The Eberly College of Arts and Sciences, West Virginia University’s largest college, has approximately 460 faculty in academic departments and program areas in the following: literature and the humanities, social and behavioral sciences, and mathematics and natural sciences. These departments occupy twelve buildings on the Downtown campus and include programs that lead to master’s degrees in twenty fields and doctoral degrees in twelve fields. Many of the faculty have earned distinguished national and international reputations and have been honored for excellence in teaching, research, and service. Their awards not only acknowledge extreme dedication but also accentuate the relationship between the faculty and students. Graduate students often collaborate with faculty on specialized research projects which lead to publications in national and international journals.

Degrees Offered

- Master of Science, Doctor of Philosophy in Biology
- Master of Science, Doctor of Philosophy in Chemistry
- Master of Arts, Doctor of Philosophy in Communication Studies
- Master of Arts in English, Professional Writing and Editing; Master of Fine Arts; Doctor of Philosophy in English
- Master of Arts in Linguistics, Teaching English to Speakers of Other Languages
- Master of Science, Doctor of Philosophy in Forensic Science
- Master of Arts, Doctor of Philosophy in Geography
- Master of Science, Doctor of Philosophy in Geology
- Master of Science in GIS and Spatial Analysis
- Master of Arts in History, Public History; Doctor of Philosophy in History
- Master of Legal Studies
- Master of Science, Doctor of Philosophy in Mathematics
- Master of Science, Doctor of Philosophy in Physics
- Master of Arts, Doctor of Philosophy in Political Science
- Master of Science in Psychology, Behavior Analysis; Doctor of Philosophy in Behavior Analysis, Behavioral Neuroscience, Clinical Psychology, Developmental Psychology
- Master of Public Administration
- Master of Social Work, Doctor of Philosophy in Social Work
- Master of Arts, Doctor of Philosophy in Sociology

The Eberly College of Arts and Sciences offers research or teaching concentrations as follows:

- Biology—ecology and evolutionary biology, forensic biology, genetics and genome biology, and neurobiology and endocrinology
- Chemistry—analytical, biological, inorganic, organic, and physical
- Communication studies— instructional, interpersonal, and organizational
- English—literature
- Geography—human geography, environmental geography, geographic information science
- Geology—energy geology, geophysics, hydrogeology, environmental geology
- History—United States (Appalachia), Europe, Africa, science, and technology
- Mathematics—selected areas of pure, applied, and discrete mathematics, and undergraduate mathematics education
- Physics—condensed matter, applied physics, plasma physics, astrophysics, electro-optics, elementary particle physics, and radio astronomy
- Political science—public policy analysis (domestic and international)
- Psychology—behavior analysis, behavioral neuroscience, clinical psychology, clinical child psychology, and developmental psychology
- Social Work—behavioral health, aging, child welfare, generalist practice and advanced integrated practice
- Sociology—crime, community, and culture

**EBERLY COLLEGE GRADUATE NON-DEGREE SEEKING STUDENTS:**

Applicants who wish to pursue graduate level work in the Eberly College unrelated to pursuing a degree may apply to be a graduate non-degree student (http://catalog.wvu.edu/graduate/graduateeducationatwestvirginiauniversity/#applytext). In addition to meeting the university requirements (http://catalog.wvu.edu/graduate/graduateeducationatwestvirginiauniversity/#Non-Degree_Graduate_Students) for a graduate non-degree student, applicants should submit brief a statement indicating why they would like to enroll in graduate coursework in the Eberly College. Applicants should also demonstrate that they have approval to enroll in specific courses.
ADMINISTRATION

DEAN
• R. Gregory Dunaway - Ph.D. (University of Cincinnati)

ASSOCIATE DEANS
• Lupe Davidson - Ph.D. (Duquesne University)
  Associate Dean for Social Justice, Faculty Development and Innovation
• Valérie Lastinger - Ph.D. (University of Georgia)
  Associate Dean for Academic Affairs
• Asuntina S. Leveille - J.D. (West Virginia University)
  Associate Dean for Financial Planning and Management
• Duncan Lorimer - Ph.D. (University of Manchester)
  Associate Dean for Research

ASSISTANT DEANS
• Andrea Bebell - Ph.D. (West Virginia University)
  Assistant Dean of Undergraduate Student Services & Programs
• Jessica M. Deshler - Ph.D. (University of New Mexico)
  Interim Assistant Dean for Graduate Studies
• John Navaratnam - Ph.D. Biology (West Virginia University)
  Assistant Dean for Curriculum and Assessment

Accreditation

The Master of Science in Forensic & Investigative Science within the Eberly College of Arts and Sciences has specialized accreditation through the Forensic Science Education Programs Accreditation Commission of the American Academy of Forensic Science.

The Doctor of Philosophy in Clinical/Behavior Analysis Psychology within the Eberly College of Arts and Sciences has specialized accreditation from the Association for Behavior Analysis International.

The Master of Public Administration within the Eberly College of Arts and Sciences has specialized accreditation through the Commission on Peer Review & Accreditation, Network of Schools of Public Policy, Affairs, and Administration (NASPAA).

The Master of Social Work within the Eberly College of Arts and Sciences is accredited by the Council on Social Work Education.

Certificate Programs

• Applied Statistics (http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/statistics/)
• Community Development Policy and Practice (http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/cdpp/)
• Cultural Resource Management (http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/culturalresourcemanagement/)
• Healthcare Administration (http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/healthcareadmin certificate/)
• Leadership (http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/leadership/)
• Linguistics (http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/foreignlanguages/linguistics/)
• Quantitative & Qualitative Social Science Research Methods (http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/social_sci_research_method/)
• Spanish (http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/spanish/)
• Teaching English to Speakers of Other Languages (http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/foreignlanguages/tesol/tesolcertificate/)
• Women's and Gender Studies (http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/womensstudies/)

ANTHROPOLOGY

ANTH 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

ASTRONOMY

ASTR 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation in advanced topics that are not covered in regularly scheduled courses.
ASTR 592. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

ASTR 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

ASTR 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

ASTR 595. Independent Study. 1-9 Hours.
Faculty-supervised study of topics not available through regular course offerings.

ASTR 601. Graduate Astrophysics Seminar. 1 Hour.
This two-semester class is designed for first-year physics graduate students interested in studying astrophysics. The course provides students access to introductory material they will need for the rest of their graduate astrophysics courses and research, including order-of-magnitude estimates, coordinate systems, blackbody radiation, radiative transfer, stellar structure and evolution, statistics, compact objects, relativity, and cosmology.

ASTR 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation in advanced topics that are not covered in regularly scheduled courses.

ASTR 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

ASTR 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

ASTR 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

ASTR 695. Independent Study. 1-9 Hours.
Faculty-supervised study of topics not available through regular course offerings.

ASTR 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

ASTR 697. Research. 1-9 Hours.
ASTR 697. Research. I, II, S. 1-15 hr. PR: Consent. Research activities leading to thesis (697), problem report (697), research paper or equivalent scholarly project (697), or a dissertation (797). (Grading is S/U).

ASTR 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision is needed during the writing of student reports (698), theses (698), or dissertations (798). (Grading is Normal.)

ASTR 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use the University's facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium, to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is normal; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.

ASTR 700. Radio Astronomy. 3 Hours.
Introduction to radio astronomy theory and techniques suitable for graduate students. Topics covered include radio-wave fundamentals, antenna theory, radiation mechanisms, extragalactic sources, pulsars and cosmology.

ASTR 701. Computational Astrophysics. 3 Hours.
Introduction to C programming to solve astrophysical problems. Topics covered include hypothesis testing, Monte Carlo simulations and Fourier techniques for analysis of astronomical data.

ASTR 702. Stellar Structure and Evolution. 3 Hours.
Comprehensive discussion of birth, life cycle and end products of stars. Topics covered include main-sequence evolution, giant stars, white dwarfs, supernovae neutron stars and black holes.

ASTR 703. Galactic Astronomy. 3 Hours.
Detailed study of galactic structures. Topics covered include galactic dynamics, rotation and spiral density waves, the interstellar medium and supernova remnants.

ASTR 704. General Relativity. 3 Hours.
Innovative 'physics- first' introduction to Einstein's relativistic theory of gravity. Topics covered include special relativity, curved space time, gravitational collapse and black holes.
ASTR 705. The Interstellar Medium. 3 Hours.
PR: ASTR 694. In-depth look at the interstellar medium (ISM), the material in between stars, with a focus on our own Milky Way Galaxy. Topics covered include the composition of our Galaxy, the phases of the ISM, the properties of the gas and dust in the ISM, dust and gas chemistry, magnetic fields, and dynamic processes.

ASTR 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation in advanced topics that are not covered in regularly scheduled courses.

ASTR 792. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

ASTR 793. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

ASTR 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

ASTR 796. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

ASTR 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis (697), problem report (697), research paper or equivalent scholarly project (697), or a dissertation (797). (Grading May be S/U).

BIBLIOGRAPHY

BIBY 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of bibliography. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading will be S/U).

BIBY 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

BIBY 592. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

BIBY 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

BIBY 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

BIBY 595. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

BIBY 596. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

BIBY 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of bibliography. Note: This course is intending to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience. (Grading will be S/U).

BIBY 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

BIBY 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

BIBY 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

BIBY 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

BIBY 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

BIBY 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

BIBY 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U).
BIBY 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

BIBY 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use of the University's facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is S/U; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.

BIBY 791. Advanced Study. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

BIBY 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U).

BIOLOGY

BIOL 548. Introduction to Cellular and Molecular Neuroscience. 3 Hours.
PR: Consent. An advanced course that synthesizes topics such as gene regulation, cell signaling and neural network structure into a comprehensive picture of the cellular basis of nervous system function.

BIOL 550. Phylogenetics and Comparative Biology. 3 Hours.
PR: This course requires the equivalent of one semester of coursework in evolutionary biology (BIOL 320, GEOL 331, BIOL 461, BIOL 464, BIOL 420, or BIOL 455), ecology (BIOL 321, BIOL 448, BIOL 456, BIOL 457, BIOL 462, BIOL 463), and/or statistical analysis (BIOL 430). This course is an in-depth exploration of the philosophy, theory, methods, and applications of phylogenetic analysis, which is the basis for all comparative biology. Topics covered include character homology assessment, phylogenetic reconstruction, divergence time estimation, trait evolution, and recent advances in phylogenomics.

BIOL 576. Computational Neuroscience. 4 Hours.
PR: Consent. This course focuses on the tools and concepts used to probe and characterize the dynamics of neurons, neural networks and neural coding mechanisms. Lectures introducing concepts and discussion sessions of the current research literature complement computer laboratories where the student learns programing skills, analytical tools and neural modeling methods used in computational neuroscience research.

BIOL 577. Central Nervous System Evolution and Development. 3 Hours.
PR: BIOL 219 and BIOL 348 or equivalent. Origin and evolution of the animal nervous system, focusing on developmental and genetic mechanisms underlying structural modifications that serve as the basis for the evolution of behavioral repertoires.

BIOL 579. Principles of Systems Neuroscience. 3 Hours.
PR: BIOL 348 or Consent. Fundamental principles of nervous system organization with an emphasis on interactions between neurons and the consequences for behavior. There will be a focus on recent advances in our understanding of each organizational principle.

BIOL 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

BIOL 593. Special Topics. 6 Hours.
A study of contemporary topics selected from recent developments in the field.

BIOL 611. Epigenetics. 3 Hours.
Explores the molecular mechanisms, phenotypic phenomena and current application of epigenetics and the study of how genetic information is regulated and maintained. Students may not earn credit for both BIOL 415 and BIOL 611.

BIOL 615. Microbial Symbiosis. 3 Hours.
Molecular techniques used towards identifying the composition, structure and functions of microbial communities in various ecological contexts will be discussed. An understanding of the significance of microbial symbioses towards ecological and health processes will be developed. (Also listed as BIOL 456.)

BIOL 620. Genomics. 3 Hours.
PR: BIOL 219 or consent. Advanced elective examining biology and evolution on a genome-wide scale. Topics include fields of study and methods of DNA sequence acquisition and annotation, including exploration of the human genome and its contribution to disease discovery.

BIOL 651. Evolution of Infectious Diseases. 3 Hours.
The application of phylogenetics, microbiology, immunology, and epidemiology towards comprehending the evolution of infectious diseases. Students will develop a fundamental understanding of the significance of evolution and ecology towards infectious disease emergence and control.
**BIOL 658. Systems Biology. 3 Hours.**
PR: Consent. Systems Biology is an approach to understanding the dynamics of biological processes by integrating and assessing changes in and across networks. Technologies driving this approach include genome-wide sequencing of DNA and RNA, measurements of genome-protein interactions, and measurement of proteome levels and post-translational protein modifications.

