elementary School Literacy I (3)**

Reading development, curriculum, and instruction in the elementary grades. Corequisites: ECED 550, EDUC 551, and EDUC 552 (block A course). Same as RDG 360 with differentiated assignments for graduate students.

**RDG 561 - Elementary School Literacy II (3)**

Reading development in curriculum and instruction with assessment and evaluation in the elementary grades (K-8). Prerequisite: RDG 560. Corequisites: EDUC 553, EDUC 554, and EDUC 555 (block B course). Same as RDG 361 with differentiated assignments for graduate students.

**RDG 585 - Practicum in Literacy Education (1-6)**

Supervised laboratory experience with children with reading difficulties. The student implements a program of specific procedures to aid the disabled reader. Prerequisite: RDG 511.

**RDG 587 - Pedagogy of TESOL (3)**

Overview of approaches that provide for interactive, culturally responsive pedagogy for students acquiring English. Emphasis on development of ESL literacy. Appropriate for public school and adult educators. Same as EDUC 587.

**RDG 598 - Selected Topics in Literacy (1-6)**

Offered under different subtitles in the Schedule of Classes. Same as RDG 698 with differentiated subjects for doctoral students.

**RDG 600 - Doctoral Research in Literacy (1-15)**

Research on topic of interest.

**RDG 605 - Independent Study Topics in Reading (1-6)**

A problem and seminar course for those pursuing an advanced degree. Each course will have an appropriate subtitle.

**RDG 608 - Critical Issues in Literacy Education (3)**

Critical issues from historical to current perspectives.

**RDG 616 - Acquiring Emancipatory Discourses and TESOL/BIL (3)**

Same as BIL 616.

**RDG 617 - Multiple Critical Literacies (3)**

Same as BIL 617.

**RDG 621 - Literacy/Biliteracy Assessment and Evaluation (3)**

Same as BIL 621.

**RDG 630 - Ethnography of Reading and Writing (3)**

Covers the dynamics of data interpretation and critical analysis in the study of literacy.

**RDG 633 - Praxis and Reflexivity (3)**

Same as BIL 633, ECED 633, EDLT 633, EDUC 633.

**RDG 636 - Special Studies in Literacy (1-6)**

Offered under different subtitles in the Schedule of Classes. Same as RDG 536 with differentiated assignments for doctoral students.

**RDG 639 - Multiculturalism, Literature, and Inquiry (3)**

Advanced exploration and examination of critical multicultural language education vis-a-vis children's adolescent, young adult, and adult literature, with an eye toward problematizing assumptions about literacy, articulating issues of social justice and enacting transactive, transformative pedagogy. Same as BIL 639.

**RDG 640 - Higher Education Teaching Apprenticeship (1-6)**

Instructor apprenticeship in teaching university-level literacy-related classes. Each course should bear a qualifying subtitle. Maximum of 6 credits per semester and a maximum of 6 credits.

**RDG 685 - Advanced Internship K-12 Literacy (3)**

Advanced internship in a professional position/research/application within K-12 schools and classes. Restricted to doctoral-level students of any major. Same as BIL 685.

**RDG 698 - Selected Topics in Literacy (1-6)**

Offered under various subtitles that indicate the subject matter. Same as RDG 598.

**RDG 699 - Research Project (1-15)**

Offered primarily for those pursuing the research requirement for the Ed.S. degree. Each research project will be designated by a qualifying subtitle.

**RGSC - RANGE SCIENCE**

**RGSC 452 - Rangeland Analysis (4)**

Analysis methods used to determine structure and function of rangelands and their applications to rangeland management and assessment. Prerequisites: RGSC 294 and A ST 311.

**RGSC 458 - Livestock Behavior, Welfare and Handling (3)**

Principles of animal behavior and evaluation of management practices on animal welfare in confined and rangeland livestock operations. Low stress livestock handling techniques. Design of livestock handling facilities. Prerequisite(s): RGSC 294 or ANSC 100. Crosslisted with: ANSC 458

**RGSC 460 - Advanced Rangeland Management (4)**

Rangeland management planning and problem solving; integration of ecological and grazing management principles to address rangeland, riparian and habitat issues. Prerequisite(s): RGSC 294, RGSC 440, and RGSC 452 or consent of instructor.

**RGSC 509 - Approaches to Rangeland Research (3)**

Experimental design and statistical analysis of experimental results. Prerequisite(s): A ST 505 or consent of instructor.

**RGSC 510 - Range Nutrition Techniques (3)**

Same as ANSC 510.

**RGSC 513 - Advanced Rangeland Ecology (3)**

Overview of the current state of knowledge in selected areas of rangeland ecology, with emphasis on currently developing ideas and issues relevant to rangeland management. Prerequisite(s): RGSC 440 or equivalent.

**RGSC 515 - Graduate Seminar (1)**

Current topics. Graded S/U.

**RGSC 516 - Rangeland Ecosystem Management (3)**

Survey of seminal and current literature in range science as an applied discipline. Includes a broad overview of interdisciplinary topics such as rangeland climates, soils, plant eco-physiology, plant community ecology, hydrology, and livestock grazing management. Applications of range science to the sustainable management of rangeland ecosystems will be emphasized.

**RGSC 518 - Watershed Methods and Management (3)**

Management of rangeland and forest watersheds with emphasis on the hydrologic cycle and land use effects on runoff and water quality. Hydrologic monitoring methods problem sets required for graduate credit.

**RGSC 520 - Rangeland Animal Ecology (3)**

Rangeland animal nutrition, behavior, and social interactions with special emphasis on rangeland animal responses to plants with antiquality compounds.

**RGSC 525 - Advanced Rangeland Restoration Ecology (3)**

Principles and practices of vegetation management and ecological restoration. Course emphasizes problems associated with rangeland degradation, and implementation of rangeland restoration and improvements. Research paper required for graduate credit.

**RGSC 550 - Special Topics (1-4)**

Specific subjects to be announced in the Schedule of Classes. Maximum of 4 credits per semester. No more than 9 credits toward a degree.

**RGSC 598 - Special Research Program (1-4)**

Individual investigations, either analytical or experimental. Maximum of 4 credits per semester. No more than 6 credits toward a degree. Consent of Instructor required.

**RGSC 599 - Master's Thesis (0-15)**

Thesis. Consent of Instructor required. Thesis/Dissertation Grading.

**RGSC 600 - Doctoral Research (1-15)**

Research. Consent of Instructor required. Thesis/Dissertation Grading.

**RGSC 611 - Principles and Evaluation of Rangeland Restoration (3)**

Soil-plant-animal-weather relations affecting improvement practices and management of the rangeland ecosystem. Prerequisite: consent of instructor.

**RGSC 618 - Interdisciplinary Modeling: Water & Climate Issues (3)**

Students will be working in interdisciplinary teams to apply interdisciplinary modeling approaches which will increase knowledge about water related issues regarding climate change and issues of variability and uncertainty. Students will use a common software to do an interdisciplinary project. Course will be taught every six years at NMSU. Consent of instructor required.

**RGSC 630 - Quantitative Plant Ecology (3)**

Applications of quantitative, analytical techniques used to describe and assess rangeland plant communities. Prerequisites: RGSC 440 and A ST 505 or equivalent.

**RGSC 698 - Special Research Programs (1-4)**

Advanced individual investigations, either analytical or experimental. Maximum of 4 credits per semester. No more than 6 credits toward a degree. Consent of Instructor required.

**RGSC 700 - Doctoral Dissertation (0-15)**

Dissertation. Consent of Instructor required. Thesis/Dissertation Grading.

**S WK - SOCIAL WORK**

**S WK 463 - Social Work Practice with Hispanic Families (3)**

Theory and skills relating to social work practice with Hispanic families. Emphasis on strengthening and empowering Hispanic families to perform their caregiving roles in their own environment. Prerequisite: S WK 300, S WK 313, S WK 314 and S WK 400.

**S WK 465 - Practice with the Elderly (3)**

Concepts and skills needed for effective practice with older adults, their families, and others in their support systems. Attention to subgroups on an older population, including persons of color, health-impaired individuals, grandparent caregivers, and elderly gay men and women. Taught with MSW 565. Cannot receive credit for S WK 465 and MSW 565. Prerequisite(s): S WK 300, S WK 313, S WK 414 and S WK 415.

**S WK 467 - Social Work Research I (3)**

Development of knowledge and skills needed to build practice knowledge, evaluate service delivery, and be effective consumers of research knowledge. The first of a two-course sequence that covers research methods, history of research, ethics, problem formulation, research design, measurement, and instrumentation. Restricted to SW K majors.

**S WK 468 - Social Work Research II (3)**

Development of knowledge and skills needed to build practice knowledge, evaluate service delivery, and be effective consumers of research knowledge. The second of a two-course sequence that covers research literature, data collection, and data analysis. Prerequisite: S WK 467. Restricted to S WK majors.

**S WK 490 - Family and Child Welfare Policy (3)**

Historical review and evolution of child welfare policies, initiatives and factors that influence child welfare service. Child welfare policies and services specific to the state of New Mexico are infused throughout the course. Taught with MSW 590. Cannot receive credit for S WK 490 and MSW 590. Prerequisite(s): S WK 313, S WK 314 and S WK 400.

**S WK 491 - Professional and Systems Responses to Child Maltreatment (3)**

Course examines the professionals and systems that respond to allegations of child abuse and neglect. Includes the differences between civil and criminal proceedings; components of a court-worthy child abuse and neglect investigation; basic child forensic interviewing; an overview of child sex offenders; current research and controversial issues affecting the field. Students majoring in social work, criminal justice, education, sociology, psychology, nursing, and other areas will enhance their capacity to strengthen the safety net that protects children. Crosslisted with: CAST302.

**S WK 492 - Death and Dying (3)**

Course introduces students to issues and problems presented by death, dying, and grief. It is designed for social work majors and others in the helping professions, by examining attitudes and responses to death, perspectives of dying children and adults, euthanasia, abortion, suicide, capital punishment, funeral behavior, and the dynamics of grief.

**S WK 496 - International Social Work and Social Welfare (3)**

This course examines how people are affected by political, economic, educational, social conditions, and the policies designed to address those conditions. Comparative analysis of social policies and practices in the United States and the developing world will be emphasized. Taught with MSW 596. Cannot receive credit for S WK 496 and MSW 596. Consent of instructor required.

**SWK 497 - Special Topics (3)**

Specific subjects to be announced in the Schedule of Classes. May be used as a mandatory practice elective. Prerequisite(s): Junior or above standing, majors or consent of instructor. Restricted to: SWK majors.

**SOC - SOCIOLOGY****SOC 450 - Qualitative Research Methods (3)**

This course will provide an in-depth examination of qualitative research methods, including participant observation techniques, interviewing, and content analysis. Prerequisites: SOC 352, COMM 305, GOVT 300, C J 300, PSY 310, PSY 355 or consent of instructor.

**SOC 451 - Advanced Quantitative Techniques (3)**

Advanced methods of sociological analysis are examined in detail. Prerequisite(s): SOC 353 or equivalent or permission of instructor. Restricted to Sociology BA or MA or permission of instructor majors.

**SOC 452 - Advanced Social Theory (3)**

Analysis of classical and contemporary theoretical perspectives within the discipline. Prerequisite(s): SOC 351. Restricted to BA Sociology MA Sociology majors.

**SOC 453 - Advanced Research Methods (3)**

Exploration of research methods, issues, and practical applications. Builds upon foundation provided by SOC 352 or other junior-level social research courses. Prerequisite(s): One of the following: SOC 352, COMM 305, GOVT 300, C J 300, PSY 310, PSY 355 or consent of instructor. Restricted to BA - Sociology MA - Sociology majors.

**SOC 455 - Advanced Social Research: Evaluation (3)**

Logic, design and ethics of evaluations including theory driven and multi level models. Emphasis on individual, group and community level needs assessment, process and activities assessment and outcomes assessment including social impact assessment. Data collection techniques will include survey questionnaire construction, interviewing, focus groups and case studies. Measures of efficiency and effectiveness will be examined. Prerequisite: Research Methods Course.

**SOC 457 - Gender, Science, and Technology (3)**

How gender, science and technology are interrelated social constructions. Science and technology are examined as social institutions. Explanations for different rates of participation based on race, class and gender are explored. Same as: W S 467.

**SOC 458V - Comparative Global Family Systems (3)**

The study of families around the world. The comparison will include how capitalism and power differentials have affected the course of family history, gender relations, and family life today.

**SOC 459 - Advanced Issues in Sex and Gender (3)**

Comprehensive examination of current gender identity and gender stratification issues. Same as W S 459.

**SOC 460 - Sociology of Religion (3)**

Examination of religion in its social context to understand the intricate relations of religion, culture and U.S. society. Recommended preparatory courses: SOC 101G, SOC 273, SOC 376, ANTH 125G.

**SOC 461 - Population Trends and Analysis (3)**

Overview of past, present, and future population phenomena and introduction to techniques of demographic analysis.

**SOC 465V - Environmental Sociology (3)**

Advanced examination of societal responses to environmental problems including social adjustments to natural and technological hazards, sociocultural aspects of technological risk and impact assessment, and emergence of environmental social movements.

**SOC 470 - Sociology of Latinos/as in the United States (3)**

In-depth examination and comparative analysis of political and economic issues affecting Latino/a culture and behavior. Includes the Chicano/a and larger Latino/a movements, the border, immigration, language policies, education, religion, labor, and Latina women s issues. Recommended preparatory courses: SOC 101G, SOC 270, SOC 371, or HIST 367.

**SOC 471 - Advanced Race and Ethnic Relations (3)**

In-depth analysis of the dynamics of prejudice, discrimination, and patterns of intergroup interaction in the U.S.

**SOC 472 - Sociology of Medical Ethics (3)**

Focus on ethics as applied in health care from a sociological perspective. Includes cultural issues and the decision making process, with individual and social implications. Same as SOC 572.

**SOC 474 - Sociology of Organizations (3)**

Sociological models of formal organizations relevant to business, education, government, healthcare, military, and religion. Focus on internal organizational structure and dynamics plus the reciprocal relationship between organizations and their operating environment.

**SOC 475 - Advanced Social Stratification (3)**

Theories of stratification and current methods of stratification research. Focus on differences by ethnicity, race, class, and gender.

**SOC 477 - Sociology of Education (3)**

Socio-political and economic factors that shape the structure and operation of educational institutions in modern complex societies. Socio-historical development of the school as a microcosm of society, with examples from American and other school systems.

**SOC 478 - Sociology of Development and the World System (3)**

A sociological approach to development and global system. Theories of development and underdevelopment; world poverty/inequality; Latin America, Africa, and Asia in comparative perspectives; transnational borders/U.S.-Mexico border; current topics.

**SOC 479 - Sociology Perspectives on the U.S.-Mexico Border (3)**

Theoretical perspectives and current research on the U.S.-Mexico border region, including topics such as migration, identity, health, gender, and environment.

**SOC 480 - Diversity in Alternative Families (3)**

Cross-cultural examination of diversity among and within families: analysis of family diversity includes consideration of the theoretical frameworks, ideological commitments, personal experiences, and methodological approaches to examine family life.

**SOC 481 - Social Deviance (3)**

Theoretical approaches to the study of social deviance with emphasis on critical theories. Exploration of forms of deviance in society. Examination of social construction of deviance within mass media and systems of social control.

**SOC 482 - Advanced Individual and Society (3)**

Examines reciprocal relationship between individual and society. Topics include socialization, social influence and persuasion, group structure and performance, altruism, aggression, interpersonal attraction, group cohesion and conformity, and inter-group conflict.

**SOC 489 - Globalization (3)**

Analysis of the globalization process. Covers theories of globalization, the global economy, political globalization, global culture, transnational social movements, transnational migration and world labor market, global cities, and local-global linkages. Same as GOVT 469.

**SOC 491 - Criminological Theory (3)**

Schools of thought, contrasting approaches, and contemporary efforts in theory construction relevant to adult and juvenile offenders.

**SOC 496 - Internship (1-6)**

Supervised participation in an appropriate community setting. Taught with SOC 596. May be repeated up to 9 credits. Consent of Instructor required. S/U Grading (S/U, Audit).

**SOC 501 - Perspectives on Sociology (3)**

Overview of the field, subfields, and faculty available for students at NMSU. Emphasis on theories and research currently being developed in the Sociology program. Graded: S/U.

**SOC 530 - Advanced Social Movement Theory (3)**

Overview of key theories in past and present social movement research. Topics include a focus on rational or spontaneous choice theories, resource mobilization, and new social movement theories. Theoretical perspectives focus on analysis of case studies including women s movement, civil rights, and environmental movements.

**SOC 548 - Graduate Special Topics (3)**

Specific subjects to be announced in the Schedule of Classes.

**SOC 549 - Special Research Problems (1-3)**

Individual analytic or experimental investigations. May be repeated for a maximum of 6 credits. Prerequisite: consent of instructor.

**SOC 550 - Qualitative Research Methods (3)**

- This course will provide an in-depth examination of qualitative research methods, including participant observation techniques, interviewing, and content analysis.
- SOC 551 - Issues in Advanced Quantitative Analysis (3)**  
Advanced methods of sociological analysis are examined in detail. Restricted to: SOC majors.
- SOC 552 - Seminar in Classical Social Theory (3)**  
Analysis of classical social thought within the discipline. Restricted to: SOC majors.
- SOC 553 - Seminar in Sociological Research (3)**  
Exploration of research methods, issues, and practical application.
- SOC 554 - Multiple Methods Research (3)**  
Builds upon basic skills of social research to design and implement a multiple methods study. Data collection, organization, and analysis involve both quantitative and qualitative approaches Prerequisite(s): SOC 551, SOC 553. Restricted to: Main campus only.
- SOC 555 - Applied Evaluation (3)**  
Logic, design and ethics of evaluations including theory driven and multi-level models. Emphasis on individual, group and community level needs assessment, process and activities assessment and outcomes assessment including social impact assessment. Data collection techniques will include survey questionnaire construction, interviewing, focus groups and case studies. Measures of efficiency and effectiveness will be examined. Prerequisite: Research Methods Course.
- SOC 556 - Survey Research Methods (3)**  
This course will provide an in-depth examination of survey research techniques, including telephone surveys, mail surveys, internet surveys, and multi-modal techniques. The various aspects of questionnaire construction and administration of surveys will be covered.
- SOC 558 - Seminar: Sociology of the Family (3)**  
The family in various societies; evolution of the American family.
- SOC 559 - Graduate Seminar in Sex and Gender (3)**  
Comprehensive examination of current gender identity and gender stratification issues. Same as W S 559.
- SOC 560 - Advanced Sociology of Religion (3)**  
Examination of religion in its social context to understand the intricate relations of religion, culture and U.S. society.
- SOC 565 - Advanced Environmental Sociology (3)**  
Advanced examination of societal responses to environmental problems including social adjustments to natural and technological hazards, sociocultural aspects of technological risk and impact assessment, and emergence of environmental social movements.
- SOC 569 - Advanced Issues in Sexualities (3)**  
Various issues in sexualities are addressed through a wide range of theoretical and empirical sociological literatures that involve quantitative and qualitative data. Advanced examination of the ways in which sexuality is constituted in local, cultural and institutional environments.
- SOC 570 - Advanced Sociology of Latinos/as in the United States (3)**  
In-depth examination and comparative analysis of political and economic issues affecting Latino/a culture and behavior. Topics include the Chicano/a and larger Latina/o movements, the border, immigration, language policies, education, religion, labor and Latina women s issues.
- SOC 571 - Advanced Race and Ethnic Relations (3)**  
In-depth analysis of the dynamics of prejudice/discrimination and patterns of intergroup interaction in the U.S.
- SOC 572 - Advanced Sociology of Medical Ethics (3)**  
Major issues in the roles and relationships of health care providers and consumers, problems in communication, malpractice, patients rights, and ethics. Taught with SOC 472 with additional work required at the graduate level.
- SOC 574 - Sociology of Organizations (3)**  
Sociological models of formal organizations relevant to business, education, government, healthcare, military, and religion. Focus on internal organizational structure and dynamics plus the reciprocal relationship between organizations and their operating environment.
- SOC 575 - Graduate Social Stratification (3)**  
Advanced examination of theories of stratification and current methods of stratification research. Focus on differences by ethnicity, race, class and gender.
- SOC 577 - Advanced Sociology of Education (3)**  
Socio-political and economic factors that shape the structure and operation of educational institutions in modern complex societies. Socio-historical development of the school as a microcosm of society, with examples from American and other school systems.
- SOC 578 - Advanced Sociology of Development and the World System (3)**  
Sociological approach to development and the global system. Theories of development, and underdevelopment; world poverty/inequality; Latin America; Africa and Asia in comparative perspectives; transnational borders/U.S.-Mexico border; current topics. Same as GOVT 577.
- SOC 579 - Advanced Sociological Perspectives on the U.S.-Mexico Border (3)**  
Theoretical perspectives and current research on U.S.-Mexico border region, including migration, identity, health, gender, and environment.
- SOC 580 - Diversity in Alternative Families (3)**  
Cross-cultural examination of diversity among and within families: analysis of family diversity includes consideration of the theoretical frameworks, ideological commitments, personal experiences, and methodological approaches to examine family life.
- SOC 581 - Issues in Social Deviance (3)**  
Selected forms of deviant behavior, social issues, and social problems.
- SOC 582 - Individual and Society (3)**  
Examines reciprocal relationship between individual and society. Topics include socialization, social influence and persuasion, group structure and performance, altruism, aggression, interpersonal attraction, group cohesion and conformity, and intergroup conflict.
- SOC 583 - Symbolic Interaction (3)**  
Examination of the interaction of self and the social order including society as process, the negotiation of social order, identity as a social product, role taking and the situated self, the social construction of reality with an emphasis on phenomenology and ethnomethodology.
- SOC 589 - Advanced Issues in Globalization (3)**  
Analysis of the globalization process. Covers theories of globalization; global economy; political globalization; global culture; transnational social movements; transnational migration and world labor market; global cities; local-global linkages. Same as GOVT 569.
- SOC 596 - Internship (1-6)**  
Supervised participation in appropriate occupational setting. May be repeated for a maximum of 12 credits. Taught with SOC 496 with additional work required at the graduate level.
- SOC 599 - Master's Thesis (0-6)**  
Thesis. Consent of instructor required. Restricted to: Main campus only. Restricted to SOC majors.
- SOIL - SOIL**
- SOIL 450 - Special Topics (1-4)**  
Specific subjects to be announced in the Schedule of Classes. Maximum of 4 credits per semester and a total of 9 credits towards a degree.
- SOIL 456 - Irrigation and Drainage (3)**  
Principles and practices required for irrigation to exist as a permanent economy. Equipment and methods for measurement and control of water.
- SOIL 472 - Soil Morphology and Classification (4)**  
Terminology used to describe soils. Soil classification systems of the world with emphasis on systems used in the United States. Theory of classification and taxonomy as applied to soils. Prerequisite: SOIL 252. Same as GEOG 472.
- SOIL 476 - Soil Microbiology (3)**  
Nature and physiology of soil microorganisms, how they affect plant growth and recycle nutrients. Land farming, bioremediation and other environmental problems as influenced by soil microorganisms. SOIL 252 and BIOL 311 recommended. Same as BIOL 476.
- SOIL 476 L - Soil Microbiology Laboratory (1)**  
Enumeration of soil microorganisms, their activities, and transformations they mediate. Prerequisites: SOIL 476 or concurrent enrollment. Same as BIOL 476L.
- SOIL 477 - Environmental Soil Physics (3)**  
A description of the physical characteristics of porous media including soil. Examination of processes describing the transport of water, chemicals, heat and gases through porous media with application to environmental quality, waste management, and crop production.

**SOIL 477 L - Environmental Soil Physics Laboratory (1)**

Concurrent enrollment with SOIL 477 recommended. Hands on experience with techniques for characterizing soil physical properties such as particle size distribution, bulk density, water retention, hydraulic conductivity and solute transport. Demonstrations of field and laboratory techniques for measuring moisture content, soil water potential, gas/air flow and thermal conductivity. Prerequisite: SOIL 252.

**SOIL 479 - Environmental Soil Chemistry (3)**

Basic elements of soil chemistry including discussion of clay mineralogy, cation and anion exchange and the chemistry of problem (acid, saline and flooded) soils. Credit not given for both SOIL 424 and SOIL 479. Prerequisite(s): SOIL 252L or CHEM 111 and 112.

**SOIL 500 - Special Topics (1-4)**

Specific subjects and credits to be announced in the Schedule of Classes. Maximum of 4 credits per semester. No more than 9 credits toward a degree.

**SOIL 505 - Research Orientation (4)**

Training in writing research proposals, presentation of research results, and interpretation of research results. Crosslisted with: AGRO 505 and HORT 505

**SOIL 514 - Soil-Plant Relationships (3)**

Physical, chemical, and biological soil environment as it affects plant and crop growth. Prerequisites: BIOL 314, SOIL 252. Same as AGRO/HORT 514.

**SOIL 590 - Graduate Seminar (1)**

Current research discussions presented by master level graduate students. Not more than one credit toward the degree. Same as AGRO/HORT 590. Crosslisted with: AGRO590 and HORT590.