**BIOL 681. Research Project Development. 1 Hour.**
This course provides graduate students with guidance on the creation and presentation of their Program of Study, which is the first benchmark to be met for a graduate degree in Biology at WVU. The program of study details the background and broad goals of a thesis research project and is used to determine personalized course load.

**BIOL 690. Teaching Practicum. 1-3 Hours.**
PR: Consent. Supervised practice in college teaching of biology. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience. (Grading will be S/U.).

**BIOL 691. Advanced Topics. 1-6 Hours.**
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

**BIOL 692. Directed Study. 1-6 Hours.**
Directed study, reading, and/or research.

**BIOL 693. Special Topics. 1-6 Hours.**
A study of contemporary topics selected from recent developments in the field.

**BIOL 695. Independent Study. 1-9 Hours.**
Faculty supervised study of topics not available through regular course offerings.

**BIOL 697. Research. 1-9 Hours.**
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.).

**BIOL 698. Thesis or Dissertation. 1-6 Hours.**
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

**BIOL 715. Extracellular Matrix in Cell Signaling. 3 Hours.**
The course emphasizes the fundamental role that the extracellular matrix plays in the process of morphogenesis, differentiation, development and maintenance of the differentiated state.

**BIOL 737. Developmental Biology. 3 Hours.**
PR: BIOL 336 or equiv., organic chemistry or biochemistry, or consent. The molecular and cellular basis of differentiation and morphogenesis. (Offered in fall of odd years.).

**BIOL 752. Physiological Plant Ecology. 3 Hours.**
PR: BIOL 350 and consent. Advanced studies on the interactions between plants and their environment focusing on whole-plant carbon exchange, water relations, and nutrient uptake, with reference to specific biomes.

**BIOL 753. Water and Nutrient Relations of Plants. 3 Hours.**
PR: BIOL 350 and consent. Advanced studies on water and nutrient acquisition, use, and transformation in plants with focus on plant-soil interactions, symbiotic associations, and acclimation and adaption mechanisms operating in plants.

**BIOL 761. Ecosystem Dynamics. 3 Hours.**
PR: Consent. A survey of our current understanding of the biogeochemistry that occurs at and near the surface of the Earth. Emphasis is placed on the biogeochemical cycles of carbon, nitrogen, phosphorus, and sulfur. The origin and dynamics of the atmosphere, lithosphere and hydrosphere are also considered. (Offered in even-numbered years).

**BIOL 762. Plant Population Biology. 3 Hours.**
PR: Graduate status or undergraduate status with the completion of BIOL 221 and the instructor's permit. Plant population biology examines the interplay of ecological theory and the real world of experimental ecology of natural populations using a case study approach. Each student will research a current topic in greater depth.

**BIOL 788. Biology Department Colloquium. 1 Hour.**
Provides for interactions with established scientists at other institutions through weekly presentations by researchers invited by graduate students and their faculty advisors.

**BIOL 790. Teaching Practicum. 1-3 Hours.**
PR: Consent. Supervised practice in college teaching of biology. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading will be S/U.).

**BIOL 791. Advanced Topics. 1-6 Hours.**
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.
BIOL 792. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

BIOL 793. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

BIOL 794. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

BIOL 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

BIOL 796. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

BIOL 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper, or equivalent scholarly project, or a dissertation. (Grading may be S/U).

BIOL 930. Professional Development. 1-6 Hours.
Professional development courses provide skill renewal or enhancement in a professional field or content area (e.g., education, community health, geology.) These tuition-waived continuing education courses are graded on a pass or fail grading scale and do not apply as graduate credit toward a degree program.

CHEMISTRY

CHEM 511. Advanced Instrumental Analysis. 3 Hours.
PR: CHEM 310 with a minimum grade of C-. Lectures and demonstrations. Classical and cutting-edge instrumental methods applied to chemical analyses: electrochemistry, spectroscopy, mass spectrometry, and chromatography; presented at the advanced level. (3 hr. lec.).

CHEM 512. Environmental Chemistry. 3 Hours.

CHEM 514. Mass Spectrometry Principles and Practices. 3 Hours.
PR: CHEM 310. Fundamental principles underlying modern mass spectrometry. Gas phase chemistry related to the formation and fragmentation of ions. The design of instrumental systems for mass spectrometry. Application of mass spectrometric techniques to multidisciplinary problems of current interest. (3 hr. lec.).

CHEM 516. Bioanalytical Chemistry. 3 Hours.
PR: (CHEM 310 and AGBI 410) or equivalent. Analytical principles and instrumental methods as they are applied to biochemical questions. Students are taught to evaluate and formulate methods and approaches for biochemical analyses.

CHEM 517. Bioanalytical Imaging: Fundamentals and Techniques. 3 Hours.
Fundamental principles and state of the art applications of bioanalytical imaging techniques.

CHEM 521. Organometallic Chemistry. 3 Hours.
PR: Graduate standing in chemistry or consent. Syntheses, structure, and reactivity of organometallic compounds. Applications of organometallic compounds to catalysis and organic synthesis. (3 hr. lec.).

CHEM 522. Topics in Inorganic Chemistry. 3 Hours.
Structure and bonding of inorganic molecules and materials. Covers the chemistry of main group elements and transition metals. Application of fundamental principles in inorganic chemistry to current research problems.

CHEM 531. Advanced Organic Chemistry 1. 3 Hours.
PR: CHEM 234. Structural concepts, bonding, tautomerism, static and dynamic stereochemistry, mechanistic classifications of reagents, and reactions including some applications. (3 hr. lec.).

CHEM 532. Advanced Organic Chemistry 2. 3 Hours.
PR: CHEM 531. Continuation of CHEM 531 with emphasis upon synthetic methods and reaction mechanisms. (3 hr. lec.).

CHEM 533. Advanced Structure Determination Using Spectroscopic Methods. 3 Hours.
PR: Graduate standing or consent. In depth exposure to the techniques for identifying the functionalities and elucidating the bond connectivity of unknown organic molecules using UV, IR, and NMR spectroscopy and mass spectrometry techniques.

CHEM 541. Chemical Thermodynamics. 3 Hours.
PR: CHEM 348. Principles of classical and statistical thermodynamics and their application to chemical problems. (3 hr. lec.).

CHEM 542. Computational Chemistry. 3 Hours.
PR: CHEM 348 or consent. Introduction to the use of quantum mechanical-based computational techniques to study molecular structure, bonding, and reactivity, and their relationship to experimental techniques.

CHEM 545. Foundations of Quantum Chemistry. 3 Hours.
Application of the principles of quantum mechanics to chemical systems and spectroscopy.
CHEM 547. Chemical Crystallography. 3 Hours.
PR or Conc: (CHEM 346 and CHEM 348) or CHEM 341 or consent. Applications of X-ray diffraction of crystals to the study of crystal and molecular structure. Includes diffraction theory, space group symmetry, and crystallographic methods of analysis. (3 hr. lec.).

CHEM 548. Biophysical Chemistry. 3 Hours.
Biophysical Chemistry lies at the interface between physics, chemistry and biology, applying theories and methods of the physical sciences toward understanding biological systems. This course focuses on the physical chemistry of biological macromolecules. Topics to be covered include protein structure formation and stability, forces/interactions in biological molecular systems, bio-macromolecule folding dynamics, phase transitions in proteins, and membrane physics.

CHEM 549. Proximal Probe Techniques. 3 Hours.
Proximal probe techniques rely on the use of nanoscale probes, positioned and scanned in the immediate vicinity of surfaces. Their development is often viewed as a first step towards nanotechnology, since they demonstrate the feasibility of building purposeful structures one atom or one (macro) molecule at a time. This course provides thorough physical background of scanning probe microscopy techniques.

CHEM 552. Biochemical Toxicology. 3 Hours.
Introduction to the principles of toxicology, with a focus on the processes that occur at the cellular and molecular levels when chemicals interact with living organisms.

CHEM 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

CHEM 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

CHEM 651. Pedagogy for College Chemistry. 3 Hours.
Prepare and equip future faculty for instructing within the chemistry discipline.

CHEM 695. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

CHEM 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.).

CHEM 713. Electrochemistry and Instrumentation. 3 Hours.
PR: CHEM 310. Electronic instrumentation applied to study of mass transfer kinetics of electrode reactions, voltammetry, and high-frequency methods. (3 hr. lec.).

CHEM 715. Chemical Separations. 3 Hours.
PR: CHEM 215 and CHEM 233, and physical chemistry. Fundamentals of transport and flow processes underlying all separation techniques. Empirical coverage of chromatographic and electrophoretic methods for analytical separations. (3 hr. lec.).

CHEM 723. Physical Methods in Inorganic Chemistry. 3 Hours.
PR: CHEM 422. Symmetry, vibrational spectroscopy, theory and applications of NMR and EPR methods, magnetism, optical activity, dynamic processes and fluxional behavior. (3 hr. lec.).

CHEM 727. Bioinorganic Chemistry. 3 Hours.
PR:CHEM 422 or consent. Metal ions in biological systems; proteins, nucleic acids, and cofactors as ligands; metal uptake, storage, and regulation; structural and catalytic roles; substance activation, electron transfer, and group transfer reactions; metals in medicine.

CHEM 743. Chemical Kinetics. 3 Hours.
PR: CHEM 348. Theories and applications of kinetics in gaseous state and in solution. (3 hr. lec.).

CHEM 745. Theoretical Chemistry 1. 3 Hours.
PR: Differential equations. Theoretical background for quantum mechanics. (3 hr. lec.).

CHEM 746. Theoretical Chemistry 2. 3 Hours.
PR: CHEM 745. Theories and applications of quantum mechanics in chemistry. (3 hr. lec.).

CHEM 747. Molecular Spectroscopy and Structure. 3 Hours.
PR: CHEM 450 or graduate standing in chemistry, or consent. Advanced applications of spectral methods to the study of molecular structure. (3 hr. lec.).

CHEM 750. Introduction to Proteomics. 3 Hours.
Introduction to protein separations and sequencing by modern mass spectrometry, and the application of these methods to the study of biological systems in health and environmental sciences.

CHEM 789. Research Seminar. 1 Hour.
PR: Graduate student in chemistry. Research seminars by visiting lecturers.
CHEM 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of chemistry. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading will be P/F.).

CHEM 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

CHEM 792. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

CHEM 793. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

CHEM 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

CHEM 796. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

CHEM 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, program report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.).

CLASSICS

CLAS 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of classics. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading will be S/U.).

CLAS 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

CLAS 592. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

CLAS 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

CLAS 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

CLAS 595. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

CLAS 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of classics. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience. (Grading will be S/U.).

CLAS 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

CLAS 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

CLAS 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

CLAS 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

CLAS 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

CLAS 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

CLAS 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.).
CLAS 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

CLAS 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use of the University's facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is S/U; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.

CLAS 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

COMMUNICATION STUDIES

COMM 509. Health Comm Dissemination. 1-3 Hours.
PR: COMM 409. Focus on effective dissemination of health messages. Students communicate outcomes of health communication campaigns conducted in previous classes to diverse external publics; could include presentations to conferences, community groups, schools, workshops.

COMM 511. Research Methods for Non-Profit Organizations. 3 Hours.
Advanced research skills applicable to non-profit organizations including precise, effective use of discipline-specific databases and grant-seeking research.

COMM 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

COMM 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

COMM 600. Communication in the Classroom. 3 Hours.
PR: Teaching experience or consent. Role of interpersonal communication in classroom environment with particular emphasis on communication between students and teachers. Recommended for elementary, secondary, and college teachers in all fields.

COMM 601. Instructional Communication. 3 Hours.
Survey of the theory and research in instructional communication. Emphasis is placed on the study of instructional communication behaviors and the role instructor-student communication plays in the instructional setting.

COMM 602. Interpersonal Communication: Theory and Research. 3 Hours.
Survey of the theory and research in interpersonal communication. Emphasis upon relational communication and intimate communication in interpersonal relationships.

COMM 603. Communication Training and Development. 3 Hours.
This applied graduate course provides the student, who has a background in human communication theory and research, an introduction to communication training and development issues, procedures, assessment, and presentational skills.

COMM 604. Theory and Research in Persuasion. 3 Hours.
Various theories and principles of persuasion with emphasis on contemporary research literature.

COMM 605. Theory and Research in Mass Communication. 3 Hours.
Mass communication from a consumer's viewpoint. Use of consumer-oriented mass media research also stressed.

COMM 606. Theory and Research in Organizational Communication. 3 Hours.
Contemporary research linking communication variables and networks to organizational change, effectiveness, leadership, power, and management practices. Analysis of communication problems within a variety of organizations.

COMM 608. Nonverbal Communication. 3 Hours.
Examines the impact of nonverbal communication on the communication process. Attention is given to research on non-language aspects of communication and their application to various contexts.

COMM 609. Communication Apprehension and Avoidance. 3 Hours.
Theory and research related to individuals' predispositional and situational tendencies to approach or avoid communication. Emphasis on work in the areas of willingness to communicate, communication apprehension, reticence, and shyness.

COMM 610. Family Communication. 3 Hours.
This course addresses the communication that exists within and about families. We address various family structures, and employ various theoretical frameworks to explain, predict, and control family communication and its correlates with socio-cultural, relational and individual wellbeing.
COMM 611. Intergroup Communication. 3 Hours.
This course focuses on intergroup communication and the reciprocal nature between identity and pro/anti-social interaction. Moving beyond the popular individualized communication perspective, intergroup theories and research allow us to explore the prominence of social group memberships (e.g., age, race, religion, gender, value orientations) in our everyday communication and cognitions.

COMM 612. Small Group Theory and Practice. 3 Hours.
Specific research areas in interpersonal communication with emphasis on small groups.

COMM 615. Media in Communication and Education. 3 Hours.
Use of the media in educational and other communication environments with emphasis on communication processes and principles relevant to television and film.

COMM 616. Communication in the Educational Organization. 3 Hours.
Problems of communication within educational organizations with emphasis on elements that impact educational change, conflict management, and interpersonal influence. Recommended for elementary, secondary, and college teachers in all fields.

COMM 617. Communication Problems of Children. 3 Hours.
(Primarily for elementary and secondary school teachers and language arts supervisors.) Normal maturational development of listening and speaking skills, their relationships to language acquisition, and influence upon achievement.

COMM 619. Communication and Affect in Instruction. 3 Hours.
PR: Graduate status. This advanced graduate course examines the influence of teachers' communicative behaviors on student learning, student communication, and the classroom climate.

COMM 622. Gender and Communication. 3 Hours.
This course will review contemporary and historical communication issues about sex, gender, and communication. Nonverbal communication, friendship, romantic family, educational, organizational, and media impacts will be reviewed.

COMM 623. Leadership. 3 Hours.
Leadership styles, models and theories in classical and contemporary settings are covered. Emphasis is given to leadership in groups and organizations.

COMM 624. Communication Ethics. 3 Hours.
This course focuses on communication ethics with a particular emphasis on communication ethics in the organizational context. Communication issues and situations are explored from various ethical perspectives.

COMM 625. Computer Mediated Communication. 3 Hours.
This course explored the relationships between CMC and various aspects of human activity. This course investigates established and emerging CMC-based social, cultural, organizational, and instructional activities.

COMM 626. Intercultural Communication: Theory and Research. 3 Hours.
Advanced seminar in communication of various cultures. Special emphasis on research in diffusion of innovations.

COMM 627. Teachers in Film. 3 Hours.
This course focuses on how teachers and schools are portrayed in film. Students will use course readings and personal experiences to offer critical analysis of these films.

COMM 629. Health Communication. 3 Hours.
Overview of essential concepts and theories needed to understand and evaluate health-related messages in patient-provider relationships, between workers in health care organizations, and in medial related applications.

COMM 632. Humor and Communication. 3 Hours.
Advanced study of humor research as a communication process, from both source and receiver perspectives. The class investigates humor theories, research on functions, enactment, and applications of humorous communication across various work and social contexts.

COMM 635. Social & Digital Media Management. 3 Hours.
This course will present students with theoretical and applied examples of how social and digital media can be successfully managed, as well as provide examples of the consequences of unsuccessful management. In the end, students will craft a social and digital media management plan for their organization or industry of choice, based on the theories and concepts discussed.

COMM 636. Workplace Relationships. 3 Hours.
Provides an overview of workplace relationships, including superior-subordinate, mentor-protégé, peer, friendships, romantic, work-spouse, client/customer, and volunteer relationships. Focuses on the functions, developmental processes, and outcomes associated with each relationship.

COMM 645. Masspersonal Communication. 3 Hours.
Examines intersections of interpersonal and mass communication research. The role of interpersonal communication in campaigns, computer-mediated communication, avatar effects, and celebrity and character attachments is explored, as well as the effect of media use on interpersonal communication.

COMM 650. Applied Communication Theory. 3 Hours.
Introduction to major communication theories, with emphasis on the applicability of these theories in the organizational context.
COMM 651. Organizational Research and Evaluation. 3 Hours.
Practical application of understanding and interpreting quantitative research and data collected by corporations and other organization. Students will acquire skills to be more critical and knowledgeable consumers of data and research. Students will develop data-analytic skills and propose research-based solutions to make better organizational decisions.

COMM 652. Diversity in the Workplace. 3 Hours.
Examines diversity/difference at work applying an intergroup communication approach intersecting diversity, identity, prejudice, inclusion and exclusion. Explores the prominence of differences of social, moral, religious, racial, and familial group memberships in our everyday lives.

COMM 654. Social Marketing for Behavior Change. 3 Hours.
Social marketing is the practice of applying marketing principles and techniques to promote social objectives that benefit individuals or society, such as improving public health and safety, and protecting the environment. This course will introduce students the basic principles of social marketing and teach them the steps in developing a social marketing communication campaign.

COMM 655. Computer-Mediated Communication and Professional Identity. 3 Hours.
Examines digital media footprints and strategies for effectively communicating professional identities online. Students evaluate current online identity portrayals and develop a theory-based strategy for goal-directed self-presentations.

COMM 656. Organizational Culture. 3 Hours.
This course examines how human communication that occurs within an organization influences how the organization creates, sustains, and changes its workplace culture. Emphasis is placed on how organizational culture is created through artifacts, espoused and enacted values, and underlying assumptions/beliefs.

COMM 659. Case Studies in Communication. 3 Hours.
This course focuses on case studies involving organizational ethics. Communication issues and situations are evaluated from various ethical perspectives. Students create their own case study.

COMM 660. Communication in the Organization. 3 Hours.
This course exposes students to the role of communication in organizational environment with particular emphasis on its social science roots.

COMM 662. Conflict in Professional Life. 3 Hours.
This course is designed to examine research findings and theory about managing and resolving conflict in professional life. This course will examine both the macrodynamics (i.e., general/global conflict processes that occur in any social setting) and microdynamics (i.e., conflict that occurs uniquely in the workplace) of conflict research.

COMM 672. Family Difference. 3 Hours.
Addresses within-family differences spanning communicative, social identity, and other categories of differentiation. Explores family socialization of difference, examining the (un)just, inclusive and exclusive communication practices taught within families.

COMM 675. Entertainment-Education. 3 Hours.
Survey of current research on entertainment-education theory and applications, a communication strategy that utilizes entertainment media, usually fictional drama, suspense and humor, in order to educate audiences and improve their health, safety, human rights, or other critical social issues.

COMM 685. Media & Emotion. 3 Hours.
Introduction to fundamental theories of emotion and survey of current theory and research on how emotions affect people's media selections and influence their experience with media content.

COMM 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

COMM 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

COMM 693. Grantseeking. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

COMM 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

COMM 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

COMM 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project, or a dissertation. (Grading may be S/U.)

COMM 700. Survey of Human Communication Theory. 3 Hours.
Broad overview of contemporary theories in human communication. Should be taken the first semester of graduate study.

COMM 701. Graduate Research Methods. 3 Hours.
Major emphasis on designing and conducting experimental and laboratory research in human communication. Computer applications to social science research also given consideration. Should be taken the first semester of graduate study.
COMM 702. Advanced Interpersonal Communication. 3 Hours.
PR: COMM 602. This course examines how interpersonal communication patterns are linked to relational processes, both as influences and outcomes. Emphasis is on in-depth analysis of social science interpersonal research.

COMM 706. Advanced Organizational Communication. 3 Hours.
PR: COMM 606. This course provides an overview of the history and development of organizational communication. Additionally, current organizational theories and perspectives are investigated.

COMM 711. Advanced Seminar in Research Methods. 3 Hours.
PR: COMM 701. Research techniques necessary to conduct original communication research. Emphasis on advanced statistical techniques.

COMM 712. Communication Measurement. 3 Hours.
PR: COMM 701. This course investigates measures and instruments used in the field of communication studies. Focus is placed on the creation and validation of communication measures.

COMM 713. Qualitative Research Methods. 3 Hours.
Qualitative research methods in human communication and related professional areas with major emphasis on conducting and evaluation qualitative research procedures. Special focus on practical application.

COMM 719. Advanced Instructional Communication. 3 Hours.
Examination of issues surrounding instructional communication. Topics include study of history, paradigms, and programmatic areas of research of instructional communication.

COMM 722. Dark Side of Interpersonal Communication. 3 Hours.
Addresses transgressions and other violations of relational rules and their antecedents and consequences in the context of close personal relationships.

COMM 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of communication studies. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students on assistantships to gain teaching experience. (Grading will be P/F.).

COMM 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

COMM 792. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

COMM 793. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

COMM 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

COMM 796. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

COMM 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.).

DATA SCIENCE

DSCI 501. Data Analysis. 3 Hours.
Basic statistical principles, probability rules, R programming, probability distributions, estimation and testing related to binomial and Poisson distributions, goodness-of-fit test, contingency-table models, the normal distribution, sampling distributions, simulations, one- and two-sample inferences, bootstrap inferences, nonparametric tests, simple linear regression, one-way analysis of variance, model assessment, and multiple testing. R is used for modeling and plotting data based examples and exercises.

DSCI 502. Data Modeling. 3 Hours.
PR: DSCI 501 or Consent. Matrix algebra using R, analysis of covariance, least squares means, model assessment, multi-way analysis of variance, fixed, random, and mixed effects models, expected mean squares, variance components, unbalanced models, multiple comparisons, nested and block designs, multilevel models, multiple regression, transformations, polynomial and nonlinear regression, logistic regression, and Poisson regression. R is used in data based examples and exercises.

DSCI 503. Data Science Processes. 3 Hours.
PR: DSCI 500. Basic data science algorithms. Data science processes, including workflows to build data products based on data collection and processing, machine learning algorithms, and statistical models using R and Python. Reproducible project reports, including data visualizations.

DSCI 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation in advanced topics that are not covered in regularly scheduled courses.

DSCI 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.
DSCI 695. Independent Study. 1-9 Hours.
Faculty-supervised study of topics not available through regular course offerings.

ENGLISH

ENGL 507. The Writing of Health and Medicine. 3 Hours.
PR: Departmental approval. Students read, analyze, and write texts in these genres-considering their audiences, purposes, and conventions as well as the role of specific texts in shaping the practices and experiences of health and medicine. Students may not earn credit for both ENGL 407 and ENGL 507.

ENGL 508. Rhetoric and Science. 3 Hours.
This course explores the relationship between rhetoric and science. Students will analyze the audiences, purposes, and conventions of scientific arguments as well as the role of specific texts in shaping scientific disciplines and debates. No background in science is required.

ENGL 509. Approaches to Teaching Composition. 3 Hours.
Prepares graduate students in the English Secondary Education MAC program for initial certification by surveying theories and foundational principles that inform contemporary writing instruction, and by providing opportunities to practice and experiment with writing pedagogies and to develop classroom leadership.

ENGL 550. Introduction to Forensic Linguistics. 3 Hours.
The course introduces students to the analysis of language for legal purposes and provides them first-hand experience in forensic linguistics. The course focuses on the application of linguistic theory, research, and procedures to issues of the law. In their final project, students analyze language data and provide a forensic linguistic report. Also listed as ENGL 450.

ENGL 593. Special Topics. 1-6 Hours.

ENGL 595. Independent Study. 1-9 Hours.
Faculty-supervised study of topics not available through regular course offerings.

ENGL 601. Studies in Composition and Rhetoric. 3 Hours.
This course explores the relationship between rhetoric and science. Students will analyze the audiences, purposes, and conventions of scientific arguments as well as the role of specific texts in shaping scientific disciplines and debates. No background in science is required.

ENGL 602. Editing. 3 Hours.
Introduces students to the theory and practice of editing.

ENGL 605. Professional Writing Theory. 3 Hours.
Introduces students to the history of, development of, and current issues in professional writing theory and research.

ENGL 606. Introduction to the Digital Humanities. 3 Hours.
Examines the evolution and application of digital research methods, focusing on topics that rotate by semester including literary and cultural studies, rhetoric and composition, and professional writing.

ENGL 607. Topics in Rhetoric. 3 Hours.
Topics vary by year; check with instructor. Course may include textual, historical, critical, and/or theoretical study. Not restricted to any one period or century.

ENGL 609. College Composition Pedagogy. 3 Hours.
Introduces students to theories, practices, and current issues in teaching college composition. Restricted to GTAs in the English department.

ENGL 610. Professional Writing Internship. 3,6 Hours.
PR: ENGL 601 and ENGL 602 and ENGL 605. Student applies research and theory to writing tasks in a professional setting; (100 workplace hours for 3 credits; 200 hours for 6 credits.).

ENGL 611. Sturm Workshop. 1 Hour.
PR: Consent. Creative writing workshop conducted by Sturm visiting writer in residence.