**SOIL 597 - University Teaching Experience (1-3)**

Certain graduate students will be permitted to teach up to one-third of one AGRO/HORT/SOIL/ES course. The student will prepare and deliver lectures and will prepare, administer, and grade at least one examination. The professor in charge of the course will attend and evaluate the student's lectures. Consent of instructor required. Crosslisted with: AGRO 597 and HORT 597

**SOIL 598 - Special Research Programs (1-6)**

Individual investigations, either analytical or experimental. Maximum of 6 credits per semester. No more than 9 credits toward a degree.

**SOIL 600 - Doctoral Research (1-15)**

Research.

**SOIL 620 - Instrumentation in Agronomy (3)**

Use of instruments used in research in all areas of agronomy including gas chromatography, high performance liquid chromatography, neutron soil moisture probe, and other instruments. Same as AGRO/HORT.

**SOIL 630 - Advanced Soil Classification (3)**

Philosophy and organization of various soil classification systems, some international in scope, with emphasis on the new USDA system and classroom and field experience in using this system. Prerequisite: SOIL 472 or consent of instructor.

**SOIL 640 - Advanced Soil Microbiology (3)**

Advanced topics in soil microbiology and biochemistry, including carbon cycling, nitrogen cycling, humus formation and nature, and microbial-plant root interactions. Consent of instructor required.

**SOIL 650 - Advanced Topics (1-3)**

Colloquium on contemporary topics associated with agriculture, environmental science and engineering. Multidisciplinary topics will be chosen to encourage participation of students from diverse disciplines. Prerequisite: consent of instructor. May be repeated for a maximum of 9 credits.

**SOIL 651 - Advanced Soil Chemistry (3)**

Advanced treatment of soil chemistry phenomena with emphasis on arid zone soils. Particular attention is given to reactions involved in environmental pollution and management of wastes. Prerequisite: SOIL 424 or SOIL 479

**SOIL 652 - Advanced Soil Physics (3)**

Advanced treatment of soil physics, modeling, includes working on an existing/new research project, modeling existing or new data, step by step guide on the use of some 1-D and 2-D models. Specific areas of specialization will be field scale variability of soil properties, water flow, solute transport, and plant water relations. Prerequisite(s): SOIL 477 and computer literacy, or consent of instructor.

**SOIL 655 - Moisture Heat Contaminant Transport Modeling (3)**

Provides clear coverage of the basic principles of heat, moisture and contaminant transport through porous media, and a step-by-step guidance

and hands on application on the use of some spreadsheet based and physically based one-and two-dimensional transport models. A similar course does not exist in the college for students that can encourage them to pursue modeling as a means of solving vadose zone and groundwater contamination and remediation problems. Consent of instructor required. Pre/Corequisite(s): Graduate student with at least two 400.

**SOIL 694 - Doctoral Seminar (1)**

Current research discussions presented by doctoral level graduate students. Not more than 2 credits toward the degree. Prerequisite: doctoral level graduate students. Same as AGRO 694.

**SOIL 696 - Doctoral Proposal (1)**

Current research proposal written by doctoral level graduate students. Not more than 1 credit toward the degree. Prerequisite: doctoral level graduate students. Same as AGRO 696.

**SOIL 697 - University Teaching Experience (1-3)**

Certain graduate students will be permitted to teach up to one-third of one AGRO/HORT/SOIL/ES course. The student will prepare and deliver lectures and will prepare, administer, and grade at least one examination. The professor in charge of the course will attend and evaluate the student's lectures. Consent of instructor required. Crosslisted with: AGRO 697 and HORT 697

**SOIL 698 - Topics in Agronomy (1-6)**

Topics of current interest, designated by title and credit. Maximum of 6 credits per semester. No more than 9 credits toward a degree.

**SP M - SPORTS MEDICINE****SP M 451 - Advanced Exercise Physiology (3)**

Detailed study of the integrated response of neuromuscular, cardiovascular, and respiratory systems to acute and chronic exercise, nutrition, and environmental conditions with a strong emphasis on laboratory experiences. Prerequisite(s): SP M 271 and SP M 308 or consent of instructor. GPA of 2.75.

**SP M 456 - Exercise for Special Populations (3)**

Fundamentals of kinesiology adapted for adults with various diseases and disabilities. Focus will be on the application of exercise assessment and prescription for selected conditions. Prerequisite(s): SPM 308 and SPM 330 or SPM 460. GPA of 2.75.

**SP M 458 - Physical Dimensions of Aging (3)**

This course introduces students to physical, physiological, social, mental, and emotional aspects of human aging. Age-related changes in human function are discussed the context of applied healthcare settings, and the implications for appropriate physical activity and functional independence. Prerequisite(s): SP M 308. GPA of 2.75.

**SP M 460 - Principles of Strength and Conditioning (3)**

Application of research, theory, and methods of high-intensity, resistive overload training. Performance-specific topics include management, nutrition. Prerequisite(s): SPM 308. GPA of 2.75.

**SP M 460 L - Principles of Strength and Conditioning Laboratory (1)**

An applied examination of the theory, principles, rules and regulations associated with various strength and conditioning exercises to include but not limited to Olympic lifting, powerlifting, bodybuilding, plyometrics, speed, agility and speed-endurance development. Lab required for Kinesiology majors. Prerequisite(s): SPM 308. GPA of 2.75.

**SP M 499 - Advanced Athletic Training I (1-3)**

Problems in athletic training and independent work in their solutions. Consent of instructor required. Prerequisite(s): Junior or Senior status; Consent of ATEP director. Restricted to: Main campus only.

**SP M 505 - Psychology of Sport II (3)**

Application of psychology in coaching and teaching sport skills to optimize athletic performance. Skills in understanding and conducting research emphasized. Consent of instructor required. Prerequisite(s): PE P 304 or consent of instructor.

**SP M 509 - Biomechanics (3)**

Mechanical and anatomical considerations applied to the analysis and teaching of human motion. Consent of instructor required. Prerequisite(s): Either PE P 305 or SP M 371 or consent of instructor.

**SP M 512 - Inferential Statistics in Sports and Exercise Science (3)**

A graduate course designed to teach students how to use and interpret inferential statistics using the scientific method. An understanding of sport and exercise science theory is prerequisite for students wishing to enroll in this course. Consent of instructor required.

**SP M 515 - Graduate Athletic Training II (3)**

Advanced clinical experiences and education in athletic training. Assessment of Athletic Training Program clinical proficiencies as described by the National Athletic Trainers' Association Education Council. Consent of Instructor required.

**SP M 551 - Advanced Exercise Physiology (3)**

Detailed study of the integrated response of neuromuscular, cardiovascular and respiratory systems to acute and chronic exercise, nutrition and environmental conditions with a strong emphasis on laboratory experience. Prerequisite: SP M 308 or consent of instructor. Same as SP M 451 with additional requirements for graduate credit.

**SP M 556 - Exercise for Special Populations (3)**

Fundamentals of kinesiology adapted for adults with various diseases and disabilities. Focus will be on the application of exercise assessment and prescription for selected conditions. Taught with PE P 456 with additional work required at the graduate level. Consent of instructor required. Prerequisite(s): SPM 308 and SPM 330 or SPM 460.

**SP M 558 - Physical Dimensions of Aging (3)**

This course introduces graduate students to physical, physiological, social, mental, and emotional aspects of human aging. Age-related changes in human function are discussed the context of applied healthcare settings, and the implications for appropriate physical activity and functional independence. Graduate students in this course are expected to participate in organizing and leading some of the class discussions and assisting in the identification of appropriate materials for the course.

**SP M 560 - Principles of Strength and Conditioning (3)**

Application of research, theory, and methods of high-intensity, resistance training. Performance-specific topics include management, nutrition, exercise prescription, periodization, lifting techniques, testing, and evaluation. Course will emphasize standards set forth by the National Strength and Conditioning Association preparing students interested in sitting for the NSCA certification examinations. Prerequisites: SP M 305, SP M 308 or consent of instructor. Same as SP M 460 with additional requirements for graduate credit.

**SP M 597 - Project (1-3)**

A scholarly project or practicum under the direction of a single faculty person in an area of coaching/teaching or sports management.

**SPAN - SPANISH****SPAN 450 - Mexican Cultures (3)**

Different aspects of Mexican Culture. Selected topic to be identified by subtitle in the Schedule of Classes. May be repeated for a total of 6 credits under a different subtitle. Prerequisite(s): SPAN 312 or SPAN 313.

**SPAN 451 - Hispanic Cultures (3)**

Issues in Hispanic cultures of the U.S., Spanish-America and Spain. Also focuses on U.S.-Mexico border culture. Selected topics to be identified by subtitle in the Schedule of Classes. May be repeated up to 6 credits. Prerequisite(s): SPAN 314 or SPAN 315.

**SPAN 453 - Independent Studies in Hispanic Linguistics (1-3)**

Individualized, self-paced projects for advanced students. Prerequisites: consent of instructor. May be repeated for a maximum of 6 credits.

**SPAN 457 - Strategies for Teaching Spanish for Heritage/Native Speakers (3)**

Overview of the main theories, research, pedagogical approaches, assessment and practice concerning the teaching of Spanish to heritage learners and native speakers. Taught with SPAN 597. Prerequisite(s): SPAN 314 or SPAN 315.

**SPAN 460 - Spanish Language Acquisition (3)**

Research and theories of acquisition of Spanish as a first or second language. Prerequisite: LING 200 or SPAN 340, or consent of instructor.

**SPAN 461 - Introduction to Spanish Phonetics (3)**

An introduction to Spanish phonetics including basic dialectal variation and comparison with English. Prerequisite: SPAN 340.

**SPAN 462 - Spanish Phonology (3)**

An in-depth examination of the sound system of Spanish including formal characterization, dialectal variation and laboratory data. Prerequisite: SPAN 461 or SPAN 492.

**SPAN 470 - Methods for Teaching Literature to SHL/SNS Children (3)**

Current methods for teaching literature to children levels K-12. Focuses on techniques for teaching literature, assessment and activity design for each level. Prerequisite(s): SPAN 314 or SPAN 315 and SPAN 380.

**SPAN 490 - Special Topics (3)**

Selected topic to be identified by subtitle in the Schedule of Classes. May be repeated up to 6 credits. Prerequisite(s): SPAN 312 or SPAN 313.

**SPAN 491 - History of the Spanish Language (3)**

The development of Spanish from its origins. Prerequisite(s): SPAN 340.

**SPAN 492 - Structure of Spanish (3)**

Topics in Spanish linguistics including phonology, morphology, syntax and semantics. Prerequisite(s): SPAN 314 or SPAN 315 or SPAN 340.

**SPAN 493 - Studies in U.S. Spanish (3)**

Linguistic issues and studies of U.S. Spanish-speaking communities. Taught with SPAN 593. Prerequisite(s): SPAN 340.

**SPAN 500 - Methods of Research and Literary Criticism (3)**

Advanced methods of research and literary criticism.

**SPAN 507 - Technology Enhanced Language Learning (3)**

Strategies for enhancing language learning with emerging technologies. Course is taught in Spanish.

**SPAN 508 - Teaching Literature with Technology (3)**

Strategies and techniques for enhancing the teaching of all literature genres using emerging technologies. Course is taught in Spanish. Co/Prerequisite(s): SPAN 507, and/or consent of instructor.

**SPAN 509 - Teaching Culture with Technology (3)**

Strategies and techniques for enhancing the teaching of culture using emerging technologies. Course is taught in Spanish. Co/Prerequisite(s): SPAN 507, and/or consent of instructor.

**SPAN 510 - Assessing the National Standards (3)**

Analysis of the National Standards for Foreign Language Learning (the 5 Cs) in the 21st Century. Course will also cover the Integrated Performance Assessment as applied to the national standards. Other assessments will be reviewed to evaluate effectiveness in all levels of Spanish language classrooms.

**SPAN 512 - Contemporary Spanish-American Poetry (3)**

Readings and interpretation of Spanish-American poetry from the 20th century to the present.

**SPAN 520 - Hispanic Micro Fiction (3)**

Advanced study of micro fiction works by Hispanic Authors and creative writing workshop related to micro fiction.

**SPAN 521 - Advanced Cuban Literature (3)**

Advanced study of major works, or specific topics or periods of Cuban Literature. Selected topics to be identified by subtitle in the Schedule of Classes. May be repeated for a total of 6 credits under a different subtitle.

**SPAN 528 - Advanced Hispanic Literature of the U.S. (3)**

Advanced study of major works by Cuban-American, Dominican-American and U.S.-Puerto Rican authors. Restricted to: Main campus only.

**SPAN 540 - Introduccion a la Linguistica (3)**

Introduces students to the foundational topics of linguistic study with particular reference given to the Spanish language: properties of language and communication, morphology, syntax, phonetics, phonology, language variation and change. Prerequisite(s): Eligibility to take graduate level courses.

**SPAN 545 - Advanced Dialectos del Espanol (3)**

Advanced research of Spanish dialects including their formal characteristics, historical formation and regional variation.

**SPAN 546 - Advanced Poesia Modernista (3)**

Advanced study of major poetry works by Latin American modernista authors. Restricted to: Main campus only.

**SPAN 547 - Advanced Hispanic Film (3)**

Advanced study of major films from Spain and Spanish-America. Restricted to: Main campus only.

**SPAN 548 - Advanced U.S.-Hispanic Film (3)**

Advanced study of major films about and/or by Hispanics of the U.S. Restricted to: Main campus only.

**SPAN 551 - Advanced Hispanic Cultures (3)**

Advanced study on Hispanic cultures of the U.S., Spanish-America and/or Spain. Selected topic to be identified by subtitle. Taught with SPAN 451. May be repeated up to 6 credits

**SPAN 552 - Advanced Literature of the Mexican Revolution (3)**

- Study of Mexican authors dealing with the Mexican Revolution. Restricted to: Main campus only.
- SPAN 555 - Advanced Spanish-American Literature Through the 18th Century (3)  
Advanced study of Spanish-American Literature through the 18th century. Restricted to: Main campus only.
- SPAN 556 - Advanced 19-Century Spanish-American Literature (3)  
Study of major works by Spanish-American authors of the 19th century.
- SPAN 558 - Bilinguismo (3)  
Examines the topics of bilingualism from a psycholinguistic perspective including the development of the bilingual brain, lexical acquisition, retrieval and storage, and experimental techniques in measuring language competence. Prerequisite(s): SPAN 540 or consent of instructor.
- SPAN 560 - Advanced Spanish Language Acquisition (3)  
Advanced research and theories of acquisition of Spanish as a first or second language. Prerequisite(s): SPAN 540.
- SPAN 561 - Advanced Spanish Phonetics (3)  
Advanced study of Spanish phonetics, including basic dialectal variation and comparisons with English.
- SPAN 562 - Advanced Spanish Phonology (3)  
An advanced formal examination of the sound system of Spanish including formal characterizations, dialectal variation and laboratory data.
- SPAN 563 - Advanced Study in Mexican Literature (3)  
Mexican literature from the Pre-Columbian period to the present.
- SPAN 564 - Advanced Caribbean Literature in Spanish (3)  
Major works of Cuban, Dominican and Puerto Rican literature.
- SPAN 566 - Contemporary Spanish-American Novel (3)  
The Spanish-American novel from the 20th century to the present.
- SPAN 567 - Advanced Study in Chicano Literature (3)  
Study of all genres of Chicano literature.
- SPAN 570 - Advanced Study in Technical Translation (3)  
Translation of a variety of non-literary texts from English to Spanish and from Spanish to English. Course is taught in Spanish.
- SPAN 573 - Advanced Study in Creative Writing (3)  
Advanced creative writing in Spanish.
- SPAN 580 - Research Methodology in Spanish Linguistics (3)  
Study and practical application of techniques in linguistic research.
- SPAN 581 - Advanced Prosa Modernista (3)  
Advanced study of major prose works by Latin American modernista authors. Restricted to: Main campus only.
- SPAN 583 - Advanced Study in Spanish-American Women Writers (3)  
All genres of Spanish-American literature written by women. Research paper required.
- SPAN 584 - Spanish Morphosyntax (3)  
Examination of the morphological and syntactic structure of the Spanish language as well as their interaction. Practical applications are also explored.
- SPAN 585 - Language Assessment (3)  
Introduces students to theoretical principles of and analytical techniques for language assessment. Students will learn to critically analyze existing language assessment measures and will develop, pilot test and analyze measures of their own. Prerequisite(s): SPAN 540 or SPAN 560 or SPAN 580 or consent of instructor.
- SPAN 586 - Contemporary Spanish-American Essay (3)  
Main currents in the Spanish-American thought from the 20th century to the present.
- SPAN 587 - Contemporary Spanish-American Short Story (3)  
The Spanish-American short story from the 20th century to the present.
- SPAN 588 - Contemporary Spanish-American Drama (3)  
The Spanish-American drama from the 20th century to the present.
- SPAN 589 - Spanish Sociolinguistics (3)  
Relationship between language and society in the Spanish-speaking world.
- SPAN 590 - Advanced Special Topics (3)  
Specific subject to be announced in the Schedule of Classes. May be repeated up to 6 credits.
- SPAN 591 - Advanced Study in History of the Spanish Language (3)  
The development of Spanish from its origins.
- SPAN 592 - Advanced Structure of Spanish (3)  
Advanced study of Spanish linguistics topics such as phonology, morphology, syntax and semantics.
- SPAN 593 - Advanced Studies in U.S. Spanish (3)  
Linguistic issues and advanced studies of U.S. Spanish-speaking communities. Taught with SPAN 493.
- SPAN 594 - Theory and Methodology of Spanish Pedagogy (3)  
Advanced studies in current theories and methodologies of Spanish language pedagogy. Taught as a practicum.
- SPAN 595 - Advanced Topics in Applied Spanish Linguistics (3)  
Selected topics to be identified by subtitle in the Schedule of Classes. May be repeated for a total of 9 credits under a different subtitle.
- SPAN 597 - Advanced Strategies for Teaching Spanish for Heritage/Native Speakers (3)  
Advanced overview of the main theories, research, pedagogical approaches, assessment and practice concerning the teaching of Spanish to heritage learners and native speakers.
- SPAN 598 - Independent Reading, Research, and/or Creative Writing (1-3)  
Individual study of selected readings and problems; or individual research, either analytical or experimental, or creative writing. May be repeated for unlimited credits.
- SPAN 599 - Master's Thesis (0-15)  
Thesis.

## SPCD - ENGLISH AS A SECOND LANGUAGE

- SPCD 470 - Scholarly Writing for International Graduate Students (3)  
Instruction and practice in writing major academic genres, including experimental, descriptive, and problem-solution research reports, proposals, and library referenced papers. Prerequisites: placement based on English language screening test or successful completion of SPCD 110; a minimum TOEFL score of 500 or consent of instructor; and successful completion of SPCD 108/490 where indicated by placement. Main campus only. Graded S/U.
- SPCD 490 - Seminar Skills for Foreign Students (3)  
Advanced skills required for active participation in academic discussions and oral presentations. Includes extensive video-taping which is replayed for evaluation. Prerequisite: placement based on English language screening test, and a minimum TOEFL score of 500 or consent of instructor. Main campus only.

## SPED - SPECIAL EDUCATION

- SPED 450 - Working with Young Children with Special Needs, Ages 3-8 (3)  
Addresses competencies for working with young children with exceptionalities, ages three-eight, and their families. Public school, private school, Head Start and other models are included. Taught with SPED 550. Prerequisite(s): SPED 350 or equivalent.
- SPED 451 - Assessment of Young Children, Birth-Eight (3)  
Covers instruments and procedures for assessing young children and their families in order to determine atypical development. Screening, diagnosis, program planning, placement and evaluation issues are covered. Prerequisite: SPED 450. Same as SPED 551.
- SPED 452 - Foundations of Visual Impairment (3)  
This course provides an overview of the history and theory of teaching students with visual impairments, including those with additional disabilities. The impact of educational, legislative, and societal trends on the psychosocial adjustment, quality of life, and post-school outcomes of individuals with visual impairments is explored. Taught with SPED 532 and SPED 632. Consent of Instructor required.
- SPED 453 - Functional Implications of Low Vision (3)  
This course examines the structure and function of the visual system in relation to associated diseases and syndromes with an emphasis on measuring functional vision and determining appropriate educational adaptations. Taught with SPED 533 and SPED 633.
- SPED 454 - Strategies for Teaching Students with Visual and Multiple Impairments (3)  
This course defines the roles and responsibilities of the teacher of students with visual impairments as part of the transdisciplinary team that serves students with visual impairments and additional disabilities. Emphasis is on

- assessment, curricula (both academic and functional), communication, behavior management, assistive technologies, inclusion, transition, and independent living. Taught with SPED 534 and SPED 634. Prerequisite(s): SPED 453.
- SPED 455 - Braille I: Literacy for Students with Visual Impairments (3)**  
This course facilitates an in-depth study of the Uncontracted and Contracted Literary Braille codes as well as methods of teaching pre-braille, braille reading, and braille writing skills to tactual learners. Taught with SPED 536 and SPED 636.
- SPED 457 - Braille II: Literacy Skills for Students with Visual Impairments (3)**  
This course facilitates an indepth study of the Nemeth Braille Code for Mathematics and Science Notation as well as instructional strategies for using the abacus and developing numeracy. Specialized braille codes for computers, music, and foreign languages will be introduced. Taught with SPED 538 and SPED 638. Prerequisite(s): SPED 455 or SPED 536 or SPED 636 or Consent of Instructor.
- SPED 458 - Intellectual Disabilities in a Diverse Society: An Introduction (3)**  
Dealing with history, philosophy, goals and objectives, classification, and characteristics of intellectual disabilities. Taught with SPED 558 and SPED 658 with differentiated assignments. Consent of instructor required. Prerequisite(s): SPED 350 or SPED 500 or consent of instructor. Restricted to SPED majors.
- SPED 459 - Classroom Management for Diverse Learners (3)**  
Behavior-change strategies for exceptional learners.
- SPED 460 - Strategies for Teaching Students with Visual Impairments (3)**  
This course covers individualized educational programming in both the core and expanded core curriculums for children and youth with visual impairments with an emphasis on assessment, curricular adaptations, IFSP/IEP/ITP planning, and evidence-based practices. Taught with SPED 539 and SPED 639. Consent of Instructor required. Prerequisite(s): SPED 453, SPED 455, SPED 457 or Consent of Instructor. Restricted to: SPED majors.
- SPED 463 - Introduction to Assessment of Diverse Exceptional Learners (3)**  
Theory and use of norm and criterion-referenced instruments and learning theories in the classroom; planning of prescriptive instructional programs.
- SPED 464 - Working with Young Children with Special Needs, Ages Birth-2 (3)**  
Provides competencies for working with infants and toddlers (birth-2) with exceptionalities and their families. Neo-natal, home-based, and community-based programs and issues are included. Same as ECED 465 and SPED 564.
- SPED 466 - The Learning Disabled Student in a Diverse Society (3)**  
Current definitions, conceptualizations, and techniques. Taught with SPED 566 and SPED 666 with differentiated assignments. Prerequisite(s): SPED 350 or 500 or consent of instructor. Restricted to SPED majors.
- SPED 467 - Behavior Disorders in a Diverse Society (3)**  
An in-depth study of the classification, characteristics, educational needs, and professional literature regarding individuals with behavior disorders. Taught with SPED 567 and SPED 667 with differentiated assignments. Prerequisite(s): SPED 350 or SPED 500 or consent of instructor. Restricted to SPED majors.
- SPED 469 - Experiential Learning in Career/Technical Education for Exceptional in a Diverse Society (3)**  
Addresses the planning, delivering and evaluation of experiential learning activities for students with special needs. Specific strategies for working with students with special needs in a shop or laboratory setting within the Career and Technical Education environment will be included. Taught with AXED 569 and SPED 569. Prerequisite(s): SPED 350. Crosslisted with: AXED 469
- SPED 470 - Life Span Development and Transition in a Diverse Society (3)**  
Special problems associated with transitions over the life span, with emphasis on adolescent and adult needs. Attention to service approaches for public schools, sheltered workshops, residential hospitals, and group homes.
- SPED 480 - Secondary Curriculum, Methods, and Materials for Special Education in a Diverse Society (3)**  
Curriculum theory and development for elementary special education programs. Various teaching methods utilized with secondary exceptional learners and techniques for identifying, adapting, and developing materials will be addressed. Taught with SPED 580.
- SPED 481 - Practicum in Education, Equity and Cultural Diversity (2-6)**  
Supervised experience in special education settings. One semester (2 credits) required. Prerequisite(s): SPED 350 and SPED 360 or consent of instructor.
- SPED 482 - Student Teaching SPED (1-12)**  
Supervised teaching in a special education classroom and participation in a required seminar. Prerequisite: SPED 481 and admission to student teaching. May be repeated for a maximum of 6 credits. Restricted to special education majors. Same as SPED 582.
- SPED 483 - Early Childhood SPED Student Teaching (6)**  
A student teaching experience designed for students studying early childhood special education. Prerequisites: SPED 281 and admission to student teaching. Restricted to majors. Same as SPED 583.
- SPED 485 - Introduction to Autism (3)**  
This course will provide an overview of autism spectrum disorders as a triad of impairments, including historical and theoretical perspectives, assessment issues, characteristics of autism, intervention programs, and family issues. Taught with SPED 585 and SPED 685.
- SPED 486 - Behavior and Autism (3)**  
This course will cover the first of the triad of impairments. Students will gain an understanding of the behaviors of children with autism. Students will examine several behavior management philosophies and research based interventions and how they can be applied in the educational setting. Attention will also be given to play skills. The family perspective and participation in the proactive behavior management process will be incorporated throughout the course. Taught with SPED 586 and SPED 686 with differentiated assignments. Prerequisite(s)/Corequisite(s): SPED 485 or SPED 585 or SPED 685.
- SPED 487 - Social Skills and Autism (3)**  
This course will cover the second of the triad of impairments. As a blend of researched based models and evidenced based practical applications, students will gain an understanding of the social skill deficits often associated with autism spectrum disorders. Review a variety of social cognition theories and explore effective social skill interventions for children functioning at a variety of levels along the autism spectrum. Taught with SPED 587 and SPED 687 with differentiated assignments. Prerequisite(s)/Corequisite(s): SPED 485 or SPED 585 or SPED 685.
- SPED 488 - Communication and Autism (3)**  
This course will cover the third of the triad of impairments. Students will gain an overview of communication characteristics and difficulties often associated with autism spectrum disorders. Review current tools and strategies used to assess speech, language, and interaction skills. Use assessment results to identify needs and implement appropriate interventions. Explore a variety of intervention strategies aimed at building receptive, expressive, and pragmatic language of children functioning at a variety of levels along the autism spectrum. Taught with SPED 588 and SPED 688 with differentiated assignments. Prerequisite(s): SPED485 or SPED585 or SPED685.
- SPED 489 - Topics (3)**  
Offered under various subtitles which indicate the subject matter to be covered. May be repeated 3 times for a maximum of 9 credits.
- SPED 495 - Directed Study courses in Special Education (1-3)**  
Each course shall be identified by a qualifying subtitle. A maximum of 3 credits per semester and a grand total of 9 credits.
- SPED 495 H - Directed Study Courses in Special Education. (1-3)**  
Designed for students in the honors program. Each course will be identified by a qualifying subtitle. A maximum of 3 credits in any one semester and a grand total of 6 credits.
- SPED 500 - Introduction to Special Education in a Diverse Society (3)**  
This course introduces the field of special education to regular educators.
- SPED 501 - Topics in Special Education (1-3)**  
Offered under various subtitles which indicate the subject matter to be covered. Maximum of 6 credits, 3 credits per semester.
- SPED 502 - Problems (1-3)**  
Offered under various subtitles which indicate the subject matter to be covered. Maximum of 6 credits, 3 credits per semester.
- SPED 503 - Contemporary Development (1-3)**  
Offered under various subtitles which indicate the subject matter to be covered. Maximum of 6 credits, 3 credits per semester.
- SPED 504 - Introduction to Assessment of Diverse Exceptional Learners (3)**  
Required for students seeking licensure at graduate level. Theory and use of norm-and criterion-referenced instruments and learning theories in the classroom; planning of prescriptive instructional programs with differentiated assignments for graduate students.
- SPED 505 - Appraisal of Psychoeducational Achievement in a Diverse Society (3)**