ENGL 618. Graduate Writing Workshop: Poetry. 3 Hours.
PR: Consent. Advanced workshop in creative writing. Genre and focus vary from semester to semester.

ENGL 618A. Graduate Writing Workshop: Fiction. 3 Hours.
PR: Consent. Advanced workshop in creative writing. Genre and focus vary from semester to semester.

ENGL 618B. Graduate Writing Workshop: Non-Fiction. 3 Hours.
PR: Consent. Advanced workshop in creative writing. Genre and focus vary from semester to semester.

ENGL 631. Studies in Nonfiction Prose. 3 Hours.
Advanced study in the genre of nonfiction, with emphasis varying from year to year. Course may include textual, historical, critical, formalist, and/or theoretical study. Not restricted to any one period or century.

ENGL 632. Studies in Poetry. 3 Hours.
Advanced study in the genre of poetry, with emphasis varying from year to year. Course may include textual, historical, critical, formalist, and/or theoretical study. Not restricted to any one period or century.
ENGL 634. Studies in Drama. 3 Hours.
Advanced study in the genre of drama, with emphasis varying from year to year. Course may include textual, historical, critical, formalist, and/or theoretical study. Not restricted to any one period or century.

ENGL 635. Studies in the Novel. 3 Hours.
Advanced study in the genre of the novel, with emphasis varying from year to year. Course may include textual, historical, critical, formalist, and/or theoretical study. Not restricted to any one period or century.

ENGL 636. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636A. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636B. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636C. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636D. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636E. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636F. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636G. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636H. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636I. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636J. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636K. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636L. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636M. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636N. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636O. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636P. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636Q. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636R. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636S. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636T. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636U. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636V. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.
ENGL 636W. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636X. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636Y. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 636Z. Study of Selected Authors. 3 Hours.
Advanced study of one or more major authors.

ENGL 646. American Literature to 1865. 3 Hours.
Readings in the literature of America from its beginnings to 1865; attention to major writers and genres; focus on literary history.

ENGL 647. American Literature, 1865-1915. 3 Hours.
Readings in the literature of America from 1865-1915; attention to major writers and genres; focus on literary history.

ENGL 648. American Literature, 1915-Present. 3 Hours.
Readings in the literature of America from 1915 to the present; attention to major writers and genres; focus on literary history.

ENGL 661. Medieval Literature. 3 Hours.
Readings in the literature of the medieval period; attention to major writers and genres; focus on literary theory.

ENGL 663. Shakespeare. 3 Hours.
Intensive study of selected plays. Special attention to textual problems and to language and poetic imagery, together with the history of Shakespearean criticism and scholarship.

ENGL 664. Renaissance Literature. 3 Hours.
Readings in the literature of the English renaissance; attention to major writers and genres; focus on literary history.

ENGL 666. Restoration and Eighteenth-Century Literature. 3 Hours.
Readings in the literature of England during the Restoration and the eighteenth century; attention to major writers and genres; focus on literary history.

ENGL 668. Romantic Literature. 3 Hours.
Readings in the literature of England during the Romantic period; attention to major writers and genres; focus on literary history.

ENGL 669. Victorian Literature. 3 Hours.
Readings in the literature of England during the Victorian period; attention to major writers and genres; focus on literary history.

ENGL 671. Twentieth-Century British Literature. 3 Hours.
Readings on the literature of England during the twentieth century; attention to major writers and genres; focus on literary history.

ENGL 680. Introduction to Literary Research. 1-6 Hours.
Bibliography; materials and tools of literary investigations; methods of research in various fields of literary history and interpretation; problem of editing. Practical guidance in the writing of theses.

ENGL 682. Recent Literary Criticism. 3 Hours.
Brief survey of theories of major schools of recent criticism and an application of these theories to selected literary works.

ENGL 683. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

ENGL 691. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

ENGL 692. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

ENGL 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

ENGL 697. Research. 1-9 Hours.

ENGL 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.
ENGL 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use of the University's facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is S/U; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement in the semester in which graduation occurs.

ENGL 701. Seminar in Rhetoric. 3 Hours.
PR: ENGL 601, or ENGL 605, or ENGL 609. Topics vary. Focus will be on a problem or issue in rhetorical studies that reflect the instructor's current research (check with instructor).

ENGL 741. Seminar in American Studies. 3 Hours.
Seminar in principal authors and movements in American literature.

ENGL 764. Seminar in Renaissance Studies, 1550-1660. 3 Hours.
Studies in major authors and special topics in the Renaissance.

ENGL 766. Seminar in Restoration and Eighteenth-Century Studies. 3 Hours.
Studies in major authors and special topics in the period.

ENGL 768. Seminar in British Romanticism. 3 Hours.
Studies in major authors and special topics in the field of British Romanticism.

ENGL 771. Seminar in Twentieth-Century British Studies. 3 Hours.
Seminar in principal authors and movements in twentieth-century British literature.

ENGL 782. Current Directions in Literary Study. 3 Hours.
PR: Advanced graduate standing (prior completion of ENGL 682 is recommended). Intensive study of one or more current approaches to literature and theories of criticism, with some emphasis on the interrelations of literary study with other disciplines.

ENGL 789. Folger Seminar. 1-6 Hours.
PR: Graduate standing. (Enrollment is by special application only. Contact department chairperson for information.) Seminar conducted by distinguished scholars and held at the Folger Institute in Washington, D.C. Topics vary.

ENGL 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of English. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading will be P/F.)

ENGL 793. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

ENGL 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

ENGL 797. Research. 1-9 Hours.

ENGL 798. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

ENGL 900. Professional Development. 1-6 Hours.
Professional development courses provide skill renewal or enhancement in a professional field or content area (e.g. education, community health, geology.) The continuing education courses are graded on a pass/fail grading scale and do not apply as graduate credit toward a degree program.

ENGL 930. Professional Development. 1-6 Hours.
Professional development courses provide skill renewal or enhancement in a professional field or content area (e.g., education, community health, geology.) These tuition-waived continuing education courses are graded on a pass/fail grading scale and do not apply as graduate credit toward a degree program.

ENGLISH AS A SECOND LANGUAGE

ESL 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of English as a Second Language. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on Assistantships to gain teaching experience. (Grading will be S/U.)

ESL 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.
ESL 630. American Culture. 3 Hours.
Advanced readings concerning the diversity of American culture with a focus on critical inquiry.

ESL 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

ESL 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U).

FORENSIC AND INVESTIGATIVE SCIENCE

FIS 501. Foundations of Criminalistics. 3 Hours.
PR: Corequisite of FIS 501L. Core theories and fundamental principles of criminalistics. Particular attention dedicated to problems of interpreting physical evidence. Also addresses aspects of research, scientific method, and ethics.

FIS 501L. Foundations of Criminalistics Laboratory. 0 Hours.

FIS 502. Forensic Laboratory Management. 3 Hours.
PR: Corequisite of FIS 502L. Overview of management issues in forensic science laboratories, including personnel and human resources, project management, leadership, organization, communication, strategy and budgeting.

FIS 502L. Forensic Laboratory Management Laboratory. 0 Hours.
PR: Corequisite of FIS 502. Forensic Laboratory Management - FIS 502 Laboratory.

FIS 505. Biological and Chemical Evidence. 3 Hours.
PR: Acceptance to the Forensic Justice LL M. The course will enable legal professionals to have a basic understanding of Chemical and Biological evidence in legal proceedings. It is a cross link between science and law and will close the existing gap between the two disciplines. The course will enable legal professionals to prepare for examination or cross examination of expert witnesses in legal proceedings.

FIS 514. Forensic Impression & Trace Evidence. 3 Hours.
PR: Admission to the Master of Laws (LLM) in Forensic Justice and FIS 480 with a minimum grade of C-. Introduction to the analysis and interpretation of forensic impression and trace evidence. Critical analysis skills for data collection methods, data interpretation, reporting structures, current challenges, and anticipated advances. Topics include: fingerprints, firearms, footwear, microscopy, hair, glass, and bloodstain pattern analysis.

FIS 592. Directed Study. 1-6 Hours.
PR: Consent. Directed study, reading, and or research.

FIS 602. Forensic Informatics. 4 Hours.
PR: Corequisite of FIS 602L. Introduction to mathematical methods of forensic data analysis, including (1) digital imaging theory, (2) data pre-processing and exploitation methodologies (e.g., principle component analysis, frequency filtering, etc.) and (3) classical and post classical decision metrics. Theoretical concepts will be supplemented by practical laboratory exercises. Basic algorithm development will also be discussed.

FIS 602L. Forensic Informatics Laboratory. 0 Hours.
PR: Corequisite of FIS 602. This is a practical laboratory class designed to familiarize the student with real-world applications of data processing. Students will formulate individualized semester-projects that can be solved using automated and numerical computing approaches. Project tasks will be executed and validated throughout the semester, culminating in a functional solution to a real-world problem that will be described in video tutorial.

FIS 610. Firearms Examination. 3 Hours.
PR: Corequisite of FIS 610L. Fundamentals and advanced aspects of firearms related to evidence. Topics include the design, mechanism, and manufacture of firearms as well as interior, exterior and terminal ballistics. This course includes laboratory component.

FIS 610L. Advanced Firearms Examination Laboratory. 0 Hours.
PR: Corequisite of FIS 610.Firearms Examination - FIS 610 Laboratory.

FIS 614. Trace Evidence Examination. 3 Hours.
PR or CONC: FIS 614L, and a background in the fundamentals of chemistry and microscopy (inclusive of laboratories) equivalent to WVU's FIS 340/341 and FIS 314 are necessary for success in this course. Develops the skills to identify and examine trace evidence, and interpret its role in forensic investigations. Students will analyze the current state of forensic examinations of glass, paint, tape, hairs, fibers, inks and firearm discharge residues.

FIS 614L. Laboratory Trace Evidence Examinations. 1 Hour.
PR or CONC: FIS 614 and a background in the fundamentals of chemistry and microscopy (inclusive of laboratories) equivalent to WVU's FIS 340/341 and FIS 314 are necessary for success in this course. Hands-on laboratory designed to prepare students for the forensic examination of trace evidence. This course will guide students to develop analytical skills for the collection, recovery, preservation, analysis, and interpretation of trace materials commonly analyzed in crime laboratories (glass, paint, tapes and adhesives, gunshot residues, inks and paper, soil, fibers and hair).

FIS 615. Questioned Document Examination. 3 Hours.
This course will focus on handwriting comparisons, signatures, typewriting, and typescripts. Topics include erasures, additions and alterations, printed and photocopied documents and ink analysis. This course includes a laboratory component.
FIS 620. Forensic Casework Practicum. 3 Hours.
Students will manage mock cases involving multiple types of evidence. They will collect, analyze and interpret the evidence. Written reports on the case will be submitted to evaluation during a mock trial.

FIS 632. Advanced Forensic Biology. 3 Hours.
PR: Corequisite of FIS 632L. Overview of forensic biological history and current methods used by a DNA analyst working in a crime laboratory. Focus on interpretation and reporting of DNA data. The course will coincide with laboratory exercises to solidify concepts learned in class.

FIS 632L. Advanced Forensic Biology Laboratory. 0 Hours.
PR: Corequisite of FIS 632. This laboratory will provide practical experience with the fundamental methods utilized by the forensic DNA analyst from sample identification through report writing.

FIS 660. Advanced Forensic Chemistry. 3 Hours.
This course covers the chemical analysis of a wide variety of forensic evidence types. Topics include statistics, sampling, data quality, calibration, sample preparation, instrumentation; drug analysis, toxicology and explosives. This course includes a laboratory component.

FIS 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

FIS 695. Independent Study. 1-9 Hours.
Faculty Supervised study of topics not available through regular class offerings.

FIS 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

FIS 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.).

FIS 703. Research Design in Forensic Science. 3 Hours.
PR: Admission to the FIS Doctor of Philosophy program. Research Design in Forensic Science is an applied research and statistics based course established specifically for students in the FIS Doctor of Philosophy program. The course will prepare students for data analysis related to sampling, regression, outlier detection, univariate significance testing, propagation of uncertainty, multivariate classification, classifier evaluation, Bayesian reasoning, data standardization and significance reporting.

FIS 792. Directed Study. 1-6 Hours.
FIS 796. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

FIS 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation.

FOREIGN LITERATURE IN TRANSLATION

FLIT 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

FLIT 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

FLIT 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of FLIT.

FLIT 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

FLIT 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

FLIT 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

FLIT 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

FLIT 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.).
FRENCH

FRCH 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of French. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading will be P/F.).

FRCH 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

FRCH 592. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

FRCH 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

FRCH 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

FRCH 595. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

FRCH 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of French. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience. (Grading will be P/F.).

FRCH 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

FRCH 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

FRCH 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

FRCH 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

FRCH 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

FRCH 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

FRCH 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project, or a dissertation. (Grading may be S/U.).