- Advanced theory and use of norm and criterion referenced instruments in the classroom: planning of prescriptive and educational programs. Prerequisite: SPED 463 or 504. Restricted to majors.
- SPED 506 - High Incidence Disabilities in a Diverse Society (3)**  
Examines those areas of disability that most frequently occur in the special education population, including mental retardation, learning disabilities, communication disorders, and behavioral and emotional disorders.
- SPED 507 - Low Incidence Disabilities in a Diverse Society (3)**  
Examines those disabilities that occur less frequently in the special education population, including hearing loss, visual disorders, autism, and other severe manifestations. Taught with SPED 607 with differentiated assignments.
- SPED 508 - Nature and Needs of Gifted Learners (0-3)**  
An introductory course in the education of gifted students. The course provides an overview of the current and historical issues in the field. The intellectual, social, emotional, development, and educational characteristics of gifted students are introduced. Appropriate educational opportunities and programming are discussed. Issues in identification of the gifted, special gifted populations, and current research are reviewed. Taught with SPED 608
- SPED 509 - Reading for Elementary Exceptional Learners in a Diverse Society, K-6 (3)**  
Emphasizes reading diagnosis and materials for students with special developmental and learning problems. Taught with SPED 409.
- SPED 510 - Current Issues in Special Education for Teaching in Culturally Responsive Society (3)**  
Theoretical and empirical bases for special education practices. Skill development in critical thinking, reading, and writing in relation to contemporary problems. Taught with SPED 610.
- SPED 511 - Reading for Secondary Exceptional Learners in a Diverse Society, 7-12 (3)**  
Extends information covered in SPED 509, which covers grades K 6. Strategies and materials are addressed. Taught with SPED 411.
- SPED 512 - Curriculum for Gifted Learners (0-3)**  
This course focuses upon the development of appropriate curriculum, courses, and units for gifted learners. Taught with SPED 612.
- SPED 513 - Current Research in Special Education (3)**  
Current investigations and research techniques.
- SPED 514 - Twice Exceptional and Special Populations of Gifted Learners (0-3)**  
This course is designed for all professional personnel who work with students who are gifted. It focuses on special populations of gifted learners who possess unique characteristics and needs. Emphases are placed on issues related to the characteristics, identification, and development of appropriate educational services for twice exceptional and special populations of gifted learners. Taught with SPED 614
- SPED 515 - Working with Families of Exceptional Learners in a Diverse Society (3)**  
Methods and techniques for educators and other professionals in parent-professional relationships. Emphasis is placed on young children. Taught with SPED 415.
- SPED 516 - Strategies for Teaching Gifted Learners (0-3)**  
This course comprehensively reviews teaching-learning models that can be used in the development and implementation of a curriculum for gifted students. The field of gifted education has seen new program models developed, more research accomplished, and new materials published, and this class examines these changes. Taught with SPED 616
- SPED 519 - School Interventions and Organization in a Diverse Society (3)**  
Introduces public school organization and laws and the psycho-sociological perspective of education. Curriculum and theory, teaching methods and materials will be presented and operationalized through a psycho-educational point of view. Restricted to majors. Taught with SPED 619.
- SPED 520 - Reading Disabilities Structure of Language (3)**  
The purpose of this course is to introduce the student to the structure of language, including phonology, morphology, syntax, semantics, and to orthography. In addition, students in this course will study each area of language and able to use this information in analyzing the process of reading and writing.
- SPED 523 - Advanced Curriculum for Diverse Exceptional Learners (3)**  
Strategies for developing curricula appropriate to handicapped and gifted learners. Prerequisite: SPED 360 or consent of instructor.
- SPED 524 - Foundations of Education for Deaf & Hard of Hearing Students (3)**  
An examination of historic and current developments in the education of the deaf and hard of hearing including: sound sensation/perception, cognition/intelligence, language/literacy, memory, psychosocial development, counseling, culture, and assessment. Taught with SPED 424 SPED 622 with differentiated assignments.
- SPED 525 - Language Development for Deaf and Hard of Hearing Students (3)**  
Developmental approach to language learning for individuals with hearing impairments including linguistic and cognitive potential, assessment and intervention strategies, and reading language. Taught with SPED 425 and SPED 623 with differentiated assignments. Prerequisite(s): C D 509.
- SPED 526 - Teaching Content Subjects to Preschool-Twelfth Grade for Deaf and Hard of Hearing Students (3)**  
Curriculum and instructional procedures common to education of hearing impaired including reading, adaptations to regular curriculum, methods for planning, implementing, and translating diagnostic information into programming. Taught with SPED 426 SPED 626 with differentiated assignments. Prerequisite(s): SPED 524.
- SPED 527 - Internship in Education of the Deaf and Hard of Hearing (1-6)**  
Supervised internship in a deaf education classroom. Prerequisite: student teaching. May be repeated for a maximum of 6 credits. Restricted to deaf education majors.
- SPED 528 - Deafness: Psychological Theories, Assessments, and Accommodations (3)**  
Developmental psychological and cognitive theories related to deafness. Assessment issues and accommodations for assessment of deaf and hard-of-hearing children. Restricted to majors. Taught with SPED 428 and SPED 628 with differentiated assignments. Prerequisite(s): SPED 524 or consent of instructor.
- SPED 529 - Literacy and Deafness (3)**  
Covers literacy development framework. Methods for teaching reading and writing and for assessment of reading and writing skills in deaf and hard-of-hearing children. Taught with SPED 429 and SPED 629 with differentiated assignments. Restricted to majors. Prerequisite(s): SPED 524 or consent of instructor.
- SPED 532 - Foundations of Visual Impairment (3)**  
This course provides an overview of the history and theory of teaching students with visual impairments, including those with additional disabilities. The impact of educational, legislative, and societal trends on the psychosocial adjustment, quality of life, and post-school outcomes of individuals with visual impairments is explored. Taught with SPED 452 and SPED 632 with differentiated assignment.
- SPED 533 - Functional Implications of Low Vision (3)**  
This course examines the structure and function of the visual system in relation to associated diseases and syndromes with an emphasis on measuring functional vision and determining appropriate educational adaptations. Taught with SPED 453 and SPED 633.
- SPED 534 - Strategies for Teaching Students with Visual and Multisensory Impairments (3)**  
This course defines the roles and responsibilities of the teacher of students with visual impairments as part of the transdisciplinary team that serves students with visual impairments and additional disabilities. Emphasis is on assessment, curricula (both academic and functional), communication, behavior management, assistive technologies, inclusion, transition, and independent living. Taught with SPED 454 and SPED 634. Prerequisite(s): SPED 533.
- SPED 536 - Braille I: Literacy for Students with Visual Impairments (3)**  
This course facilitates an in depth study of the Uncontracted and Contracted Literary Braille codes as well as methods of teaching pre-braille, braille reading, and braille writing skills to tactual learners. Taught with SPED 455 and SPED 636.
- SPED 537 - Independent Readings in Special Education (1-3)**  
Each course shall be identified by a qualifying subtitle. Maximum of 6 credits, 3 credits per semester.
- SPED 538 - Braille II: Numeracy for Students with Visual Impairments (3)**  
This course facilitates an indepth study of the Nemeth Braille Code for Mathematics and Science Notation as well as instructional strategies for using the abacus and developing numeracy. Specialized braille codes for computers, music, and foreign languages will be introduced. Taught with SPED 457 and SPED 638 with differentiated assignments. Prerequisite(s): SPED 455 or SPED 536 or SPED 636 consent of instructor.
- SPED 539 - Strategies for Teaching Students with Visual Impairments (3)**

- This course covers individualized educational programming in both the core and expanded core curriculums for children and youth with visual impairments with an emphasis on assessment, curricular adaptations, IFSP/IEP/ITP planning, and evidence-based practices. Taught with 460 and SPED 639. Prerequisite(s): SPED 533, SPED 536, SPED 538. Restricted to: SPED majors.
- SPED 545 - Technology and Exceptionality in a Diverse Society (3)**  
This class will address the unique educational needs of learners with exceptionalities, and will provide information and practice in addressing those needs through the use of technology-based interventions. Taught with SPED 645.
- SPED 548 - Field Experience in Education, Equity & Cultural Diversity (1-3)**  
Supervised experience for the advanced student. Designed for both the practicing classroom teacher and nonteaching graduate student. May be repeated for a maximum of 6 credits. Prerequisite(s): SPED 350 and SPED 360, or SPED 500 and SPED 523, or consent of instructor.
- SPED 550 - Working with Young Children with Special Needs, Ages 3-8 (3)**  
Addresses competencies for working with young children with exceptionalities, ages three eight, and their families. Public school, private school, Head Start and other models are included. Prerequisite: SPED 500 or equivalent, or consent of instructor. Same as SPED 450 with differentiated assignments for graduate students. Same as ECED 550.
- SPED 551 - Assessment of Young Children, Birth Eight (3)**  
Covers instruments and procedures for assessing young children and their families in order to determine atypical development. Screening, diagnosis, program planning, placement and evaluation issues are covered. Prerequisite: SPED 550 or consent of instructor. Same as SPED 451.
- SPED 552 - Introduction to Orientation and Mobility (3)**  
This course provides an overview of the history and theory of formalized orientation and mobility instruction as it relates to the ability to live independently. The impact of visual impairment and concomitant impairments on the development of spatial concepts and motor skills in relation to independent locomotion is emphasized. Topics covered include mobility aids; navigation, familiarization, and protective techniques; structured pre-cane assessment and instruction; the development and use of tactual maps; and the relationship of orientation and mobility to other areas of the expanded core curriculum. Consent of Instructor required. Prerequisite(s): Consent of instructor. Restricted to: SPED, EDUC majors.
- SPED 553 - Beginning Orientation and Mobility (3)**  
This course provides an overview of the history of the profession of orientation and mobility with an emphasis on modes of mobility, particularly cane travel, and orientation strategies needed for safe and efficient travel in basic indoor and outdoor settings. Consent of Instructor required. Prerequisite(s): SPED 552. Restricted to: SPED majors.
- SPED 554 - Intermediate Orientation and Mobility (3)**  
This course focuses on the development of cane skills needed for safe and efficient travel in residential and small business districts. Strategies and methods necessary to conduct assessments and appropriately sequence skill acquisition based on individual needs is also covered. Consent of Instructor required. Prerequisite(s): SPED 553. Restricted to: SPED; EDUC majors.
- SPED 555 - Advanced Orientation and Mobility (3)**  
This course focuses on the development of cane skills needed for safe and efficient travel in large business districts, including the use of public transportation systems. Development, administration, and supervision of orientation and mobility programs is also covered. Consent of Instructor required. Prerequisite(s): SPED 554. Restricted to: SPED majors.
- SPED 558 - Intellectual Disabilities in a Diverse Society: An Introduction (3)**  
Dealing with history, philosophy, goals and objectives, classification, and characteristics of intellectual disabilities. Same as SPED 458 and SPED 558 with differentiated assignments for graduate students. Consent of instructor required. Prerequisite(s): SPED 350 or SPED 500. Restricted to SPED majors.
- SPED 559 - Classroom Management for Diverse Learners (3)**  
Behavior-change strategies for exceptional learners. Taught with SPED 459 with differentiated assignments for graduate students.
- SPED 561 - The Bilingual Exceptional Student (3)**  
Introduction to the field of bilingual/multicultural special education. Same as BIL 561, BIL 661, SPED 661.
- SPED 562 - Elementary Curriculum Methods and Materials for Special Education in a Diverse Society (3)**  
ESL and bilingual methods applied to bilingual exceptional students. Appropriate curriculum needs and materials development are also included. Taught with SPED 360, SPED 662.
- SPED 563 - Assessment and Consultation for Exceptional Multicultural Populations (3)**  
Covers formal and informal methods of assessment as well as consultation models for multicultural populations. Same as BIL 563, BIL 663, SPED 663.
- SPED 565 - Sociocultural Perspectives in Bilingual/Multicultural SPED (3)**  
Covers a discussion of current issues impacting the education of exceptional minority students. Same as BIL 565, BIL 665, SPED 665.
- SPED 566 - The Learning Disabled Student in a Diverse Society (3)**  
Current definitions, conceptualizations, and techniques. Taught with SPED 466 with differentiated assignments for graduate students Prerequisite(s): SPED 350 or SPED 500. Restricted to SPED majors.
- SPED 567 - Behavior Disorders in a Diverse Society (3)**  
An in-depth study of the classification, characteristics, educational needs, and professional literature regarding individuals with behavior disorders. Taught with SPED 467 and SPED 667 with differentiated assignments. Prerequisite(s): SPED 350 or SPED 500 or consent of instructor. Restricted to SPED majors.
- SPED 569 - Experiential Learning in Career/Technical Education for Exceptional Learners in a Diverse Society (3)**  
Addresses the planning, delivering and evaluation of experiential activities for students with special needs. Specific strategies for working with students with special needs in a shop or laboratory setting within the Career and Technical Education environment will be included. Taught with SPED 469 and AXED 469. Prerequisite(s): SPED 350 or SPED 500. Crosslisted with: AXED 569
- SPED 570 - Life Span Development and Transition in a Diverse Society (3)**  
Covers special problems associated with transitions over the life span, with emphasis on adolescent and adult needs. Attention to service approaches for public schools, sheltered workshops, residential hospitals, and group homes. Taught with SPED 470.
- SPED 580 - Curriculum, Methods, and Materials for Secondary Special Education (3)**  
Curriculum theory and development for elementary special education programs. Various teaching methods utilized with secondary exceptional learners and techniques for identifying, adapting, and developing materials will be addressed. Taught with SPED 480.
- SPED 582 - Student Teaching SPED (1-12)**  
Required for students seeking licensure at graduate level. May be repeated for a maximum of 6 credits. Prerequisites: bachelor s degree, SPED 548, and admission to student teaching. Restricted to majors. Same as SPED 482 with differentiated assignments for graduate students.
- SPED 583 - Early Childhood SPED Student Teaching (6)**  
A student teaching experience designed for students studying early childhood special education. Prerequisites: SPED 281 and admission to student teaching. Restricted to majors. Same as SPED 483 with differentiated assignments for graduate students.
- SPED 585 - Introduction to Autism (3)**  
This course will provide an overview of autism spectrum disorders as a triad of impairments, including historical and theoretical perspectives, assessment issues, characteristics of autism, intervention programs, and family issues. Taught with SPED 485 and SPED 685. Differentiated Assignments.
- SPED 586 - Behavior and Autism (3)**  
This course will cover the first of the triad of impairments. Students will gain an understanding of the behaviors of children with autism. Students will examine several behavior management philosophies and research based interventions and how they can be applied in the educational setting. Attention will also be given to play skills. The family perspective and participation in the proactive behavior management process will be incorporated throughout the course. Taught with SPED 486 and SPED 686 with differentiated assignments. Prerequisite(s): SPED 485 or SPED 585 or SPED 685.
- SPED 587 - Social Skills and Autism (3)**  
This course will cover the second of the triad of impairments. As a blend of researched based models and evidenced based practical applications, students will gain an understanding of the social skill deficits often associated with autism spectrum disorders. Review a variety of social cognition theories and explore effective social skill interventions for children functioning at a variety of levels along the autism spectrum. Taught with SPED 487 and SPED 687 with differentiated assignments. Prerequisite(s): SPED 485 or SPED 585 or SPED 685.
- SPED 588 - Communication and Autism (3)**  
This course will cover the third of the triad of impairments. Students will gain an overview of communication characteristics and difficulties often associated with autism spectrum disorders. Review current tools and strategies used to assess speech, language, and interaction skills. Use assessment results to identify needs and implement appropriate interventions.

- Explore a variety of intervention strategies aimed at building receptive, expressive, and pragmatic language of children functioning at a variety of levels along the autism spectrum. Taught with SPED 488 and SPED 688 with differentiated assignments. Prerequisite(s): SPED485 or SPED585 or SPED685.
- SPED 590 - Masters Degree Seminar (3)**  
Capstone review of current issues in special education. Each student will participate in a practice comprehensive oral exam.
- SPED 598 - Special Research Problems (1-3)**  
Individual investigation either analytical or experimental. May be repeated for a maximum of 6 credits, 3 credits per semester.
- SPED 599 - Master's Thesis (0-15)**  
Thesis.
- SPED 600 - Doctoral Research (1-15)**  
Research.
- SPED 603 - Special Education in a Diverse Society (3)**  
This course introduces the field of special education to Ph.D. students. Taught with SPED 500. Consent of instructor required. Prerequisite(s): MA Degree. Restricted to SPED CD majors.
- SPED 605 - Independent Study Topics in Special Education (1-6)**  
A problem and seminar course for those pursuing an advanced graduate degree. Each course to bear an appropriate subtitle.
- SPED 606 - High Incidence Disabilities in a Diverse Society (3)**  
Examines those areas of disability that most frequently occur in the special education population, including mental retardation, learning disabilities, communication disorders, and behavioral and emotional disorders. Taught with SPED 506. Prerequisite: Master's Degree. Restricted to SPED and CD majors.
- SPED 607 - Low Incidence Disabilities (3)**  
Examines those disabilities that occur less frequently in the special education population, including hearing loss, visual disorders, autism, and other severe manifestations. Taught with SPED 507 with differentiated assignments.
- SPED 608 - Nature and Needs of Gifted Learners (0-3)**  
An introductory course in the education of gifted students. The course provides an overview of the current and historical issues in the field. The intellectual, social, emotional, development, and educational characteristics of gifted students are introduced. Appropriate educational opportunities and programming are discussed. Issues in identification of the gifted, special gifted populations, and current research are reviewed. Taught with SPED 508
- SPED 610 - Current Issues in Special Education for Teaching in a Culturally Responsive Society (3)**  
Required for students seeking the Ed.D./Ph.D. Taught with SPED 510.
- SPED 612 - Curriculum for Gifted Learners (0-3)**  
This course focuses upon the development of appropriate curriculum, courses, and units for gifted learners. Taught with SPED 512
- SPED 613 - Current Research in Special Education (3)**  
Required for students seeking the Ed.D./Ph.D. Prerequisite: M.A. degree. Restricted to majors. Same as SPED 513.
- SPED 614 - Twice Exceptional and Special Populations of Gifted Learners (0-3)**  
This course is designed for all professional personnel who work with students who are gifted. It focuses on special populations of gifted learners who possess unique characteristics and needs. Emphases are placed on issues related to the characteristics, identification, and development of appropriate educational services for twice exceptional and special populations of gifted learners. Taught with SPED 514
- SPED 616 - Strategies for Teaching Gifted Learners (0-3)**  
This course comprehensively reviews teaching-learning models that can be used in the development and implementation of a curriculum for gifted students. The field of gifted education has seen new program models developed, more research accomplished, and new materials published, and this class examines these changes. Taught with SPED 516.
- SPED 619 - School Intervention and Organization in a Diverse Society (3)**  
Introduces public school organization and laws and the psycho-sociological perspective of education. Curriculum and theory, teaching methods and materials will be presented and operationalized through a psycho-educational point of view. Restricted to majors. Taught with SPED 519.
- SPED 622 - Foundations of Education for Deaf & Hard of Hearing (3)**  
An examination of historic and current developments in the education of the deaf and hard of hearing including: sound sensation/perception, cognition/intelligence, language/literacy, memory, psychosocial development counseling, culture, and assessment. Taught with SPED 524 and SPED 622 with differentiated assignments.
- SPED 623 - Language Development for Deaf & Hard of Hearing Students (3)**  
Developmental approach to language learning for individuals with hearing impairments including linguistic and cognitive potential, assessment and intervention strategies, and reading language. Taught with SPED 425 and SPED 525 with differentiated assignments.
- SPED 626 - Teaching Content Subjects to Preschool-Twelfth Grade for Deaf and Hard of Hearing Students (3)**  
Curriculum and instructional procedures common to education of hearing impaired including reading, adaptations to regular curriculum, methods for planning, implementing, and translating diagnostic information into programming. Taught with SPED 426 and SPED 526 with differentiated assignments.
- SPED 628 - Deafness: Psychological Theories, Assessments and Accommodations (3)**  
Developmental psychological and cognitive theories related to deafness. Assessment issues and accommodations for assessment of deaf and hard-of-hearing children. Restricted to majors. Taught with SPED 428 and SPED 528 with differentiated assignments.
- SPED 629 - Literacy and Deafness (3)**  
Cover literacy development framework. Methods for teaching reading and writing skills in deaf and hard-of-hearing children. Taught with SPED 429 and SPED 529 with differentiated assignments.
- SPED 632 - Foundations of Visual Impairment (3)**  
This course provides an overview of the history and theory of teaching students with visual impairments, including those with additional disabilities. The impact of educational, legislative, and societal trends on the psychosocial adjustment, quality of life, and post-school outcomes of individuals with visual impairments is explored. Taught with SPED 452 and SPED 532.
- SPED 633 - Functional Implications of Low Vision (3)**  
This course examines the structure and function of the visual system in relation to associated diseases and syndromes with an emphasis on measuring functional vision and determining appropriate educational adaptations. Taught with SPED 453 and SPED 533.
- SPED 634 - Strategies for Teaching Students with Visual and Multiple Impairments (3)**  
This course defines the roles and responsibilities of the teacher of students with visual impairments as part of the transdisciplinary team that serves students with visual impairments and additional disabilities. Emphasis is on assessment, curricula (both academic and functional), communication, behavior management, assistive technologies, inclusion, transition, and independent living. Taught with SPED 454 and SPED 534. Prerequisite(s): SPED 633.
- SPED 636 - Braille I: Literacy for Students with Visual Impairments (3)**  
This course facilitates an in-depth study of the Uncontracted and Contracted Literary Braille codes as well as methods of teaching pre-braille, braille reading, and braille writing skills to tactual learners. Taught with SPED 455 and SPED 536.
- SPED 638 - Braille II: Numeracy for Students with Visual Impairments (3)**  
This course facilitates an indepth study of the Nemeth Braille Code for Mathematics and Science Notation as well as instructional strategies for using the abacus and developing numeracy. Specialized braille codes for computers, music, and foreign languages will be introduced. Taught with SPED 457 and SPED 538. Prerequisite(s): SPED 455 or SPED 536 or SPED 636.
- SPED 639 - Strategies for Teaching Students with Visual Impairments (3)**  
This course covers assessment, curricular adaptation's, knowledge of transition age, young children with multiple disabilities, and assistive technology. Taught with SPED 460 and SPED 539. Consent of Instructor required. Prerequisite(s): SPED 633, SPED 636, SPED 638 or Consent of Instructor. Restricted to: SPED majors.
- SPED 640 - Internship in Special Education (1-6)**  
Each course bears a qualifying subtitle. Maximum of 6 credits per semester.
- SPED 645 - Technology and Exceptionality in a Diverse Society (3)**  
This class will address the unique educational needs of learners with exceptionalities, and will provide information and practice in addressing those needs through the use of technology-based interventions. Taught with SPED 545.
- SPED 658 - Intellectual Disabilities in a Diverse Society: An Introduction (3)**  
Dealing with history, philosophy, goals and objectives, classification, and characteristics of intellectual disabilities. Taught with SPED 458 and SPED 558

with differentiated assignments. Consent of instructor required.  
Prerequisite(s): SPED 350 or SPED 500. Restricted to SPED majors.