FRCH 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

FRCH 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use of the University’s facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department’s 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is P/F; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.

FRCH 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

GEOGRAPHY

GEOG 520. Methods for Open Science. 3 Hours.
New approaches in data science are enabling collaboration and discovery at unprecedented rates and scales. Students will learn how to rapidly download data; use the terminal to search, organize, and edit large numbers of files; develop a workflow, functions, and loops in open programming language (Unix-like and R); and use version control software (GitHub) to enable collaboration and reproducibility.
GEOG 550. Geographic Information Science. 4 Hours.
PR: Corequisite of GEOG 550L. Principles and practice of geographical information science. Geospatial data handling for research, planning and decision-making. Spatial analysis, information production, and display.

GEOG 550L. Geographic Information Science Laboratory. 0 Hours.
PR: Corequisite of GEOG 550. Geographic Information Science - GEOG 550 Laboratory.

GEOG 551. Open-Source GIScience. 3 Hours.
PR: GEOG 550 or students must complete an equivalent course or undergraduate GIS coursework and obtained instructor permission. The goal of this course is to introduce students to open-source software tools and standards for working with spatial data and undertaking spatial analysis. Topics explored include open data standards, open metadata standards, open licensing options, and undertaking geospatial data science in currently available open source environments including QGIS, GRASS, SAGA, Orfeo Toolbox, and WhiteboxTools.

GEOG 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

GEOG 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

GEOG 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

GEOG 600. Geography Research Colloquium. 1 Hour.
PR: Consent. Lectures and presentation on recent and current research by resident and visiting scholars.

GEOG 601. Geographic Thought. 3 Hours.
This seminar explores formative theories and ideas in contemporary geographic thought. It covers some of the essential history of geographic thought, but the course is not a comprehensive survey of the “traditions” of the Geographic discipline. Rather, we examine the key epistemologies that have animated our discipline since mid 20th century.

GEOG 602. Geographic Research-Design. 3 Hours.
PR: GEOG 300 and GEOG 601. Choosing, preparing, and developing research problems of geographic interest. Emphasizes proposal writing and research design alternatives.

GEOG 603. Qualitative Research in Geography. 3 Hours.
PR: GEOG 601. Analysis of qualitative research in geography and related fields. Examine methodological approaches and techniques that explore and interpret issues in the development of geographical research projects.

GEOG 602. Gender, Society and Space. 3 Hours.
PR: GEOG 601 or Consent. Examines how gender and feminist perspectives are an integral part of how space is used, distributed, and perceived in society. Overviews of major developments in the field including diversity and difference, representation, identity, and nature.

GEOG 640. Geopolitical Perspectives. 3 Hours.
This course uses geopolitical perspectives to critically examine the linkages between power and places. Seminal literatures in the sub-field of geopolitics are read and critiqued, including critical geopolitics, feminist geopolitics and post-colonial theory.

GEOG 650. Political Ecology Seminar. 3 Hours.
Critical examination of the some of the most world’s most pressing social-ecological challenges, including the impacts of and responses to climate change and issues of environmental justice, based on scholarship from the social and biophysical sciences. Students will explore foundational texts, core themes and debates, and future trajectories in political ecology.

GEOG 651. Geographic Information Science: Technical Issues. 3 Hours.
PR: GEOG 350. Current issues in GIS research. Technical aspects of GIS operations, algorithms, theory of geographical data structures, and error handlings. Labs focus on tools, data structures, database languages and macros. (2 hr. lec., 1 hr. lab.).

GEOG 654. Environmental Geographic Information Systems Modeling. 3 Hours.
Provides background and hands-on experience needed to answer scientific questions about the environment within a raster-based GIS Framework. Students should have introductory level GIS background.

GEOG 655. Remote Sensing Principles. 3 Hours.
PR: Corequisite of GEOG 655L. Mapping of earth features using aerial and satellite-borne sensors, image enhancement, geo-referencing, and classification. (Also listed as GEOL 655).

GEOG 655L. Remote Sensing Principles Laboratory. 0 Hours.

GEOG 657. Open-Source Spatial Analytics. 3 Hours.
PR: GEOG 550. Prepare, analyze, and model geospatial data using the R language and computational environment. Topics covered include coding in R, data wrangling, data visualization and mapping, vector- and raster-based spatial analysis, spatial predictive modeling using machine learning, and presenting results.
GEOG 662. Digital Cartography. 3 Hours.
PR: GEOG 550. Use cartographic principles, geographic information systems (GIS), graphic design software, and digital data to generate reference and thematic maps appropriate for an intended audience. Learn to generate effective maps and visualizations by exploring cartographic standards, geospatial datums and projections, data visualization techniques, scale and generalization, typology and labeling, use of color, and parameterization of symbols.

GEOG 663. Client-Side Web GIS. 3 Hours.
PR: GEOG 550. Explore client-side web technologies and tools for serving data and developing web maps and applications. Define web content using hypertext markup language (HTML), style web content using cascading style sheets (CSS) and Bootstrap, and add functionality to a website using JavaScript, jQuery, and web mapping APIs.

GEOG 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

GEOG 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

GEOG 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

GEOG 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

GEOG 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

GEOG 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his/her program.

GEOG 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U).

GEOG 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

GEOG 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use of the University's facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is P/F; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.

GEOG 701. Quantitative Spatial Analysis. 3 Hours.
This course covers methodological issues in the use of statistics for analysis of geographical data, such as sampling, inference, and the modifiable areal unit problem. It also covers a series of specific quantitative techniques tailored to student needs, such as spatial regression, measures of spatial autocorrelation, and geostatistical interpolation.

GEOG 753. Exploratory Spatial Data Analysis. 3 Hours.
Develop expertise in spatial analytical techniques for use in geographical data analysis and GIS.

GEOG 755. Advanced Remote Sensing. 3 Hours.
PR: (GEOG 655 or GEOL 655) and Coreq: GEOG 755L or consent. Collection, processing, and classification of remotely sensed data, including optical, thermal, radar, and topographic information. (Also listed as GEOL 755.)

GEOG 780. Non-Thesis Project. 3 Hours.
Research activities leading to a non-thesis project report.

GEOG 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

GEOG 792. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

GEOG 793. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

GEOG 794. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.
GEOG 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

GEOG 796. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

GEOG 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U).

GEOLOGY

GEOL 505. Scientific Writing. 3 Hours.
Fundamentals of effective science communication with emphasis on the skills and ethical practices required to produce high-quality, long-form writing projects. Course work involves all aspects of the writing process, including planning, drafting, editing and revising. Course also addresses how to identify and target different audiences using alternative science communication formats. Emphasis on geoscience but applicable to all natural sciences.

GEOL 510. Computer Aided Subsurface Interpretations. 3 Hours.
PR: GEOL 311 and GEOL 341. Develop subsurface interpretations from integrated geological, geophysical and engineering databases in a computer workstation environment. Construct maps and 3D visualizations of subsurface structure, seismic horizons, layer properties, etc., for prospect location and subsurface assessment.

GEOL 511A. Sedimentary Geology in Ireland - Travel. 1 Hour.
Travel portion of GEOL 511. See GEOL 511 for description.

GEOL 522. Surficial and Glacial Geology. 3 Hours.
PR: GEOL 321 or GEOG 321 or consent. Analysis of late Cenozoic landscapes, especially those caused by glaciers or otherwise influenced by global climate change. Required weekend field trips at student's expense. (Also listed as GEOG 522.).

GEOL 525. Problems in Geomorphology. 4 Hours.

GEOL 543. Tectonics. 3 Hours.
PR: GEOL 341 and GEOL 311; undergraduates need Consent. Investigation of patterns and processes of large-scale deformation mechanisms that shape the earth. Focuses on the structural evolution and modeling process of various plate boundaries.

GEOL 556. 3-D Seismic Visualization. 3 Hours.
This course focuses on the application of 3-D seismic data visualization and interpretation technologies to the characterization of subsurface structure, facies, and reservoirs, with particular reference to hydrocarbon exploration and CO2 sequestration.

GEOL 558. Seismic Attribute. 3 Hours.
PR: GEOL 341 and GEOL 311 and MATH 155. The effective seismic attribute technologies and attribute interpretation workflows, their application to the characterization of subsurface structures, facies, and reservoir properties, with particular reference to hydrocarbon exploration and CO2 sequestration.

GEOL 562. Quantitative Hydrogeology. 3 Hours.
PR: MATH 156 or GEOL 351 and GEOL 463 or Consent. Mathematical and computer analysis of groundwater flow, aquifer systems, radial-flow solutions; well/aquifer test methods; superposition, boundaries; dispersive/advective transport.

GEOL 564. Environmental Hydrogeology. 4 Hours.
PR: GEOL 101 and GEOL 102 and GEOL 463 and (PR or CONC: GEOL 562). Seminar reviewing groundwater occurrence, flow, quality, and exploration in various geologic terrains; groundwater pollution and dewatering; and groundwater technology. Includes topical literature review.

GEOL 575. Imperial Barrel Competition. 3 Hours.
The students will participate in the Imperial Barrel Award competition sponsored by the American Association of Petroleum Geologists (AAPG). They will evaluate a real-world petroleum basin using industry seismic and well data and will make a presentation to a panel of professional judges recommending an exploration strategy. Travel to the regional and national AAPG meeting may be required.

GEOL 579. Applied Petroleum Geoscience. 3 Hours.
Students work in teams to conduct integrated characterization of a petroleum reservoir, develop numerical simulation, consider technical options, perform economic analyses and make a final report to the company/organization.

GEOL 580. Organic Contaminant Geochemistry. 3 Hours.
This course focuses on fundamental chemical properties and structures of organic contaminants that control their functionality, fate, and transport in the environment. Natural organic matter and inorganic phases are discussed relative to contaminant mobility.

GEOL 585. Optical Mineralogy and Petrology. 3 Hours.
PR: GEOL 285. Introduction to the optical properties of minerals and the use of the petrographic microscope. Interpretation of sedimentary, igneous, and metamorphic rocks based on microscopic examination of thin sections. (Offered alternate years.).

GEOL 586. Advanced Isotope Geochemistry. 3 Hours.
PR: GEOL 486. Advance the understanding of isotopic systems by comprehensive discussion of selected research publications. Laboratory exercises will provide hands-on training in stable isotope measurement techniques. Study topics will focus on use of isotopes to address research questions in variety of fields, including geology, biology, forensics, environmental sciences and energy.
GEOL 588. Aqueous Geochemistry. 3 Hours.
PR: GEOL 101 and CHEM 112 or CHEM 116, or Consent. Review of basic chemical principles as they apply to aqueous geochemical environments. Properties of water and the types, sources, and controls of the common and environmentally significant chemical species dissolved in water.

GEOL 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

GEOL 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

GEOL 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

GEOL 615. Advanced Stratigraphic Methods. 3 Hours.
Advanced discussion of stratigraphic correlation techniques, including sequence stratigraphy, to analyze deposition of clastic and carbonate sediments, with emphasis on assessing porosity development in sandstones and limestones, organic matter deposition, and flow of fluids, such as water, gas and oil, through rock.

GEOL 616. Advanced Sedimentation. 4 Hours.
PR: GEOL 311 or Consent. (Required field trips at student's expense.) Origin of sedimentary rocks; principles involved in interpretation of ancient geography, climates, animals, and plants. Emphasis on detrital sediments and rocks.

GEOL 621. Advanced Fluvial Geomorphology. 4 Hours.
PR: GEOL 321 or GEOG 321 or Consent. Analysis of stream processes, landforms, deposits, including paleohydrology and Appalachian surficial geology. (Required weekend field trips at student's expense; also listed as GEOG 521.).

GEOL 632. Paleoeocology. 3 Hours.
PR: GEOL 331 and GEOL 311 or Consent. Methods of paleoecologic analysis in sedimentary geology. Topics include trace fossil analysis, shell biogeochemistry, community paleoecology, biofacies analysis of basins, and Precambrian paleoecology.

GEOL 642. Advanced Structural Geology. 3 Hours.
PR: GEOL 341. Theoretical and observational aspects of the development of geological structures. Problems ranging from the microstructural to the orogenic scale will be addressed.

GEOL 645. Basin Analysis. 3 Hours.
PR: GEOL 341 and GEOL 311 or equivalent. The origin, development, and distribution of basins and the structure found within basins throughout the world are studied. The techniques used for investigating basin evolution are emphasized. The effects of basin processes on the occurrence of energy resources are addressed.

GEOL 659. Quantitative Methods in Geoscience. 3 Hours.
PR: STAT 312 or STAT 511 or Consent. Brief review and introduction to multivariate quantitative techniques as applied to geology and geography.

GEOL 665. Groundwater Modeling. 4 Hours.
PR: GEOL 562 or Consent. Theory and application of groundwater flow modeling, focusing on MODFLOW; numerical methods; discretization and boundaries; parameterization and calibration; problems and case histories.