**SPED 661 - The Bilingual Exceptional Student (3)**

Same as BIL 561, BIL 661, SPED 561.

**SPED 662 - Elementary Curriculum Methods and Materials for Special Education in a Diverse Society (3)**

ESL and bilingual methods applied to bilingual exceptional students. Appropriate curriculum needs and materials development are also included. Taught with SPED 360, SPED 562.

**SPED 663 - Assessment and Consultation for Exceptional Multicultural Population (3)**

Covers formal and informal methods of assessment as well as consultation models for multicultural populations.

**SPED 665 - Sociocultural Perspectives in Bilingual/Multicultural SPED (3)**

Same as BIL 565, BIL 665, SPED 565.

**SPED 666 - The Learning Disabled Student in a Diverse Society (3)**

Current definitions, conceptualizations, and techniques. Taught with SPED 466 and SPED 566 with differentiated assignments. Prerequisite(s): SPED 350 or SPED 500. Restricted to SPED majors.

**SPED 667 - Behavior Disorders in a Diverse Society (3)**

An in-depth study of the classification, characteristics, educational needs, and professional literature regarding individuals with behavior disorders. Taught with SPED 467 and SPED 567 with differentiated assignments. Prerequisite(s): SPED 350 or SPED 500 or consent of Instructor. Restricted to SPED majors.

**SPED 685 - Introduction to Autism (3)**

This course will provide an overview of autism spectrum disorders as a triad of impairments, including historical and theoretical perspectives, assessment issues, characteristics of autism, intervention programs, and family issues. Differentiated Assignments. Taught with SPED 585 and SPED 485.

**SPED 686 - Behavior and Autism (3)**

This course will cover the first of the triad of impairments. Students will gain an understanding of the behaviors of children with autism. Students will examine several behavior management philosophies and research based interventions and how they can be applied in the educational setting. Attention will also be given to play skills. The family perspective and participation in the proactive behavior management process will be incorporated throughout the course. Taught with SPED 486 and SPED 586 with differentiated assignments. Prerequisite(s): SPED485 or SPED585 or SPED685.

**SPED 687 - Social Skills and Autism (3)**

This course will cover the second of the triad of impairments. As a blend of researched based models and evidenced based practical applications, students will gain an understanding of the social skill deficits often associated with autism spectrum disorders. Review a variety of social cognition theories and explore effective social skill interventions for children functioning at a variety of levels along the autism spectrum. Taught with SPED 487 and SPED 587 with differentiated assignments. Prerequisite(s)/Corequisite(s): SPED 485 or SPED 585 or SPED 685.

**SPED 688 - Communication and Autism (3)**

This course will cover the third of the triad of impairments. Students will gain an overview of communication characteristics and difficulties often associated with autism spectrum disorders. Review current tools and strategies used to assess speech, language, and interaction skills. Use assessment results to identify needs and implement appropriate interventions. Explore a variety of intervention strategies aimed at building receptive, expressive, and pragmatic language of children functioning at a variety of levels along the autism spectrum. Taught with SPED 488 and SPED 588 and differentiated assignments. Prerequisite(s): SPED 485 or SPED 585 or SPED 685.

**SPED 690 - Doctoral Seminar (1-4)**

The seminar will engage doctoral students in scholarly dialogue and production. It will assist in preparing them for future careers in leadership roles. Same as CD 690.

**SPED 698 - Selected Topics in Special Education (1-6)**

Offered under various subtitles which indicate the subject matter to be covered. Maximum of 6 credits, 3 credits per semester.

**SPED 699 - Ed.S. Thesis (1-15)**

Offered primarily for those pursuing the research requirements for the Ed.S. degree. Course may be repeated up to a maximum allowed for this degree. Each research project will be designated by a qualifying subtitle.

**SPED 700 - Dissertation (0-9)**

Credit may be earned by students who have successfully completed their doctoral comprehensive exams and presented their dissertation proposals to their committees. At least 18 credits are required during the course of dissertation study. May be repeated for a maximum of 24 credits. Restricted to majors.

## STAT - STATISTICS

**STAT 470 - Probability: Theory and Applications (3)**

Basic probability distributions including binomial, normal; random variables, expectation; laws of large numbers; central limit theorem. Prerequisites: MATH 291G and at least one-300 level Math course.

**STAT 480 - Statistics: Theory and Applications (3)**

Point and interval estimation; sufficiency; hypothesis testing; regression; analysis of variance; chi-square tests. Prerequisite: STAT 470.

**STAT 515 - Probability: Theory and Applications (3)**

Same as STAT 470 with additional work for graduate students.

**STAT 525 - Statistics: Theory and Applications (3)**

Same as STAT 480 with additional work for graduate students.

**STAT 535 - Elementary Stochastic Processes (3)**

Markov chains, Poisson processes, Brownian motion, branching processes, and queuing processes, with applications to the physical, biological, and social sciences. Prerequisite: STAT 515 or consent of instructor.

**STAT 540 - Directed Reading (1-6)**

Prerequisite: consent of instructor and graduate committee. May be repeated for a maximum of 6 credits. Graded S/U.

**STAT 562 - Foundations of Probability (3)**

Probability spaces, expectation and conditional expectation, limit theorems and laws of large numbers. Prerequisite: MATH 593.

**STAT 571 - Continuous Multivariate Analysis (3)**

Theory and applications of the multivariate normal distribution. Prerequisites: MATH 480 and STAT 525, or consent of instructor.

**STAT 572 - Linear Models (3)**

Theory of regression, analysis of variance, analysis of covariance in various linear models. Prerequisite: STAT 571.

**STAT 581 - Advanced Theory of Statistics I (3)**

Testing hypotheses, probability and sufficiency, uniformly most powerful tests, unbiasedness, invariance, and minimax principle. Prerequisite: STAT 525 or consent of instructor.

**STAT 582 - Advanced Theory of Statistics II (3)**

Estimation of parameters; unbiased estimators; equivariance; Bayes properties; large sample theory and optimality. Prerequisite: STAT 581 or consent of instructor.

**STAT 598 - Special Research Problems (1-3)**

Individual investigations or consulting programs. Maximum of 3 credits.

## SUR - SURVEYING

**SUR 450 - Senior Project (1)**

Research project prepared by student. Includes class presentation. Students will learn how to research after the end of their formal education. Prerequisite(s): Senior Standing.

**SUR 451 - Advanced Survey Measurements, Analysis, and Adjustments (3)**

Rigorous analysis of theory of observations as applied to surveying. Conventional topics of error ellipses, least squares, and survey pre-analysis, etc., to be addressed. Emphasis on computer applications for adjustments and analysis. Prerequisite(s): SUR 330, SUR 351, (MATH 280 or MATH 480). Pre/Corequisite(s): STAT 371.

**SUR 452 - Land Development Design (3)**

Covers different phases of land development process. Study of New Mexico subdivision and condominium laws. Site evaluation includes boundary, control topographic surveys, and environmental and cultural considerations. Students design lot and building arrangements and streets. Prerequisite(s): SUR 312, SUR 328. Pre/Corequisite(s): DRFT 153.

**SUR 461 - Introduction to Satellite Geodesy (3)**

Overview of astronomy concepts, summary of celestial mechanics, history of satellite positioning, modern positioning techniques, impact of gravity, review of geodetic standards and specifications, logistics of GPS data collection. GPS data processing, network adjustments, and evaluation of spatial data accuracy. Prerequisite(s): SUR 361 and (MATH 280 or MATH 480).

**SUR 464 - Land Information Systems Applications (3)**

Concepts of real property, land tenure and ethics, and land registration systems; the function and design of multipurpose cadastre and land information systems. Prerequisite(s): SUR 264, SUR 312, and SUR 330

**SUR 498 - Special Topics (1-3)**

Directed studies into current topics. Subject to be agreed upon between student and instructor. Prerequisite: Consent of instructor

**THTR - THEATRE****THTR 455 - Advanced Lighting Design (3)**

Conceptual aspects of lighting design, as well as the uses of special techniques and effects, drafting light plots and paperwork, and the development of a portfolio. Prerequisite(s): THTR 355 or consent of instructor.

**THTR 457 - Advanced Computer Scenographics (3)**

Project-oriented course for the advanced modeler. Projects focus on the creation of complex models, custom texturing and shading, virtual lighting, postproduction image work, and animation techniques. Students will develop digital portfolios. Prerequisite: THTR 357 and consent of instructor.

**THTR 495 - Directing II (3)**

Advanced study of directing, with focus on theory, style, and concept. Prerequisite(s): THTR 395.

**THTR 500 - Introduction to Graduate Theatre Studies (3)**

Advanced exploration of the theory, terminology, and integration of the various theatre artists involved in, and aspects of, theatrical practice.

**THTR 510 - Acting Theory and Pedagogy (3)**

Study of the basics of Stanislavski acting theory and their application for the teaching and coaching of young actors. Students will be expected to act and coach acting in a studio setting.

**THTR 530 - Dramaturgy (3)**

A practical course introducing the graduate student to principles and practices of script selection, analysis, editing, and theatrical research. Prerequisite(s): THTR 500 Intro to Graduate Theatre Studies.

**THTR 535 - Directed Study (1-3)**

For the highly motivated student. Independent projects and individual guidance. Graduate standing and consent of instructor required. May be repeated up to 6 credits.

**THTR 540 - Practical Problems in Theatre Production (3)**

Seminar class dealing with issues surrounding theatre production and problem solving strategies for overcoming them.

**THTR 541 - Stagecraft & Lightcraft (3)**

This course is designed to put into practice the theory from the scenic and lighting design course. Topics covered will include basic tool use, color theory, painting techniques, the hanging and focusing of lighting instruments as well as instrument selection.

**THTR 542 - Graduate Costume Craft: Theory and Practice (3)**

Graduate study of the techniques and applications of costuming.

**THTR 552 - Graduate Costumes: History, Theory and Design (3)**

Course focusing on the evolution of fashion through time and the theory of its application for theatrical productions.

**THTR 553 - Scenic and Lighting Design (3)**

This course is designed to develop an understanding and foundation in the basic tools used in lighting and scenic design. Lighting topics include: electricity, light sources, optics, color theory, instrument types, design styles, history of theatrical lighting and selection of instrumentation for design. Scenic topics include: scenic design history, communications tools designers use, script analysis and design strategies.

**THTR 595 - Directing/Producing Theory and Practice (3)**

Theoretical and practical applications in directing and producing for the stage.

**TOX - TOXICOLOGY****TOX 461 - Toxicology I (3)**

Introduction to principles of toxicology. Prerequisite(s): BIOL 111G or BIOL 211G, and CHEM 345. Restricted to: Main campus only. Crosslisted with: ANSC 461

**TOX 523 - Environmental Toxicology (3)**

Introduction to the science of environmental toxicology. This course examines common pollutants and their impact on human and environmental health. It also evaluates the role of environmental protection agencies in

monitoring and regulating these substances. Prerequisite(s): CHEM 211 or CHEM 313-314. Restricted to: Main campus only.

**TOX 550 - Special Topics (1-3)**

Readings, discussions, and/or field and laboratory investigation of selected problems. Typical examples: pharmacology, reproductive toxicology, environmental toxicology, or mutagenesis. Prerequisite: consent of instructor, and designation of a specific topic before registration.

**TOX 598 - Special Research Programs (1-3)**

Individual investigations, either analytical or experimental. Graded S/U.