GEOL 666. Karst Geology. 3 Hours.
PR: Consent. Review of karst terrain hydrogeology and geomorphology, emphasizing origins and nature of caves, sinkholes and other karst landforms, environmental problems of karst, and its water and mineral/ petroleum resources.

GEOL 680. Masters Project Research. 1-5 Hours.
Planning and presentation of a professional project, including proposal, work plan execution, and project report. Status reports and timeline planning. Must be taken in two consecutive semesters, totaling to 6 credits.

GEOL 681. Grad Internship in Geology. 1-6 Hours.
PR: Be enrolled in the Geology MS with a Professional Studies AOE and consent. To obtain practical work experience in a professional setting while obtaining skills and knowledge as a geologist.

GEOL 682. Masters: Professional Studies Track Cohort Seminar. 1 Hour.
PR: Registered students in the Geology MS - Professional Studies Track. This seminar will provide graduate students with the information, tools and resources needed to succeed in the Masters of Geology Professional Studies Track.

GEOL 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of geology. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience. (Grading will be P/F.)

GEOL 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

GEOL 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.
GEOL 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

GEOL 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

GEOL 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

GEOL 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Series of meetings that may include research presentations by students, faculty, or visitors; discussions of professional issues or current literature; or other varying topics.

GEOL 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.).

GEOL 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

GEOL 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking course work credit, but who wish to meet residence requirements, use the University facilities and participate in its academic and cultural programs. NOTE: Graduate students not actively involved in course work or research or enrolled, through enrollment in their department's Graduate Colloquium, to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program and retain all of the rights and privileges of duly enrolled students. Grading is P/F; colloquium credit may not be counted against credit requirements for master's programs.

GEOL 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of geology. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading will be P/F.).

GEOL 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

GEOL 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

GEOL 796. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

GEOL 799. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use of the University's facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is P/F; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.

GEOL 930. Professional Development. 1-6 Hours.
Professional development courses provide skill renewal or enhancement in a professional field or content area (e.g., education, community health, geology). These tuition-waived continuing education courses are graded on a pass/fail grading scale and do not apply as graduate credit toward a degree program.

GERMAN

GER 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of German. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading may be S/U.).

GER 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

GER 592. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

GER 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.
GER 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

GER 595. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

GER 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of German. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience. (Grading may be S/U.).

GER 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

GER 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

GER 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

GER 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

GER 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

GER 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

GER 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.).

GER 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

GER 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use of the University's facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is S/U; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.

GER 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

GERONTOLOGY

GERO 512. Public Policy of Aging. 3 Hours.
Policy analysis of public programs for senior citizens - Older Americans Act, Medicare-Medicaid and Social Security. Discussion of future of these programs and societal response. Emphasis on senior programs in West Virginia. (Equivalent to GERO 412).

GERO 628. Aging Women & Cultural Issues. 3 Hours.
This course will use a multi-disciplinary approach to examine the impact of gender, race/ethnicity, and culture on aging, and the aging population.

GERO 645. Fundamentals of Gerontology. 3 Hours.
Introduction to the multidisciplinary field of gerontology and the biological, psychological, social, and spiritual aging processes. Examination of challenges and opportunities in older adulthood. Examination of the growth, diversity, and resilience of older adults and their family. Analysis of policies and programs designed to assist this population.

GERO 681. Rural Gerontology. 3 Hours.
Contemporary knowledge and understanding of aging in small towns and rural areas. Exploration of unique challenges and opportunities facing rural elders and their families and the professionals who work with them. Examination of public policies that impact this population and health care and social service delivery within the rural context.

GERO 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

GERO 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.
GERO 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

GERO 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U).

HISTORY

HIST 517. German Central Europe: Empires, States and Nations, 1648-1900. 3 Hours.
Explores the Habsburg Monarchy and Holy Roman Empire, following devastation of 30 years of War, Enlightenment and State-building, Industrialization and Nation-building until the eve of the Great War.

HIST 518. Twentieth Century German Central Europe. 3 Hours.
Explores the two World Wars, Holocaust, the Cold War, National Socialist, Communist, and Democratic regimes and Austria as well as the reunification of Germany following Revolutions of 1989.

HIST 525. History of Modern China. 3 Hours.
Provides an overview of Chinese history with an emphasis on major events since the mid-19th century, placed in a broad context of the important political, economic, social, and diplomatic events in China's historic past.

HIST 526. History of Modern Japan. 3 Hours.
Provides an overview of Japanese history with an emphasis on major events since the mid-19th century, placed in a broad context of the important political, economic, social, and diplomatic events in Japan's historic past.

HIST 558. United States Cultural History 1819-1893. 3 Hours.
Examines the cultural panics about identity and sensibility produced by capitalism, slavery, and war in the nineteenth-century United States.

HIST 575. Hollywood and History. 3 Hours.
Examines twentieth century American culture, politics and society through film. It explores the relationship between film and history, using films as primary sources for understanding the past and it examines how film is used in teaching history.

HIST 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

HIST 600. Cultural Resource Management. 3 Hours.
PR: Consent. Explores principles and practices of managing cultural and material historic resources, with an overview of best practices, federal requirements, and fundamental skills expected of the practitioner.

HIST 605. Historical Administration and Governance. 3 Hours.
Exploration of professional standards, governance, grant writing, and financial sustainability for leadership roles in historical societies, archives, museums, and other cultural agencies that collect and preserve historical material. Through examination of institutional histories, students will compare models for shaping institutional policy, procedures, planning, and visioning.

HIST 609. Field Methods in Historic Preservation. 3 Hours.
Outlines professional historic preservation fundamentals associated with inquiry, documentation and analysis. A variety of research approaches expose students to both primary and secondary sources that are typically utilized when conducting reconnaissance or intensive level historic surveys or in preparing HABS/HAER or NRHP documentation.

HIST 610. Historic Site Interpretation. 3 Hours.
Introduction to the craft of historic site interpretation. Readings, lectures, and field trips will explore current issues, approaches to developing meaningful experiences for visitors, and the transmission of culture through historic places.

HIST 611. Archival Management. 3 Hours.
PR: HIST 412. Principles and practices of archival work within a laboratory context. Includes lectures and selected readings illustrated by holdings and policies of West Virginia and Regional History Collection of the WVU Library.

HIST 613. Local History Research Methodology. 3 Hours.
Emphasis on research methods applicable to any locality; includes legal records, oral records, secondary sources, photographs, maps, and government documents.

HIST 614. Internship in Public History. 1-6 Hours.
PR: Consent. A professional internship at a historical agency. Supervision is exercised by history department faculty and the host agency. Written and oral research report required. (Grading may be P/F.).

HIST 615. Museum Studies. 3 Hours.
Introduction to museum management and curation of collections of historic or archaeological significance. Students will learn the basic skills necessary to work with and use museum collections.

HIST 620. Practicum in Cultural Resource Management. 3 Hours.
Professional placement or scholarly research project designed to be the capstone experience for students in the CRM graduate certificate program. Placement is tailored to the area of student interest.
HIST 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

HIST 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

HIST 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project, or dissertation. (Grading may be S/U.)

HIST 700. Historiography. 3 Hours.
Core course for entering graduate students: critical survey of important contemporary approaches to history writing, methodological practices, and current issues in the field.

HIST 701. Readings in Medieval History. 3-6 Hours.
Examination of the literature, bibliography, sources, and research methods on selected problems in medieval history, using discussion and written reports on assigned readings. (May be repeated for a maximum of 6 hours.)

HIST 702. Seminar in Medieval History. 3 Hours.
PR: HIST 701; (Reading knowledge of Latin and a modern European language strongly recommended.) Directed examination of bibliographic sources and historiographical issues on selected aspects of the Middle Ages, leading to preparation of a research paper based on primary sources.

HIST 705. Readings in Early Modern History 3 Hr. 3 Hours.
Directed readings on selected major historiographical themes in European history relating to the period from the Renaissance to the French Revolution.

HIST 706. Seminar in Early Modern History. 3 Hours.
Research and writing of an article-length paper based on extensive and/or in-depth analysis of early modern primary sources. Class presentations and discussions of colleagues' work.

HIST 707. War and Society in a Transnational Context. 3 Hours.
The course examines the broad theme of War and Society in a transnational context from the late 1600s to Cold War. The course is designed to help graduate students establish a foundation for further research, to provide opportunities to strengthen their command of European history as a teaching field and to enhance their ability to think comparatively about historical topics.

HIST 717. Readings In Modern European History. 3 Hours.
The object of this course is to familiarize graduate students with the main themes and approaches in the historiography of Modern Europe from the Enlightenment to the end of the twentieth century. (May be repeated once.)

HIST 718. Seminar in Modern European History. 3 Hours.
A research seminar in selected topics in modern European history. One major paper and extensive reading based on available source material is required. A reading knowledge of the appropriate language is required, if applicable.

HIST 721. Readings in Asian History. 3 Hours.
Intensive readings in the history of East Asia (especially China and Japan) since the nineteenth century; students should normally have had HIST 425 and 426, or their equivalents; reviews, as well as bibliographical and historiographical essays, required. (May be repeated once.)

HIST 725. Readings in African History. 3 Hours.
This course will normally focus on readings and discussion on problems in the history of pre-colonial Africa, the major works in African history, and recent interpretations in the field. (May be repeated once.)

HIST 726. Seminar in African History. 3 Hours.
The seminar will normally focus on eastern Africa in the colonial period. Location and use of source materials will be emphasized as well as economic and political developments. Students will spend considerable time in research and writing on selected aspects of eastern African history. (May be repeated once.)

HIST 729. Readings in Latin American History. 3 Hours.
Critical examination of selected sources and topics for understanding and interpreting Latin American history. (May be repeated once.)

HIST 731. Readings In American History: 1585-1763. 3 Hours.
Supervised readings and reports designed to prepare students for intensive study in a seminar or for field examinations in colonial American history. (May be repeated once.)

HIST 732. Seminar in American History: 1585-1763. 3 Hours.
PR: HIST 331 or consent. Directed research on colonial American history, using original and secondary materials. (May be repeated once.)

HIST 750. Public History Methods. 3 Hours.
This course provides the foundations of public history as students examine approaches to historical interpretation for public audiences. Topics will include client-driven research, commemoration, and cultural heritage tourism.

HIST 757. Readings in United States History: 1787-1850. 3 Hours.
Critical examination of major works and themes on the political, economic, social, and legal formation of the nation. (May be repeated once.) (Alternate years.)
HIST 758. Seminar in United States History: 1787-1850. 3 Hours.
Directed research in early United States history. Research will include primary and secondary sources. (May be repeated once.) (Alternate years.).

HIST 759. Readings in United States History: 1840-1898. 3 Hours.
Survey of interpretative literature on Sectionalism, Civil War, Reconstruction and Gilded Age. Assignments are both oral and written reports on assigned readings and a critical essay on some aspect of American historiography for this period.

HIST 760. Seminar in United States History: 1850-1898. 3 Hours.
Directed research in mid-and late 19th century American history, including guidance in methods of research and manuscript preparation. (May be repeated once.).

HIST 763. Readings in United States History: 1898-Present. 3 Hours.
Readings and class-led discussion of one paperback book per week, and preparation of a paper based on these books and the class discussion of them. (Course may be repeated for credit.).

HIST 764. Seminar in United States History: 1898-Present. 3 Hours.
Directed research in recent American history including guidance in methods of research and manuscript preparation. May be repeated once.

HIST 765. Readings in United States Diplomatic History. 3 Hours.
Readings in U.S. Diplomatic History with an emphasis on the 20th century.

HIST 766. Seminar in United States Diplomatic History. 3 Hours.
Directed research in the history of U.S. foreign policy with emphasis on 20th century including guidance in methods of research and manuscript preparation.

HIST 773. Readings in Appalachian Regional History. 3 Hours.
A course for graduate students and seniors in the history of West Virginia and neighboring states, which form what is known as the Trans-Allegheny or Upper Ohio region. (May be repeated once.).

HIST 774. Seminar in Appalachian Regional History. 3 Hours.
A seminar for graduate students in the history of West Virginia and neighboring states, which form what is known as the Trans-Allegheny or Upper Ohio region. (May be repeated once.).

HIST 782. Readings in United States Social History. 3 Hours.
The objective of the course is to establish for graduate students usable frames of reference for selected topics in social history by examining the ways in which historians have written about these topics. (Course may be repeated for credit.).

HIST 785. Readings in Environmental History. 3 Hours.
Examines broad themes including settlement patterns, attitudes toward nature, the rise of ecological science, and agricultural and industrial practices. Explores historiographical and methodological issues. (May be repeated once.) (Alternate years.).

HIST 786. Seminar in Environmental History. 3 Hours.
Directed research involving primary and secondary sources. Will focus on regional case studies and examination of broad intellectual and policy themes. (May be repeated once.) (Alternate years.).

HIST 787. Readings in World History. 3 Hours.
Core course for teaching concentration in world history; review of selected exemplary and recent readings in world history; evaluation of textbooks and teaching materials; composition of syllabi, lectures, and assignments.

HIST 789. Teaching History Online. 3 Hours.
Designed to provide graduate students with the training to create an online course in History and prepare them to deliver it. Through class discussions and meetings with the instructor, students will be exposed to software tools to implement sound pedagogical practice online, different approaches to online instruction, and standards guiding online teaching in Higher Education. (Grading will be P/F).

HIST 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practices in college teaching of history. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibilities. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading will be P/F.).

HIST 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

HIST 792. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

HIST 793. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

HIST 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

HIST 796. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.
HIST 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or dissertation. (Grading may be S/U.).

HIST 900. Professional Development. 1-6 Hours.
Professional development courses provide skill renewal or enhancement in a professional field or content area (e.g., education, community health, geology). The continuing education courses are graded on a pass/fail grading scale and do not apply as graduate credit toward a degree program.

HIST 930. Professional Development. 1-6 Hours.
Professional development courses provide skill renewal or enhancement in a professional field or content area (e.g., education, community health, geology). These tuition-waived continuing education courses are graded on pass/fail grading scale and do not apply as graduate credit toward a degree program.

HUMANITIES

HUM 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

LANGUAGE TEACHING METHODS

LANG 521. English as a Second Language Methods. 3 Hours.
Theory and practice of teaching English as a second language; techniques and approaches for teaching speaking, listening, reading, and writing skills.

LANG 522. Computer Assisted Language Learning. 3 Hours.
Examines CALL (Computer Assisted Language Learning) methodologies, introduces principles of CALL evaluation, explores current CALL practices in language teaching, develops web-based CALL materials, and reviews CALL research.

LANG 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of languages. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading may be P/F.).

LANG 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

LANG 592. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

LANG 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

LANG 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

LANG 595. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

LANG 610. Methods of Research. 3 Hours.
This class covers basic research skills and professional norms in the field of applied linguistics. Topics include: finding, reading, synthesizing, and evaluating primary research; research questions, research design, sampling strategies, data collection procedures, and data analysis in quantitative and qualitative methods; and proposing research projects.

LANG 621. Teaching Foreign Language in College. 3 Hours.
CONC: LANG 690. Methods and techniques of teaching a foreign language at the college level.

LANG 622. English as a Second Language Theory. 3 Hours.
PR: LING 101 or LING 311. Explores factors and processes involved in the acquisition of English as a second language and their implications for classroom instruction.

LANG 624. Second Language Writing. 3 Hours.
PR: LING 101 or equivalent. A study of how adults learn to write in a second language and how to help them improve their writing.

LANG 625. Language Assessment. 3 Hours.
Introduces fundamental principles of language testing and helps students develop skills in test development, item analysis, interpretation of test results.

LANG 626. Literacy in a Second Language. 3 Hours.
Reviews theoretical perspectives on reading and literacy development and explores research studies that cover different areas in second language reading and literacy (biliteracy).

LANG 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of languages. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience. (Grading may be P/F.).
LANG 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

LANG 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

LANG 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

LANG 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

LANG 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

LANG 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

LANG 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.)

LANG 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

LANG 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use of the University's facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is P/F; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.

LANG 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

LANG 930. Professional Development. 1-6 Hours.
Professional Development courses provide skill renewal or enhancement in a professional field or content area (e.g., education, community health, geology). These tuition-waived continuing education courses are graded on a pass/fail grading scale and do not apply as graduate credit toward a degree program.

LEADERSHIP STUDIES

LDR 501. Advanced Leadership Theory and Practice. 3 Hours.
The objectives of this course are to introduce, examine, critique, and apply leadership theories to workplace settings. Topics will include person-centered, group-centered, and process-centered approaches to leadership. This is the first required course for students taking the graduate certificate in leadership.

LDR 551. Advanced Problems in Leadership. 3 Hours.
PR: LDR 501. This is the second core course in the sequence to attain the Graduate Certificate in Leadership. The objectives of this course are to introduce followership, critique the relationship between leaders and followers, and to detect context in workplace settings. Major topics include leaders, followers and context.

LDR 595. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

LDR 601. Applied Leadership in the Workplace. 3 Hours.
PR: LDR 551. The objective of this course is to provide a comprehensive understanding and application of the Leaders, Followers, Context framework to the professional workplace setting. Students create action projects in order to improve their workplace context.

LDR 610. Operationalizing Leadership. 3 Hours.
Practical applications of leadership within public and private sectors. Examines case studies and simulations to illustrate ways in which leadership is operationalized in for-profit and non-profit organizations, governments and boards.

LDR 615. Leadership in Contemporary Organizations. 3 Hours.
PR: LDR 501. The objective of this course is to facilitate workplace case studies and simulations where leaders, followers and context are all incorporated to manage conflict and change in organizations.
LEGAL STUDIES

LEGS 610. Law and the Legal System. 3 Hours.
Introduction to the law and its functions, the structure of the U.S. legal system, and the actors in the legal system.

LEGS 620. Researching the Law. 3 Hours.
Provides experience in locating and interpreting primary and secondary legal authority; federal and state constitutions; agency rules and regulations.

LEGS 640. Administrative Legal Process. 3 Hours.
Explores the role of administrative agencies in making law.

LEGS 645. Judicial Legal Process. 3 Hours.
Introduction to the structure of the U.S. judicial system. Focuses on how beliefs and social conditions influenced the development of the United States Constitution, the institution of judicial review, and judicial participation in governing.

LEGS 650. The Legislative Process. 3 Hours.
Examines how legislation develops and implications of recent legislative reform enactments and proposals.

LEGS 660. Dispute Resolution. 3 Hours.
Theoretical and practical examination of dispute resolution processes and assessment of the appropriateness of dispute resolution for particular legal disputes.

LEGS 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

LEGS 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

LEGS 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

LEGS 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

LEGS 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U).

LEGS 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use of the University's facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is P/F; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.

LEGS 700. Research Capstone. 3 Hours.
Research activities leading to a scholarly project applying and extending knowledge gained across the master of legal studies program coursework.

LEGS 720. Media and the Law. 3 Hours.
Survey of mass media and the law, implications of existing law, and proposed changes.

LEGS 730. Employment Law. 3 Hours.
Explores law related to workers compensation, disability insurance, affirmative action/equal opportunity policies, workplace, workplace discrimination and related federal and state statutes.

LEGS 731. State, Corporate, and Organizational Fraud. 3 Hours.
PR: MLS major or consent. Typologies of fraud and white-collar crime in occupational, governmental, corporate, financial, technical, and professional fields. Examination of compliance in healthcare settings from providers to suppliers; governmental agencies relating to homeland security including computer-cyber crime, and; prosecution via the criminal justice system and civil systems.

LEGS 750. Criminal Law and Procedure. 3 Hours.
Covers investigative stages of search and seizure, interrogation, and identification. Familiarizes students with prosecutorial stages and evidentiary issues.

LEGS 751. Punishment and Corrections. 3 Hours.
Introduction to certain bodies of law in the areas of punishment and corrections, including statutory codes, common law doctrines, and executive agency rules. Focuses on the application of rules that govern those who enforce our system of punishment.

LEGS 752. Homeland Security. 3 Hours.
Introduction to current public management policies and issues relevant to security of the United States. Provides both traditional students and current practitioners with a broad, up-to-date, multidisciplinary overview of homeland security as a contemporary subject of intense interest and inquiry, and as an emerging academic discipline.
LEG3 753. Immigration and Border Security. 3 Hours.
This course provides knowledge of the history of immigration to the United States, the current state of affairs and the legal implications of the legal system.

LEG3 754. Military Justice. 3 Hours.
Survey and analysis of U.S. Military Justice practice as experienced by Judge Advocates and civilian practitioners. Emphasizes unique issues that arise in the military context.

LEG3 760. Administrative Ethics. 3 Hours.
Analysis of ethical issues in the law and the administrative decision making process.

LEG3 770. Healthcare Law. 3 Hours.
Examines law and health care regulations related to provision of healthcare and issues related to liability.

LEG3 771. Legal Issues for Adults in Care. 3 Hours.
PR: MLS major or consent. Overview of all areas of the law which concern adult care such as living facilities, insurance, estate planning, probate, age discrimination, durable powers of attorney, right-to-die issues, trusts, disability planning, long-term care, guardianship, Social Security, and elder abuse.

LEG3 780. Constitutional Law. 3 Hours.
Examines the concept of constitutionalism, the relationships between the branches of government and between national and state governments, and the role of the Constitution in protecting individual liberties.

LEG3 793. Special Topics. 1-6 Hours.
PR: Consent. advanced topics that are not covered in regularly scheduled courses.

LINGUISTICS

LING 501. Structure of Spanish. 3 Hours.
Description of phonological or grammatical systems of Spanish, with emphasis on contrastive analysis (Spanish/English) and applied linguistics.

LING 511. English as a Second Language Linguistics. 3 Hours.
PR: LING 101 or LING 311. Analysis of English structure for the purpose of teaching it to non-native speakers. Includes identification of problematic aspects and procedures for teaching them effectively.

LING 512. Applied Linguistics. 3 Hours.
PR: LING 311 and prior second language study. Study of the application of linguistic analysis in the areas of language acquisition, instruction, and use.

LING 513. History of Linguistics. 3 Hours.
PR: LING 311 or Consent. Development of linguistics from Greeks and Romans to contemporary researchers with concentration on major linguists and schools of the nineteenth and twentieth centuries.

LING 514. Sociolinguistics. 3 Hours.
PR: LING 101 or LING 311. Linguistic study of geographical and social variation in languages; effects of regional background, social class, ethnic group, sex, and setting; outcomes of conflict between dialect and between languages.

LING 516. Discourse Analysis. 3 Hours.
PR: LING 101 or equivalent. A study of the structural properties of spoken and written texts and how they are related to the contextual factors involved in text production.

LING 517. Cognitive Foundations of Language. 3 Hours.
An investigation of the ways in which generative linguistics fits into the broader intellectual, historical and ideological mosaic of the cognitive sciences.

LING 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of linguistics. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading may be P/F.).

LING 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

LING 592. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

LING 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

LING 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

LING 595. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.
LING 610. Methods of Research. 3 Hours.
This class covers basic research skills and professional norms in the field of linguistics. Topics include: finding, reading, and evaluating primary research; research questions and research design; formulating and testing hypotheses; basic quantitative issues in the social sciences; and applying to conferences, graduate programs, and jobs.

LING 611. Advanced Phonology. 3 Hours.
PR: LING 411. The form of phonological rules and their organization within a grammar, the structure of phonological representations, and the role of language universals in models of language acquisition.

LING 612. Advanced Syntax. 3 Hours.
PR: LING 412 or Consent. Examination and discussion of theoretical issues in generative-transformational syntax. Focus on specific proposals advanced within the framework of Government- Binding Theory.

LING 613. English as a Second Language Phonetics. 3 Hours.
PR: LING 311. Analysis of American English phonetics including sound segments, stress, rhythm, intonation, and positional variants. Techniques and practice offered for teaching pronunciation to non-native speakers.

LING 614. Psycholinguistics. 3 Hours.
PR: LING 311 or Consent. Provides an insight into the many areas of psycholinguistics study, including language acquisition, sentence processing, animal communication, dichotic listening, aphasia, and semantics.

LING 615. Language Change and Reconstruction. 3 Hours.
PR: LING 311 or equivalent. Exploration of the mechanisms of language change, theories of diachronic linguistics, and techniques for reconstructing unattested languages; concentration on the Indo-European family and its history.

LING 616. Language Typology. 3 Hours.
PR: LING 101 or LING 311 or equivalent. Study of the uniformity and diversity of the world's languages. Which characteristics of human languages are universal and which are subject to cross-linguistic variation. An overview of the main results and methodology of typological research.

LING 620. Spanish Prosody. 3 Hours.
PR: LING 501. The goal of this course is to familiarize students with the prosodic aspects of the Spanish language including the suprasegmental properties of stress, rhythm and intonation. The course will cover their phonetic descriptions in multiple dialects and their relevance in communication for both L1 and L2 Spanish speakers. Theoretical approaches and article discussions will be combined with practical exercises.

LING 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of linguistics. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience. (Grading will be P/F.).

LING 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

LING 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

LING 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

LING 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

LING 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

LING 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

LING 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper, or equivalent scholarly project, or a dissertation. (Grading may be S/U.).

LING 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

LING 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use of the University's facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is P/F; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.
LING 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

MATHEMATICS

MATH 521. Numerical Analysis. 3 Hours.
General introduction to traditional areas of numerical analysis, emphasizing underlying mathematical theory and computational experience.