**UNIV - UNIVERSITY STUDIES****UNIV 495 - Independent Study (1-3)**

Individualized projects related to the field of learning assistance. Taught with UNIV 395.

**WS - WOMEN'S STUDIES****WS 450 - Special Topics (3)**

The topic of course will vary and will be indicated by subtitle. May be cross-listed with relevant courses at the 400-level from any specific department. May be repeated under different subtitle(s).

**WS 451 - Women's Studies Practicum (3)**

Supervised field work in community setting relating to women. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.

**WS 453 - Women and Politics (3)**

Crosslisted with: GOVT 353

**WS 454 - Women Crossing Borders (3)**

Experiences of women who cross class, race, cultural, national, or sexual borders including theories regarding women's Interactions across borders. Emphasis will vary with professor and discipline.

**WS 455 - Feminist Research Methods (3)**

Feminist research practices and methodologies utilized in various disciplines. Definitions of research, what constitutes valid inquiry, how research can be feminist, and what it means to do interdisciplinary work.

**WS 459 - Advanced Issues in Sex and Gender (3)**

Same as SOC 459.

**WS 461 - Women's Studies: Independent Study (3)**

Individual study of selected topic and writing of research paper. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.

**WS 463 - Communication and Gender (3)**

Same as COMM 463.

**WS 465 - Sex, Gender and the Body (3)**

Examines forces at work in defining and differentiating gender, race, sexuality. How ideas about what is 'natural' and 'normal' for men and women shifted over time. Considers different discourses shaping embodied experiences and categories of identity. Prerequisite(s): None.

**WS 468 - Global Sexualities (3)**

Generates a global context to focus on sexual identity and orientation, sexual identity politics, romantic relationships, patterns of sexual behavior, sexual regulation and the impact of different cultures on individual sexualities. Taught with WS 568. Crosslisted with: SOC 468

**WS 469 - Gender and Sexuality in Hispanic Film (3)**

The study of gender and sexual orientation issues in relation to identity as portrayed in Hispanic cinema. Taught in Spanish but assignments accepted in English. Crosslisted with: SPAN 469

**WS 471 - Seminar in Feminist Theory (3)**

Current feminist theory. Topic changes by semester. Course subtitled in the Schedule of Classes. Prerequisite: None

**WS 474 - Gender in East Asian History (3)**

Same as HIST 474.

**WS 481 - Hate Crimes and Hate Groups (3)**

Explores the phenomenon of hate-motivated violence. Examines the hate crime laws, organized hate groups and social theories attempting to explain violent hate.

**WS 482 - Gender and Popular Culture (3)**

Intensive study of the representations of gender in popular culture. Examines the historical, aesthetic, and cultural contexts of these representation and the

various critical and theoretical lenses we use to understand them. Repeatable under different subtitles. Crosslisted with: ENGL 482

#### W S 484 - Women's Literature (3)

Intensive study of literature by women, in particular historical, aesthetic, cultural, or intellectual contexts. Repeatable under different subtitles. Crosslisted with: ENGL 481

#### W S 485 - Sex Crimes (3)

Dynamics of sex crimes for victims and offenders; plus consideration of the legal correction systems' response to sex crimes. Same as C J 485

#### W S 501 - Advanced Women & Immigration (3)

Advanced exploration of experiences of women immigrants as gender, race and class became increasingly important aspects of US immigration policies in the early 19th century. Explores role of gender in today's immigration experience.

#### W S 502 - Advanced Transnational Feminisms (3)

Advanced analysis of dimensions of gender, race, class, and sexuality in conjunction with nationalisms, anti-capitalist struggles, religious fundamentalism, militarism, globalization, eco-critique, and the politics of resistance and social movements.

#### W S 503 - Advanced Gender & Horror (3)

Advanced analysis of anxieties and crises through the genre of horror as they relate to issues of gender, sexuality, feminism, and race. Traces ways horror films represent and reconfigure notions of sexuality and gender and ways they reinforce and/or challenge social norms.

#### W S 504 - Advanced Arab-Muslim Feminisms (3)

Advanced study of historical and contemporary arab-muslim feminisms and homosexuality in Islam. Explores and uses critical feminist theories, language, and methods to counter interlocking discourses of Islamophobia, gendering, and homophobia affecting arab-muslim women.

#### W S 505 - Advanced Alternative Genders and Sexualities (3)

Advanced study of the academic fields of Gay, Lesbian, Bisexual, Transgender (GLBT) and Queer Studies. Examines academic texts as well as literature and film from different historical moments and social/ global sites.

#### W S 520 - Advanced Girls, Women & Crime (3)

Advanced critical social science analysis of concepts of violence and justice as experienced by women impacted by the criminal justice system. Crosslisted with: C J 520

#### W S 522 - Graduate Study in a Literary Form or Genre (3)

Same as ENGL 522.

#### W S 533 - Advanced Issues in Women, Gender, and Culture (3)

Same as ANTH 533.

#### W S 545 - Advanced Victimology (3)

Study of the risk factors in crime victimization, the impact of crimes upon victims, and the role of the victim in the criminal justice system, consideration of the impact of criminal justice policy on victim outcomes. Same as C J 545.

#### W S 550 - Special Topics (3)

The topic of course will vary and will be indicated by subtitle. May be cross-listed with relevant courses at the 500-level from any specific department. May be repeated under different subtitle(s).

#### W S 551 - Graduate Practicum in Women's Studies (3)

Supervised field work in community setting relating to women. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits.

#### W S 554 - Advanced Issues in Women Crossing Borders (3)

Experiences of women who cross class, race, cultural, national, or sexual borders including theories regarding women's interactions across borders.

#### W S 555 - Advanced Feminist Research Methods (3)

Advanced feminist research practices and methodologies utilized in various disciplines. Definitions of research, what constitutes valid inquiry, how research can be feminist, and what it means to do interdisciplinary work.

#### W S 561 - Independent Graduate Research in Women's Studies (3)

Individual study of selected topics and writing of a research paper. Prerequisite: consent of instructor. May be repeated for a maximum of 6 credits. Graded S/U.

#### W S 565 - Advanced Sex, Gender & the Body (3)

Advanced examination of forces at work in defining and differentiating gender, race, sexuality. How ideas about what is 'natural' and 'normal' for men and

women shifted over time. Considers different discourses shaping embodied experiences and categories of identity.

#### W S 567 - Global Sexualities (3)

Generates a global context to focus on sexual identity and orientation, sexual identity politics, romantic relationships, patterns of sexual behavior, sexual regulation and the impact of different cultures on individual sexualities. Taught with WS 468. Crosslisted with: SOC 568

#### W S 569 - Gender and Sexuality in Hispanic Film (3)

The study of gender and sexual orientation issues in relation to identity as portrayed in Hispanic cinema. Taught in Spanish but assignments are accepted in English. Crosslisted with: SPAN 569

#### W S 571 - Advanced Seminar in Feminist Theory (3)

Current feminist theory. Topic changes by semester. Course subtitled in the Schedule of Classes.

#### W S 574 - Gender in East Asian History (3)

Same as HIST 474 with differentiated assignments for graduate students. Required for graduate credit.

#### W S 582 - Gender and Popular Culture (3)

Intensive study of the representations of gender in popular culture. Examines the historical, aesthetic, and cultural contexts of these representation and the various critical and theoretical lenses we use to understand them. Repeatable under different subtitles. Crosslisted with: ENGL 582

#### W S 584 - Women's Literature (3)

Intensive study of literature by women, in particular historical, aesthetic, cultural, or intellectual contexts. Repeatable under different subtitles. Crosslisted with: ENGL 581

## WSAM-WATER SCIENCE AND MANAGEMENT

#### WSAM 599 - Masters Thesis (1-15)

Thesis. May be repeated up to 88 credits. Consent of Instructor required. Restricted to: Water and Science Management majors. Thesis/Dissertation Grading.

#### WSAM 605 - Arid Land Water Resources (3)

The course will cover various issues of relevance to water resources and water supply management within the Southwest US and other semiarid and arid regions. Discussions may include development and sustainability, climate change and drought, socioeconomic and cultural, and transboundary issues.

#### WSAM 610 - Water and Sustainable Economic Development (3)

For graduate students in the Water Science and Management or other research degree programs, use the water economics literature as a model for student research leading to an M.S. thesis or Ph.D. dissertation.

#### WSAM 700 - Doctoral Dissertation (0-15)

Dissertation for Water Sciences and Management Majors May be repeated up to 88 credits. Restricted to: Water Sciences and Management majors. Thesis/Dissertation Grading.

## WERC - A CONSORTIUM FOR ENVIRONMENTAL EDUCATION AND TECHNOLOGY DEVELOPMENT

#### WERC 466 - Fuel Cell and Hydrogen Technology (3)

Same as Ch E 466. Prerequisites: CHEM 111G and PHYS 215G

#### WERC 471 - Health Physics (4)

Introduction to Radiation Protection, Radiation/Radioactivity, Radioactive Decay/Fission, Interaction of Radiation and Matter, Biological Effects of Radiation, Radiation Measurement/Statistics, Sampling for Radiation Protection Purposes, Radiation Dosimetry, Environmental Transport, Radiation Protection Guidance, External Radiation Protection, Internal Radiation Protection, Waste Management, and Hazards Analysis and Control. Prerequisite(s): MATH 192G and CH E 470. Crosslisted with: CH E 471

#### WERC 473 - Nuclear Regulations and Compliance Practices (3)

Same as CH E 473. Consent of instructor required. Prerequisite(s): MATH 191G and (CHEM 111G or Chem 115). Crosslisted with: CH E 473

#### WERC 566 - Fuel Cell and Hydrogen Technology (3)

Crosslisted with: Ch E 566 with differentiated assignments for graduate students.

#### WERC 595 - Special Topics (1-3)

Lecture instruction on special topics such as energy, environment and economics. Prerequisite: consent of instructor. May be taken for a maximum of 6 credits.

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# NEW MEXICO STATE UNIVERSITY

## ACADEMIC CALENDAR 2014-2015

### Fall Semester 2014

*August 22- December 13, 2014*

Campus Housing Opens.....	August 17
Faculty Report.....	August 18
Fall Convocation.....	August 19
Instruction Begins.....	August 21
Late Registration.....	August 21
Deadline for Registration/Course Addition.....	August 22
Deadline for Filing Degree Application.....	August 29
<i>(Students meeting requirements at end of fall)</i>	
Labor Day Holiday.....	September 1
Last Day to Drop Course with "W".....	October 21
<i>(Except courses carrying designated dates)</i>	
Last Day to Withdraw from the University.....	November 14
Thanksgiving Holiday for Students.....	November 24-28
EXAM WEEK.....	December 8-12
Last Day of Classes.....	December 12
Commencement.....	December 13
Campus Housing Closes.....	December 13
Final Grades Due.....	December 16

### Spring Semester 2015

*January 16 - May 19, 2015*

Faculty Report.....	January 8
Curriculum study & improvement of instruction.....	January 8-9
Campus Housing Opens.....	January 11
Spring Convocation.....	January 13
Program/Registration for New Students.....	January 14
Instruction Begins.....	January 15
Late Registration.....	January 15
Deadline for Registration/Course Addition.....	January 16
Martin Luther King Holiday.....	January 19
Deadline for Filing Degree Application.....	January 23
<i>(Students meeting requirements at end of spring)</i>	
Last Day to Drop Course with "W".....	March 16
<i>(Except courses carrying designated dates)</i>	
Spring Break.....	March 23-27
Spring Holiday.....	April 3
Last Day to Withdraw from the University.....	April 17
EXAM WEEK.....	May 4-8
Last Day of Classes.....	May 8
Commencement.....	May 9
Campus Housing Closes.....	May 9
Final Grades Due.....	May 12

### Summer Semester 2015

*May 22 - August 1, 2015*

Memorial Day Holiday.....	May 25
Campus Housing Opens.....	May 27
Registration for New Students.....	May 27
Faculty Report.....	May 27
Instruction Begins.....	May 28
Deadline for Registration/Course Addition.....	May 29
Independence Day Holiday.....	July 4
Deadline for Filing Degree Application.....	July 6
Last Day to Drop Course with "W".....	July 7
Last Day to Withdraw from the University.....	July 23
Last Day of Classes.....	August 6
Campus Housing Closes.....	August 7
Final Grades Due.....	August 10

### Holidays for Administrative Offices 2014-2015

Labor Day.....	September 1, 2014
Thanksgiving.....	November 27-28, 2014
Winter Holiday.....	Dec. 24, 2014-Jan 2, 2015
Martin Luther King Holiday.....	January 20, 2015
Spring Holiday.....	April 19, 2015
Memorial Day Holiday.....	May 25, 2015
Independence Day Observance.....	July 3, 2015