MATH 522. Numerical Solution of PDE. 3 Hours.
PR: MATH 261 and computer language. Finite difference and finite element methods for elliptic, parabolic, and hyperbolic problems. Study of properties such as consistency, convergence, stability, conservation, and discrete maximum principles.

MATH 534. Modern Algebra For Teachers 2. 3 Hours.
PR: MATH 341 or MATH 533. Further investigation of algebraic structures begun in MATH 533. (Emphasis on topics helpful to secondary-school mathematics teachers.) Topics include Sylow theory, Jordan-Holder Theorem, rings and quotations, field extensions, Galois theory and solution by radicals.

MATH 535. Foundations of Geometry. 3 Hours.
PR: MATH 251 (Designed especially for secondary mathematics teachers; others admitted with departmental approval obtained before registration.) Incidence geometrics with models; order for lines and planes; separation by angles and by triangles; congruence; introduction to Euclidean geometry; geometry.

MATH 541. Modern Algebra 1. 3 Hours.
PR: Adequate background in abstract algebra including group, ring, and field theory, and adequate background in linear algebra. Focuses on Galois theory - the study of roots of single variable polynomials - an application of group theory to the study of field extensions. Covers group actions, Sylow theorems, solvable groups, field extensions, splitting fields, Galois group of a polynomial, fundamental theorem of Galois theory, solvability by radicals, and further topics if time permits.

MATH 543. Linear Algebra. 3 Hours.
PR: MATH 441. Review of theory of groups and fields; linear vector spaces including the theory of duality; full linear group; bilinear and quadratic forms; and theory of isotropic and totally isotropic spaces.

MATH 545. Number Theory 1. 3 Hours.
Introduction to classical number theory covering such topics as divisibility, the Euclidean algorithm, Diophantine equations, congruencies, primitive roots, quadratic residues, number-theoretic functions, distribution of primes, irrationals, and combinatorial methods. Special numbers such as those of Bernoulli, Euler, and Stirling.

MATH 551. Real Variables 1. 3 Hours.
Development of measure theory, Lebesgue integral, function spaces and Lebesgue differentiation.

MATH 555. Complex Variables 1. 3 Hours.
PR: MATH 451. Number systems, the complex plane and its geometry. Holomorphic functions, power series, elementary functions, complex integration, representation theorems, the calculus of residues, analytic continuation and analytic function, elliptic functions, Holomorphic functions of several complex variables.

MATH 560. Introduction to Dynamical Systems and Applications. 3 Hours.
This course is an introduction to the theory of dynamical systems, whose goal is to study the behavior of systems with known laws of evolution. We cover basic topics including fixed points, periodic orbits, linearization, local and global behavior of solutions, bifurcations, and chaos. The theory will be accompanied by applications from biology, chemistry, and physics.

MATH 563. Mathematical Modeling. 3 Hours.
Survey of selected mathematical models used in the physical and biological sciences, in economics, and operations research. Both deterministic and stochastic models are included, as well as the mathematical methods used for analytic and computational analysis.

MATH 564. Intermediate Differential Equations. 3 Hours.

MATH 566. Intermediate Partial Differential Equations. 3 Hours.
The goal of this course is to study the behavior of mathematical models arising from applied sciences with known boundary and initial conditions. Basic topics include first and second order equations, well-posedness, method of characteristics, energy methods, maximum principle, Green's functions, Duhamel's principle and shock waves. Knowledge of ordinary differential equations is necessary for successful completion of this course.

MATH 576. Advanced Calculus. 3 Hours.
per semester. PR: MATH 261. Primarily for engineers and scientists. Functions of several variables, partial differentiation, implicit functions, transformations; line surface and volume integrals; point set theory, continuity, integration, infinite series and convergence, power series, and improper integrals.
MATH 568. Advanced Calculus. 3 Hours.
per semester. PR: MATH 567. Primarily for engineers and scientists. Functions of several variables, partial differentiation, implicit functions, transformations; line surface and volume integrals; point set theory, continuity, integration, infinite series and convergence, power series, and improper integrals.

MATH 571. Combinatorial Analysis 1. 3 Hours.
PR: One year of calculus. Permutations, combinations, generating functions, principle of inclusion and exclusion, distributions, partitions, compositions, trees and networks.

MATH 573. Graph Theory. 3 Hours.
Basic concepts of graphs and digraphs, trees, cycles and circuits, connectivity, traversability, planarity, colorability, and chromatic polynomials. Further topics from among factorization, line graph, covering and independence, graph matrices and groups, Ramsey theory, and packing theory.

MATH 578. Applied Discrete Mathematics. 3 Hours.
PR: MATH 375 or MATH 378 or MATH 341 or MATH 343 or MATH 283. Topics may include combinatorial optimization, applied coding theory, integer programming, linear programming, matching, and network flows.

MATH 581. Topology 1. 3 Hours.
PR: (MATH 541 or MATH 551 or MATH 560) with a minimum grade of B-. A detailed treatment of topological spaces covering the topics of continuity, convergence, compactness, and connectivity; product and identification space, function spaces, and the topology in Euclidean spaces.

MATH 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of mathematics. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also provide a mechanism for students not on assistantships to gain teaching experience. Grading will be P/F.

MATH 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

MATH 592. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

MATH 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

MATH 595. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

MATH 631. RUME 1: Introduction to Undergraduate Mathematics Education Research. 3 Hours.
PR: (MATH 451 and MATH 452) or MATH 551 or MATH 567. Research literature will provide background for investigating issues in knowing and learning undergraduate mathematics. Students will be introduced to research design, data collection, and qualitative analysis related to investigating aspects of learning undergraduate mathematics.

MATH 641. Modern Algebra 2. 3 Hours.
PR: MATH 545. Concepts from set theory and the equivalence of the axiom of choice. Zorn's Lemma and the Well-Ordering Theorem; a study of the structure of groups, rings, fields, and vector spaces; elementary factorization theory; extensions of ring and fields; modules and ideals; and lattices.

MATH 645. Number Theory 2. 3 Hours.
PR: MATH 305. Introduction to classical number theory covering such topics as divisibility, the Euclidean algorithm, Diophantine equations, congruences, primitive roots, quadratic residues, number-theoretic functions distribution of primes, irrationals, and combinatorial methods. Special numbers such as those of Bernoulli, Euler, and Stirling.

MATH 651. Real Variables 2. 3 Hours.
PR: MATH 551. A development of the Lebesgue integral, function spaces and differentiation, complex measures, the Lebesgue-Radon-Nikodym theorem.

MATH 681. Topology 2. 3 Hours.
PR: MATH 581. A detailed treatment of topological spaces covering the topics of continuity, convergence, compactness, and connectivity; product and identification space, function spaces, and the topology in Euclidean spaces.

MATH 683. Set Theory and Applications 1. 3 Hours.
PR: (MATH 541 or MATH 551 or MATH 581) with a minimum grade of B-. The course concentrates on the typical methods of set theory, transfinite induction, and Zorn's Lemma with emphasis on their applications outside set theory. The fundamentals of logic and basic set theory are included.

MATH 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of mathematics. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience. (Grading will be S/U.)

MATH 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.
MATH 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

MATH 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

MATH 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

MATH 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

MATH 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

MATH 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project or a dissertation. (Grading may be S/U).

MATH 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

MATH 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use of the University's facilities, and participate in academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is P/F; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.

MATH 732. RUME 2: Learning Theories. 3 Hours.
PR: MATH 631. Students will investigate learning theories related to undergraduate mathematics education research and use these learning theories to formulate research questions and to collect and analyze data.

MATH 733. RUME 3: Advanced Learning Theories. 3 Hours.
PR: MATH 732. Students will expand their understanding of learning theories related to undergraduate mathematics education research and their ability to use these learning theories to formulate research questions and to collect and analyze data.

MATH 745. Analytic Number Theory 1. 3 Hours.
PR: MATH 555 and MATH 645. Selected topics in analytic number theory such as the prime number theorem, primes in an arithmetical progression, the Zeta function, the Goldbach conjecture.

MATH 746. Analytic Number Theory 2. 3 Hours.
PR: MATH 745. Selected topics in analytic number theory such as the prime number theorem, primes in an arithmetical progression, the Zeta function, the Goldbach conjecture.

MATH 747. Advanced Topics in Modern Algebra. 1-6 Hours.
This course will cover selected topics of modern algebra as an extension of the basic material covered in the 541-641 sequence. The topic will be selected from algebraic number theory, noncommutative rings and modules, representation theory, algebraic model theory, homological algebra. (May be repeated for credit with consent.)

MATH 751. Functional Analysis 1. 3 Hours.
PR: MATH 551. A study of Banach and Hilbert spaces; the Hahn-Banach theorem, uniform boundedness principle, and the open mapping theorem; dual spaces and the Riesz representation theorem; Banach algebras; and spectral theory.

MATH 752. Functional Analysis 2. 3 Hours.
PR: MATH 751. A study of Banach and Hilbert spaces; the Hahn-Banach theorem, uniform boundedness principle, and the open mapping theorem; dual spaces and the Riesz representation theorem; Banach algebras; C* algebras; spectral theory.

MATH 757. Theory of Partial Differential Equations 1. 3 Hours.

MATH 758. Theory of Partial Differential Equations 2. 3 Hours.

MATH 771. Matroid Theory 1. 3 Hours.
PR: (MATH 541 or MATH 543) and (MATH 571 or MATH 573). Independent sets, circuits, bases, rank functions, closure operators and close sets, other axiom systems, geometric representations, duality and minors, linear and algebraic representability, connectivity, basics of partial ordered sets, flats and lattices, relationship between lattices and matroids.
MATH 772. Matroid Theory. 2 Hours. PR: MATH 771. Matroid representability, representability over finite fields, algebraic matroids, matroid constructions, higher connectivity of matroids, binary and ternary matroids, the splitter theorem and its applications, submodular functions, matroid intersection theorem, matroids in combinatorial optimizations.

MATH 773. Advanced Topics in Graph Theory. 3 Hours. PR: MATH 573. (May be repeated for credit toward graduation.) Topics may include: Algebraic graph theory, random graph theory, extremal graph theory, topological graph theory, and structural graph theory.

MATH 777. Advanced Topics in Combinatorics. 3 Hours. PR: MATH 571. Topics may include: Combinatorics on finite sets, probabilistic methods in combinatorics, enumerations, Polya Theory, combinatorial matroid theory, coding theory, combinatorial identities, infinite combinatorics, transversal theory, and matroid theory. (May be repeated for credit with consent.)

MATH 780. Seminar in Topology. 1-12 Hours.

MATH 783. Set Theory and Applications. 3 Hours. PR: MATH 683. The course elaborates on the applications of the transfinite induction, and combines recursion methods with other elements of modern set theory, including the use of additional axioms of set theory, introduction to the forcing method.

MATH 790. Teaching Practicum. 1-3 Hours. PR: Consent. Supervised practice in college teaching of mathematics. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading will be S/U.)

MATH 791. Advanced Topics. 1-6 Hours. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

MATH 792. Directed Study. 1-6 Hours. Directed study, reading, and/or research.

MATH 793. Special Topics. 1-6 Hours. A study of contemporary topics selected from recent developments in the field.

MATH 795. Independent Study. 1-9 Hours. Faculty supervised study of topics not available through regular course offerings.

MATH 796. Graduate Seminar. 1-3 Hours. PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

MATH 797. Research. 1-9 Hours. PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or dissertation. (Grading may be S/U.)

MATH 930. Professional Development. 1-6 Hours. Professional development courses provide skill renewal or enhancement in a professional field or content area (e.g., education, community health, geology). These tuition-waived continuing education courses are graded on a pass/fail grading scale and do not apply as graduate credit toward a degree program.

PHILOSOPHY

PHIL 501. Metaphysics. 3 Hours. Traditional problems associated with universals and particulars, reality and experiences, causality, space and time, matter and mind, the nature of the self, etc.

PHIL 531. Health Care Ethics. 3 Hours. Topics: Clinician-patient relationship, life-sustaining treatment, physician-assisted death, physician/nurse conflicts, confidentiality, research, reproductive technology, abortion, maternal/fetal conflicts, genetics, rationing, and access.

PHIL 590. Teaching Practicum. 1-3 Hours. PR: Consent. Supervised practice in college teaching of philosophy. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain college teaching experience. (Grading may be S/U.)

PHIL 591. Advanced Topics. 1-6 Hours. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

PHIL 593. Special Topics. 1-6 Hours. A study of contemporary topics selected from recent developments in the field.

PHIL 594. Seminar. 1-6 Hours. Special seminars arranged for advanced graduate students.
PHIL 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

PHIL 692. Directed Study. 1-6 Hours.
PR: Consent. Directed study, reading, and/or research.

PHIL 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

PHIL 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

PHIL 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

PHIL 696. Graduate Seminar. 1-3 Hours.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

PHIL 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U).

PHIL 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

PHIL 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking course work credit but who wish to meet residency requirements, use of the University's facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department's 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is S/U; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.